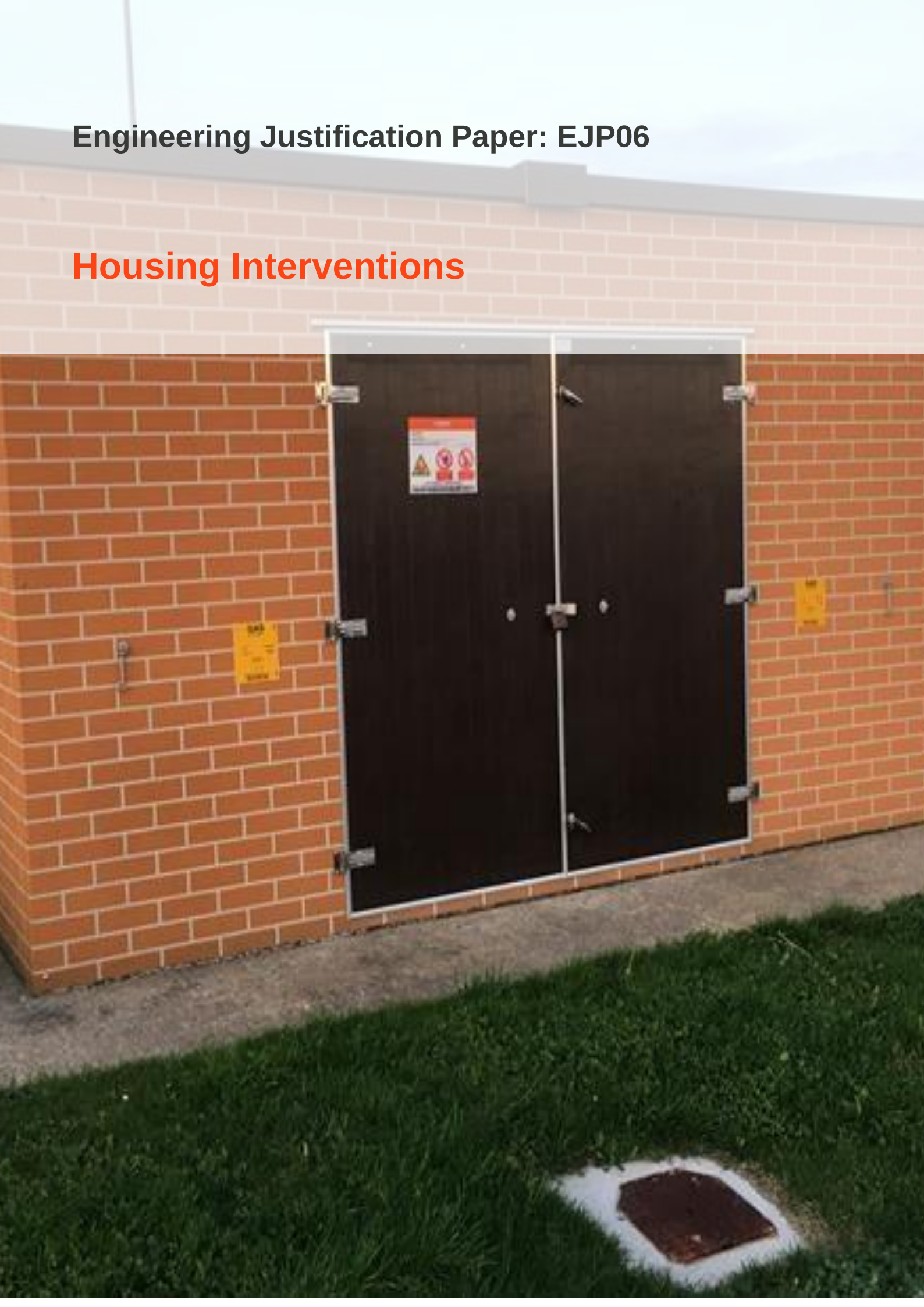
Engineering Justification Paper: EJP06

Housing Interventions



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Contents

Table of Figures

Table of Tables

1 Summary Table

Name of Project	Housing Interventions		
Primary Investment Driver	Asset Health- Safety		
Project Initiation Year	2026		
Project Close Out Year	2031		
Total Installed Cost Estimate (£)	RIIO-3 work plan: [Cost Data]		
Cost Estimate Accuracy (%)	±5%		
Project Spend to date (£)	Nil		
Current Project Stage Gate	This is a 5-year rolling programme of reactive maintenance.		
Reporting Table Ref	5.01 - Housing Interventions >7bar NTS Offtakes & PRS 5.04 – Housing Interventions <7bar		
Outputs included in RIIO-3 Business Plan	Yes- volumes and costs included in above tables		
Proposed Regulatory Treatment for RIIO-3 work plan.	Other Capex		
Spend apportionment for RIIO-3 work plan	**RIIO-2**	**RIIO-3**	**RIIO-4**
	[Cost Data]	[Cost Data]	[Cost Data]

Table 1: Summary Table

This investment case does not satisfy the criteria for late competition or early competition and pursuing these activities would not be in the interests of the customer. We recognise the benefits that competition can bring to customers through efficiency and innovation. We continue to challenge ourselves as a business to ensure that we are harnessing competitive forces where they can provide these benefits. For specific detail on how we have assessed competition, please see Chapter 6 of the Workforce and Supply Chain Strategy (Appendix 17).

All prices are pre-efficiency and are listed in 2023/24 prices, unless otherwise stated.

2 Executive Summary

We have 10,423 housings with approximately 12% of asset stock on above 7 bar (>7 bar) sites with the remaining 88% on below 7 bar (<7 bar) sites.

The investment driver for housing interventions is to ensure that the structure meets building compliance standards (safety), provides noise & explosion protection to operational staff and the public (safety), reduces the likelihood of asset deterioration of housed assets from exposure to the elements, and secures the gas carrying assets from interference from third parties.

Housings protect our gas assets from deterioration and damage, but there is no direct correlation between housing deterioration and service-risk. We have a good understanding of the condition grade of our housings and have used this to infer a total work volume in RIIO-3 to hold asset health stable, using a range of intervention modes. For this reason, a CBA has not been used to inform our preferred programme selection.

Risks are identified by routine operational visits, and we intervene in housing in the worst asset condition. It is not possible to forecast the types of interventions required, but current condition grades provide an indication of the likely volume as part of our ongoing inspection programme.

In RIIO-3 we are forecasting a significant reduction in the volume and spend on housings relative to RIIO-2, based on our current understanding of housing condition. The increased workload in RIIO-2 was driven by the Health & Safety Executive (HSE) mandated Governor Improvement Programme (GIP)[1], in RIIO-2 that was motivated by our legal obligation to comply with the DSEAR[2] on our <7bar housings.

The RIIO-2 & proposed RIIO-3 programme is summarised below:

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Table 2: Summary of RIIO-2 & RIIO-3 volumes and costs for Housings (23/24 price base, pre-efficiency)

[1] [Commercially Sensitive Information Redacted]

[2] Dangerous Substances and Explosive Atmospheres Regulations 2002.

3 Introduction

This investment case has been derived from a review of our housing data to inform a likely future intervention rate based on the volume of housings by condition grade. We review workload volume and the associated spend per condition grades as part of our options assessment. We have used a blended unit rate per housing intervention, multiplied by the volume of housing interventions to inform the total forecast investment required, on the assumption that the complexity and work-mix will remain consistent across RIIO-2 and RIIO-3.

We have not derived a Cost Benefit Analysis (CBA) to inform decision making, because there is generally no immediate or explicit correlation of housing deterioration and service risk; as such we have proposed to remove this asset from NARM. This is consistent with the proposed approach to non-CBA papers discussed and agreed with Ofgem during our bilateral in September 2024. Our asset strategy is to continue our rolling housing inspection programme and to intervene on our highest priority housings when the needs are identified. Further information on our inspection programme is discussed in Section 4.

4 Equipment Summary

We have 10,423 housing assets located on both >7bar and <7bar operational sites. The above7 bar assets are sub-divided into Offtakes and Pressure Reduction System (PRS) sites. The below 7 bar sites are sub-divided into pressures tiers based upon inlet pressure: medium pressure (MP), or intermediate pressure (IP). They are also categorised based upon the customers they feed; large industrial and commercial (I&C) customers are fed by I&C governors and regions of small industrial, commercial and domestic customers are fed by district governors. A summary of the asset base across the four networks can be seen in Tables 3 and 4 below.

Above 7 Bar		Housings		
		Offtakes	PRS	Grand Total
Network	EE	[No. of sites]	[No. of sites]	[No. of sites]
	NL	[No. of sites]	[No. of sites]	[No. of sites]
	NW	[No. of sites]	[No. of sites]	[No. of sites]
	WM	[No. of sites]	[No. of sites]	[No. of sites]
Grand Total		[No. of sites]	[No. of sites]	[No. of sites]

Table 3: > 7 bar Housings Asset Base – [corporate system] (August 2024)

Below 7 Bar		Housings				
		IP District	IP I&C	MP District	MP I&C	Grand Total
Network	EE	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]
	NL	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]
	NW	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]

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Below 7 Bar		Housings				
		IP District	IP I&C	MP District	MP I&C	Grand Total
	WM	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]
Grand Total		[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]	[No. of sites]

Table 4: < 7 bar Housings Asset Base – [corporate system] data (August 2024)

A total of [Cost Data] will be invested in 1786 housing interventions in RIIO-2. Table 2, in the executive summary provides further detail.

Housing assets protect the equipment found within these installations e.g. pressure regulating systems (PRS), electrical, instrumentation and telemetry equipment. Housings provide a range of benefits to the assets themselves (i.e. security, weather protection). Installed housings must also provide appropriate noise attenuation, ventilation and explosive relief, to protect our operators, sites visitors and the public.

Housings are typically either a purpose-built brick building or room, or kiosks constructed of glass reinforced plastic (GRP). Buildings and kiosks are, by design, characterised by the presence of:

- A door or doors that allows entry and egress (either made of GRP or wood)
- A roof (either made of GRP or wood)
- Walls (number can vary depending on installation)
- Concrete foundation/base.

Figure 1: A typical brick housing

Figure 2: A typical GRP kiosk

Housings are typically constructed with provisions installed to limit the risk and impact of fire and explosion such as:

- Explosion relief roof and panels - safety mechanisms designed to control an explosion and minimise its capacity for damage and harm.
- Purpose-designed apertures to provide natural ventilation directly into atmosphere.
- Fire resistant material of construction and coating.

GRP housings are designed with a typical design life of 20 years, whilst brick housing have an expected design life of 50 years. Circa 90% of our housings are currently GRP-type.

Housing condition grades are assessed on a 1-5 scale as part of a routine inspection programme, completed every 6 years. A general site check is also carried out every 18 months. The definition of each of our health index score used within the inspection programme can be found in Table 5 below.

HI Score	Risk Description
HI 1 (New)	**New or as new condition.**
HI 2 (Good)	**Good condition- cosmetic repairs required** Structural Integrity Minor cosmetic damage only. No staining inside building. No water ingress. Roofs Lining intact, but signs of micro-cracking. No staining inside building. No water ingress. Doors Minor cosmetic damage only.
HI 3 (Fair)	**Fair condition- minor repairs required.** Structural Integrity Minor cracking / breakdown of wall structure. Small staining or cracking indicating slight water ingress. No security concern. Roofs Small damage to roof lining or coping. Small staining or cracking indicating slight water ingress. Doors Some damage, multiple cosmetic damage. Door hinges faulty / corroded. Door struggles to open / close, Integral locking mechanism stiff. No security concern.
HI 4 (Poor)	**Poor condition, severe deterioration/damage- major repairs required.** Material deterioration, intervention requires consideration. Structural Integrity Major cracking / breakdown of wall structure. Brickwork starting to become loose. Multiple patches of staining inside building - considerable water ingress. Potential security issues. Roofs Considerable damage to lining or coping. Multiple patches of staining inside building - considerable water ingress.

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HI Score	Risk Description
	Doors Considerable cracks and material breakdown. Frame movement when door is opened. Door does not close properly. Exit push bars have failed. Access only with additional effort.
HI 5 (Priority)	**Poor Condition, severe deterioration/damage- end of serviceable life, replacements required** End of serviceable life, intervention required. Structural Integrity Severe damage to structure. Severe water ingress - not secure. Safety concerns. Roofs Major damage to lining or coping. Large areas of staining inside building. Severe water ingress. Safety concerns. Risk of collapse. Unintended loading. Doors Severe cracking / material breakdown. Safety concerns. Security concerns. Access only with excessive effort.

Table 5: Explanation of Health Index (HI) scoring used by Painting and External Risk Assessment Survey

The following tables show the housing condition grades of all sites in August 2024. Approximately 70% of housing assets have a recorded condition grade 1-5 listed on [Corporate system]. For any housings without a condition grade, we assigned a condition grade assuming a proportional split based on the known condition grades.

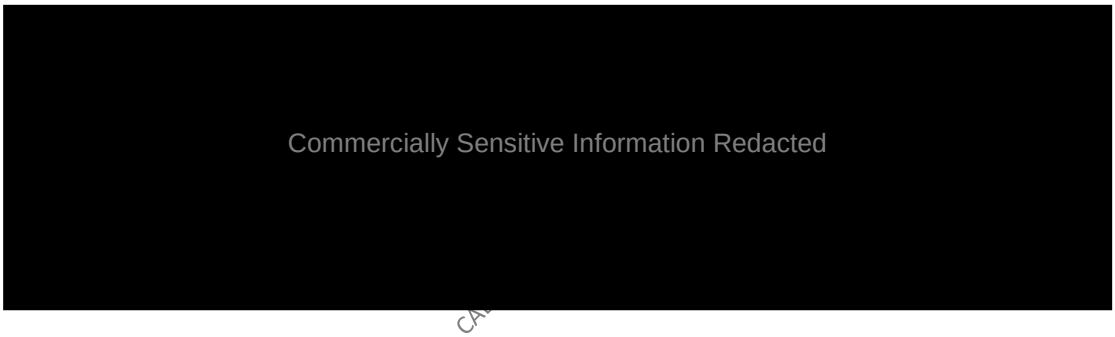

Table 6: Condition grades by network for > 7 bar PRS sites

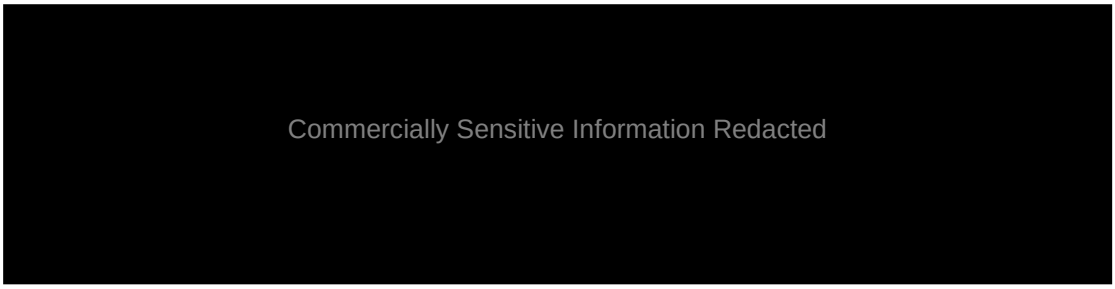

Table 7: Condition grades by network for > 7 bar offtakes sites

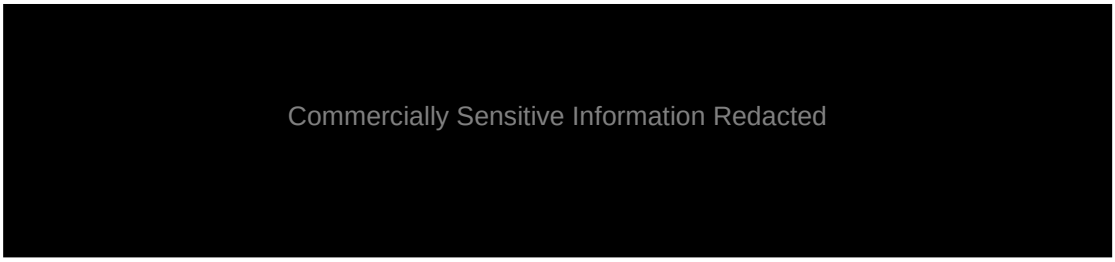

Table 8: Condition grades by network for <7 bar sites

The average condition grade at the beginning of RIIO-3 is estimated as [Condition Grade Data]. Refer to Section 10.1 for the forecast asset health condition grades at the end of RIIO-3 without intervention and as a result of the preferred option.

5 Problem/Opportunity Statement

5.1 Why are we doing this work

The investment driver for this investment case is the need to maintain asset health to ensure we comply with key legal obligations:

- Ensuring our housings provide a safe working environment for our employees, site visitors and the public in accordance with our obligations under the Health & Safety at Work Act 1974
- All housing assets must be designed, installed and maintained in accordance with DSEAR Dangerous Substances and Explosive Atmosphere Regulations (2002)[3] to ensure safety of the gas network and security of supply.

It is important that we manage and maintain our housing assets through effective inspection, and by carrying out remediation and replacement where necessary. In RIIO-3 we will continue our routine inspection and maintenance examination programmes, and we will need to intervene where risk is identified to maintain an operationally safe working environment and in accordance with regulatory requirements.

5.2 What happens if we do nothing?

[section redacted]

5.3 Key Outcomes and Understanding Success

5.3.1 How will we understand if the spend has been successful

[section redacted]

5.3.2 What is the outcome we want to achieve

[section redacted]

[3] DSEAR regulation 6(8) states: 'The employer shall, so far as is reasonably practicable, take the general safety measures specified in Schedule 1, subject to those measures being consistent with the risk assessment and appropriate to the nature of the activity or operation.' Schedule 1(2) states: 'Ensuring that the workplace is designed, constructed and maintained so as to reduce risk.'

5.4 Narrative real-life example of problem

[section redacted]

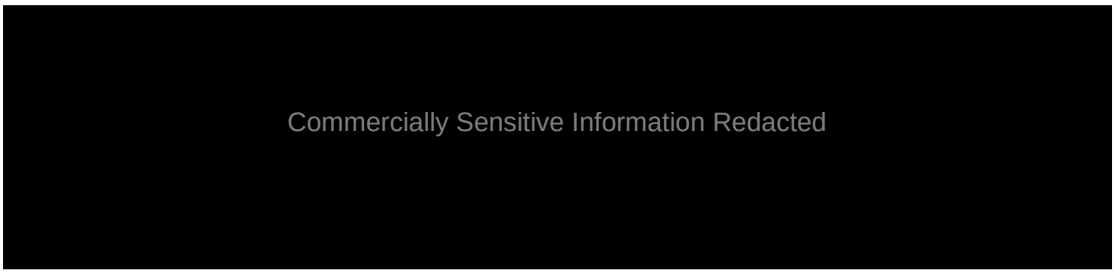

Figure 3: [Site location details] (before) Intervention

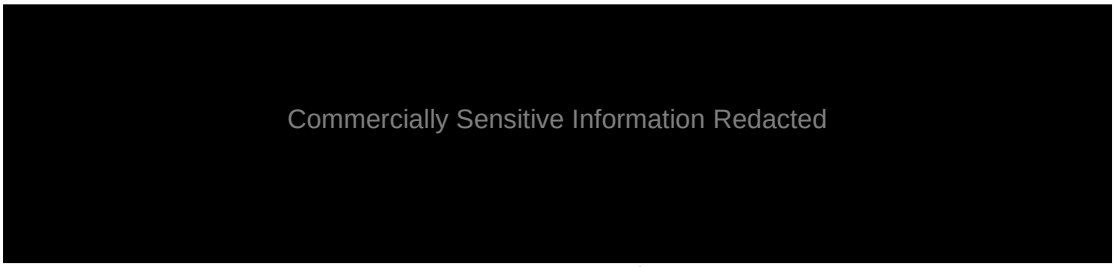

Figure 4: [Site location details] (After) Intervention

5.5 Project Boundaries

[section redacted]

6 Probability of Failure

[section redacted]

6.1 Probability of Failure Data Assurance

[section redacted]

7 Consequence of Failure

[section redacted]

7.1 Supply and Demand Scenario Discussion and Selection

[section redacted]

8 Options Considered

8.1 How we have structured this section

[section redacted]

8.2 Modes of Intervention

[section redacted]

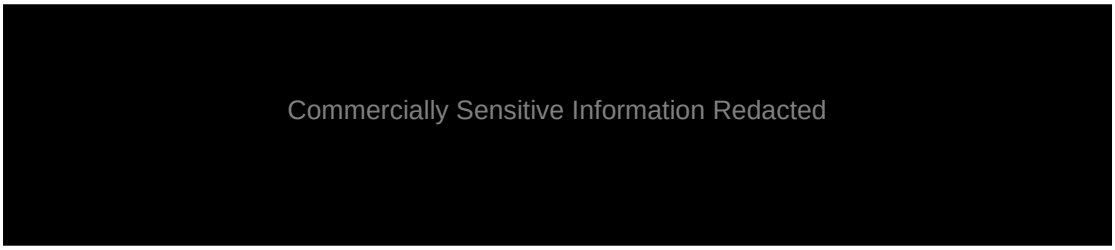

Table 9: Intervention modes considered.

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8.3 Timing Choices

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8.4 Options

[section redacted]

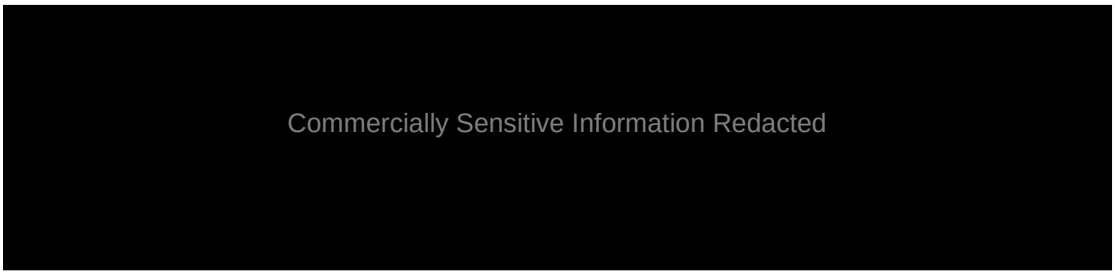

Table 10: Summary of Options considered

[section redacted]

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8.5 Option 0: Baseline: inspect and repair only

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Table 11: Option 0: summary table

[section redacted]

8.6 Option 1: Maintain asset health

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Table 12: Option 1 Summary

[section redacted]

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Table 13: Proposed intervention volumes for Option 1

[section redacted]

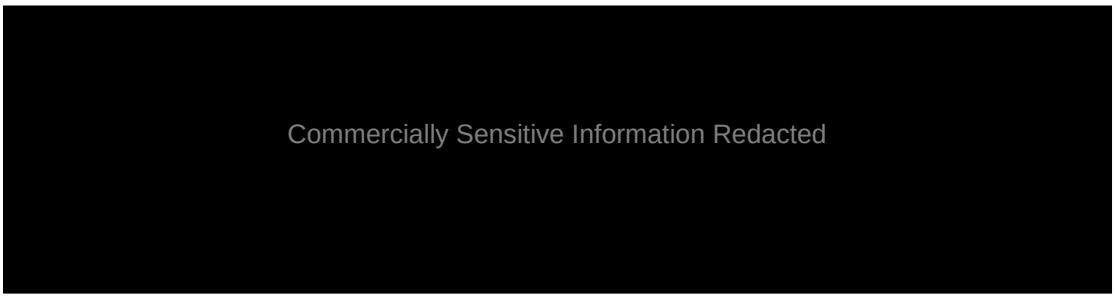

Table 14: Option 1: Spend profile (£m) for RIIO-3 > 7 bar sites (offtakes)

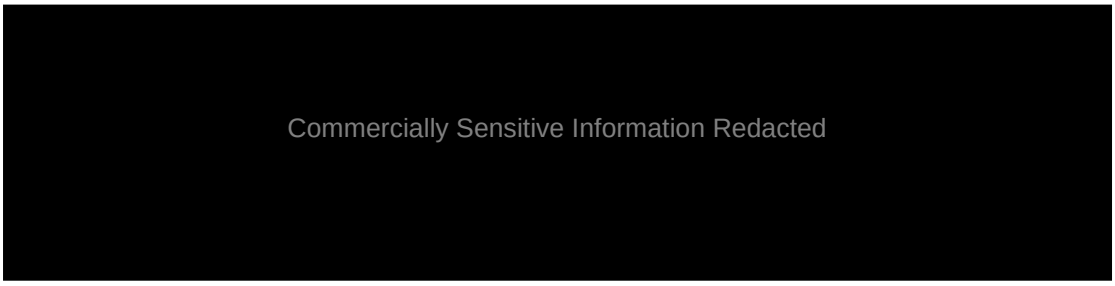

Table 15: Option 1: Spend profile (£m) for RIIO-3 > 7 bar sites (PRS)

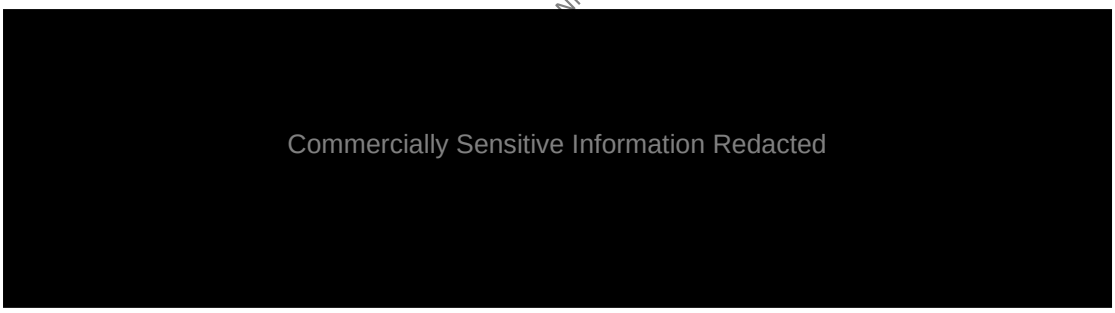

Table 16: Option 1: Spend profile (£m) for RIIO-3 < 7 bar sites

8.7 Option 2: Enhanced asset health: Intervene on condition grade 4 and 5.

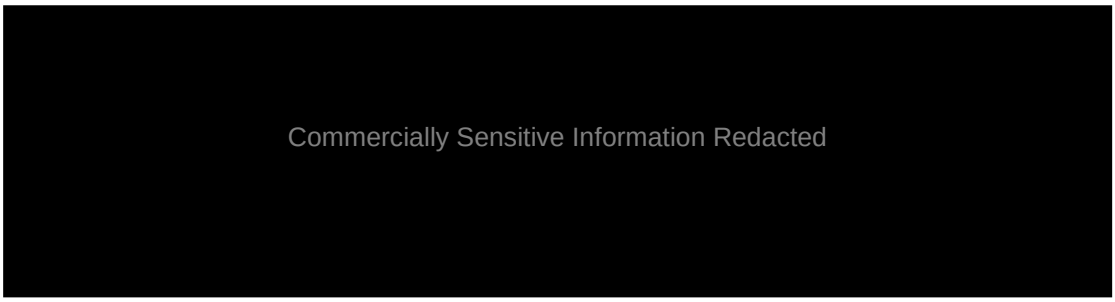

Table 17: Option 2 Summary

[section redacted]

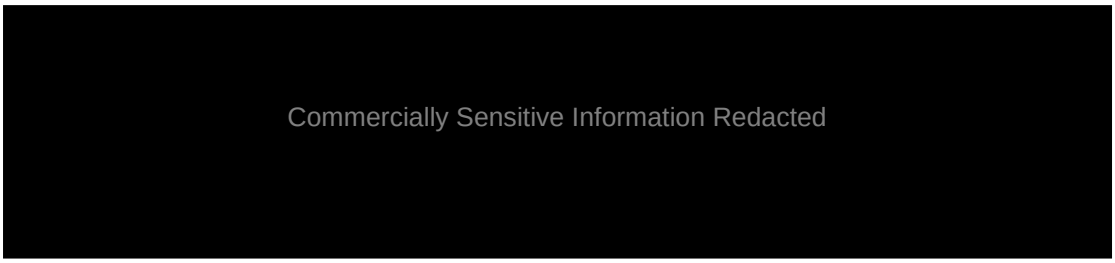

Table 18: Proposed intervention volumes for Option 2.

[section redacted]

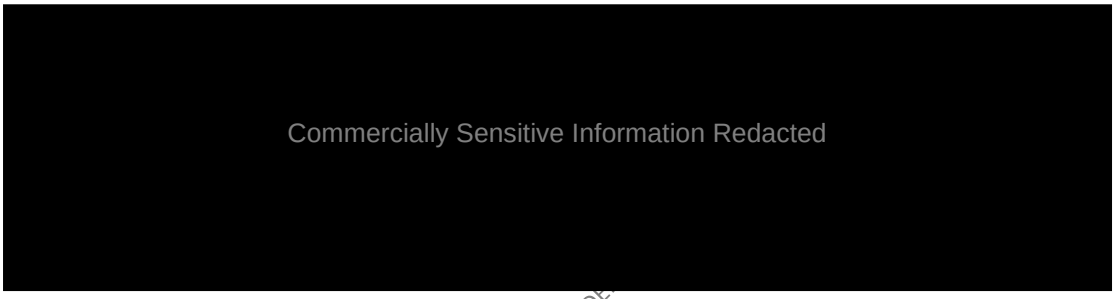

Table 19: Option 2: Spend profile (£m) for RIIO-3 > 7 bar sites (offtakes)

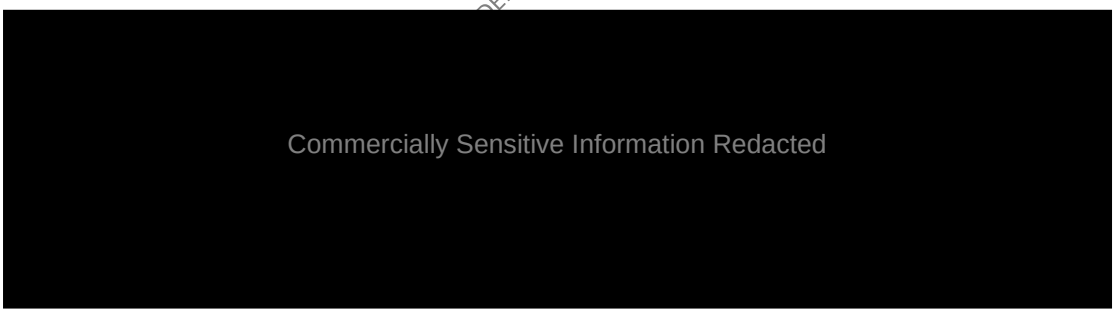

Table 20: Option 2: Spend profile (£m) for RIIO-3 > 7 bar sites (PRS)

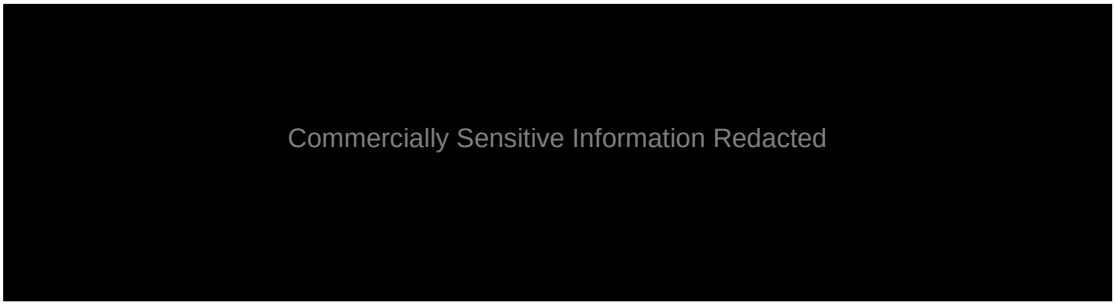

Table 21: Option 2: Spend profile (£m) for RIIO-3 < 7 bar sites

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8.8 Option 3: Further enhanced asset health

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Table 22: Option 3 Summary

[section redacted]

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Table 23: Proposed intervention volumes for Option 3.

[section redacted]

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Table 24: Option 3: Spend profile (£m) for RIIO-3 > 7 bar sites (offtakes)

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Table 25: Option 3: Spend profile (£m) for RIIO-3 > 7 bar sites (PRS)

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Table 26: Option 3: Spend profile (£m) for RIIO-3 < 7 bar sites

8.9 Options Technical Summary Table

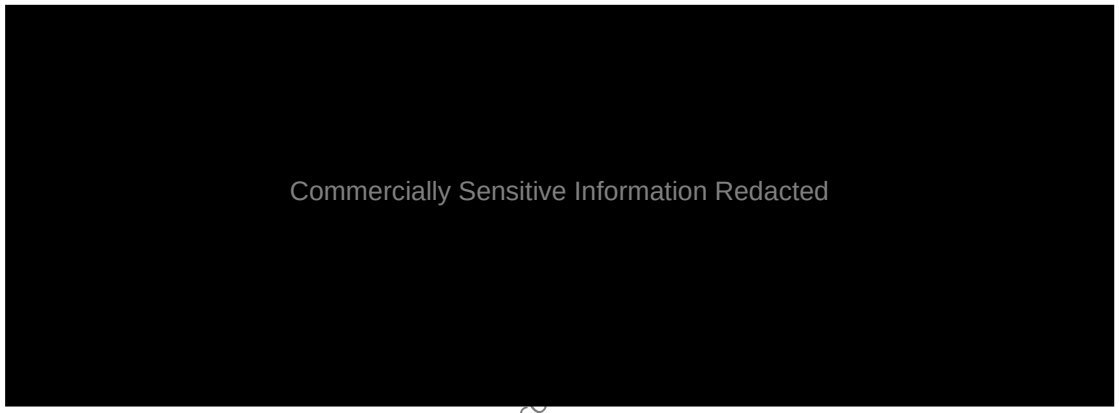

Table 27: Options Technical Summary Table

9 Business Case Outline and Discussion

9.1 Key Business Case Drivers Description

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9.2 Business Case Summary

[section redacted]

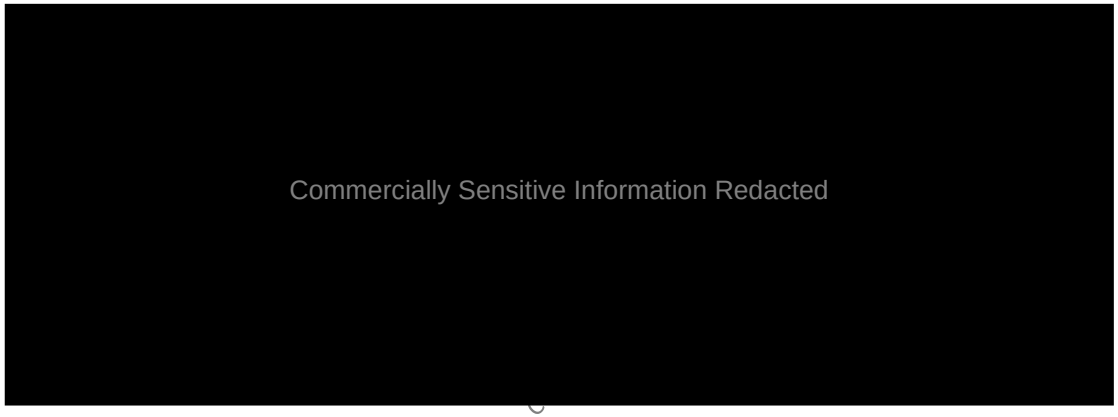

Table 28: Business Case Summary table

[section redacted]

10 Preferred Option Scope and Project Plan

10.1 Preferred Option

[section redacted]

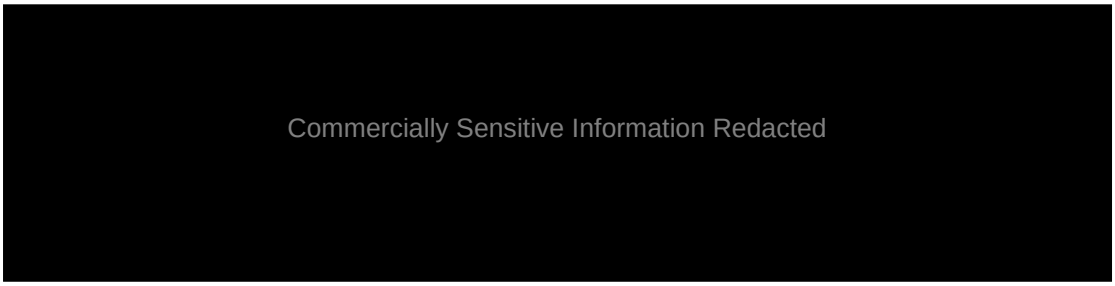

Table 29: Summary of average asset health condition grade

10.2 Asset Health Spend Profile

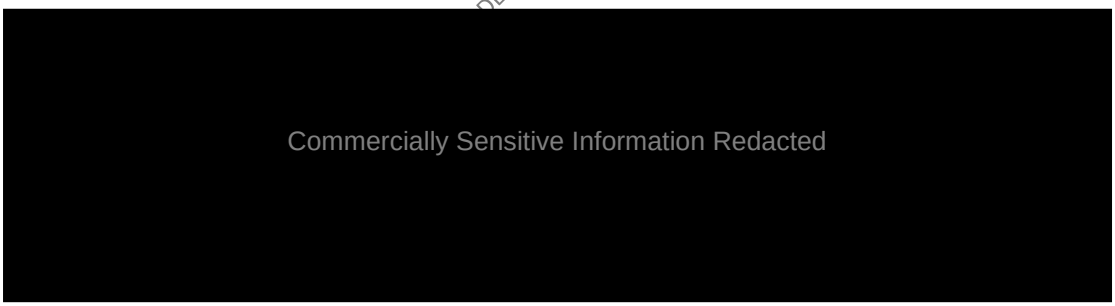

Table 30: RIIO-3 expenditure by Network (Housings): Preferred option

10.3 Investment Risk Discussion

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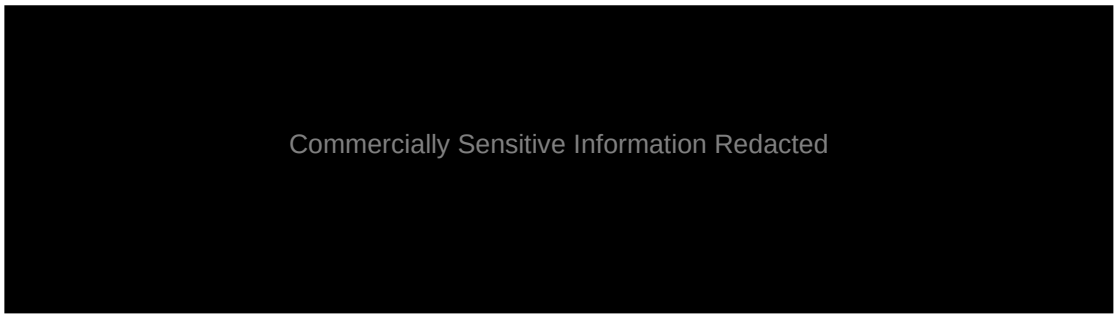

Table 31: Key business risks and their applicability to Housings investment case.

10.4 Project Plan

[section redacted]

10.5 Key Business Risks and Opportunities

[section redacted]

10.5.1 What changes to system operational or supply-demand scenario are required to alter the outcome of this justification paper

[section redacted]

10.6 Outputs included in RIIO-2 Plans

[section redacted]

11 Regulatory Treatment

[section redacted]

12 Glossary

Term	Definition
CBA	Cost Benefit Analysis
DSEAR	Dangerous Substances and Explosive Atmosphere Regulations
GIP	Governor Improvement Programme
GRP	Glass Reinforced Plastic
HSE	Health & Safety Executive
NAMS	Network Asset Management Strategy
PRS	Pressure Reduction System

Table 32: Glossary Table