

Engineering Justification Paper

CPM7708 Bridgend (Dundee IPMP)

Version: Final

Date: December 2019

Classification: Highly Confidential



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2 Introduction

SGN anticipates development to result in a system capacity failure in Blairgowrie, thus, reinforcement has been identified within the Perth - Blairgowrie MP system. This project is part of a wider programme of reinforcement associated with the RIIO-GD2 Business Plan Appendix covering Capacity Management.

2.1 General Background

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

Link: [Gas Transporters Licence – Standard Conditions](#)

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

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

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

2.2 Site Specific Background

Development within the Dundee Grid is covered by the Perth and Kinross Local Development Plan which presents the strategy for directing growth for the next 10-20 years.

The driver(s) for this reinforcement project are the Local Development Plan (LDP) sites located within the Perth - Blairgowrie MP system.

The Perth and Kinross Local development Plan has allocated sites to develop approximately 1300 homes in the region of the Perth – Blairgowrie MP system, 500 within Scone and a further 500 in Blairgowrie.

The Perth - Blairgowrie MP system is particularly sensitive to new demand around Blairgowrie. This area is at the network extremity, while energised by Perth Bridge DPG with support from Balgray DPG, the pressure loss along the significant length of MP mains presents a capacity issue.

3 Equipment Summary

The Dundee IPMP Grid covers Dundee and surrounding towns and villages in Angus and Perth & Kinross. The Balgray National Offtake supplies the Dundee IP system at 7.0 bar and is the principle supply to the Dundee Grid.

The IP system energises the integrated Perth – Carnoustie MP system at 2.0 bar via Balgray and Waterybutts DPGs. Additional gas is supplied from the Careston National Offtake via Westerton DPG at 2.0 bar from the north east, and the Perth (Auchtermuchty) TRS via Perth Bridge DPG at 2.0 bar from the south west.

Security

4 Problem Statement

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

New connections to SGN's networks reduce available capacity. It is necessary to reinforce or elevate pressures to increase capacity in the system when pressures are predicted to fall below minimum acceptable levels.

In the case of the Perth - Blairgowrie MP system significant potential development identified within the LDP and associated documents, will see the network approach capacity near the mid-point of RIIO-GD2.

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

What is the outcome that we want to achieve?

Maintain SGN's Licence Conditions to ensure security of supply and support economic prosperity by not becoming a blocker to development.

How will we understand if the spend has been successful?

On completion of the proposed reinforcement, SGN will monitor system performance to ensure expected system pressures are maintained. This will take the form of regular system performance checks and localised pressure surveys to ensure a successful outcome is delivered.

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

4.1 Narrative Real-Life Example of Problem

Significant development has been identified within the LDP and associated documents in Scone and Blairgowrie, the two largest settlements on the Perth – Blairgowrie MP system. The existing network will require significant reinforcement to support these sites.

A recent example of good planning to meet customer expectation, whilst also ensuring security of supply, occurred following the acceptance of a quotation to supply a new development at New Mills Balerno (P17141081).

Network analysis confirmed a requirement to reinforce SGN's system in advance of connecting the fully developed site load. However, network analysis also confirmed an interim load/connection of 30 new properties in advance of reinforcement, thereby meeting the GT/Developer's schedule of works.

Reinforcement to supply the full development was subsequently planned and completed in advance of connections beyond the interim load, ensuring security of supply to approximately 350 new/existing customers.

Security

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

Table 1: Development Driving Reinforcement

Development Name	Site Usage	Site Status	Confidence
Glenalmond Road	147 houses	Planning Permission	Highly probable (>90% confidence)
Perth Road Blairgowrie	261 houses	Allocation within the Adopted Local Development Plan	Probable (>75% confidence)
North of Scone	466 houses	Allocation within the Adopted Local Development Plan	Probable (>75% confidence)

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

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

4.2 Spend Boundaries

The spend associated with these reinforcement works provide capacity within the Perth – Blairgowrie MP system to support the project development during RIIO-GD2.

The monies associated with these works ensure security of supply for existing customers and connection of planned development. Costs have been prepared using average contracted rates at depot level and validated against known costs for similar, completed projects.

5 Probability of Failure

As development progresses, the Angus (Dundee) IPMP grid is predicted to fail at 95% demand by winter 2025/26, putting at risk supplies of up to 3,000 customers.

5.1 Probability of Failure Data Assurance

Model Validation

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

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

In addition to the Validation Programme, a robust model maintenance process and annual system performance checks ensures that the models continue to be accurate and fit for purpose.

Table 2: System Performance Review – 31st January 2019 (82% peak demand)

System	Site	System Pressure (82%)		System Pressure (1 in 20)	
		Recorded (Actual)	Modelled (Predicted)	Min. Required (Acceptable)	Modelled (Predicted)
Angus (Dundee) IPMP	Ardblair DG	1.06bar	1.13bar	0.346bar	0.347bar

Model Maintenance

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

The resulting outputs have been applied to the network model, providing confidence that reinforcement will be required during RIIO-GD2 to ensure SGN meets its Licence Conditions, maintaining minimum supply pressure under all demand conditions.

6 Consequence of Failure

Loss of Supply to Customers

Failure to reinforce will put at risk the supply to customers in Blairgowrie.

The loss of supply to Blairgowrie would result in the loss of supply of up to 3,000 customers and a failure to meet SGN's Licence Conditions, attracting adverse publicity and damage to the company's reputation.

Among the affected customers would be Blairgowrie Cottage Hospital, Ardblair Medical Practice, Strathmore Surgery, Blairgowrie High School, and the primary schools of Newhill, Hill and Rattray.

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

Table 3: Projected Pressures (2025/26) without Reinforcement

Location	Minimum Required Pressure	Lowest Modelled Pressure
Carsie RRI, Blairgowrie	340 mbar	0 mbar

Security

Safety Impact of Failure

Reinforcement of the Dundee IPMP system is necessary to meet the requirements of our Licence Condition.

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

Environmental Impact

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

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

7 Options Considered

Options Summary

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

Replace on Failure

Wait until the network fails then replace the system. This option has been discounted as it is impracticable to replace the Angus (Dundee) IP MP system.

Repair on Failure

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

Pre-emptively Replace

Replace the network before the network fails. This option has been discounted as it is impracticable to replace the Angus (Dundee) IP MP system.

Pre-emptively Repair

Mains reinforcement based on model data prior to network failure. Two options have been considered for further investigation, both main-laying solutions.

Do Nothing

This option has been discounted as it would breach SGN's licence conditions, driving pressure below minimum operating pressure at Blairgowrie, 345mbar. With the DPG being set at a maximum of 2 bar, uprating is not an option here.

7.1 First Option Summary: Gannochy Road

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

The first option considered for further investigation, **Gannochy Road**, involves the construction of approximately 2.78km x 400mmPE MP.

The basis for the cost estimate/unit cost

Costs for this option, amounting to £1.453m, have been prepared using average contracted rates at depot level and validated against known costs for similar, completed projects.

The perceived benefits of the option

The proposed works provide capacity for the development identified within the LDP that is scheduled for construction during RIIO-GD2.

Delivery timescales

This project is scheduled to commence in 2023/24 and is expected to be completed in the same financial year.

Key assumptions made

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

Any other items that differentiate the option from the others considered

This route, by avoiding crossing the River Tay, is expected to present significantly less engineering difficulty and disruption to the public.

7.2 Second Option Summary: Smeaton's Bridge**The technical detail of the option i.e. capacity, system rating, availability etc.**

The second option considered for further investigation, **Smeaton's Bridge**, involves the construction of approximately 2.78km x 400mmPE MP.

The basis for the cost estimate/unit cost

Costs for this option, amounting to £2.124m, have been prepared using average contracted rates at depot level and validated against known costs for similar, completed projects.

The perceived benefits of the option

The proposed works provide capacity for the development identified within the LDP that is scheduled for construction during RIIO-GD2.

Delivery timescales

This project is scheduled to commence in 2023/24 and is expected to be completed in the same financial year.

Key assumptions made

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

Any other items that differentiate the option from the others considered

This route, by crossing the River Tay, is expected to present significantly greater engineering difficulty and disruption to the public. However, by crossing the river and reinforcing closer to the source, this option will provide a greater capacity return.

7.3 Third Option Summary: Interruption

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

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

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

7.4 Options Cost Details

Table 4: Summary of RIIO-GD2 Costs

Option	First Year of Spend	Final Year of Spend	Volume of Interventions	Design Life (years)	Total (£m)
1/ Gannochy Road	2023/24	2023/24	2.78km x 400mm MP PE	10	1.453
2/ Smeaton's Bridge	2023/24	2023/24	2.78km x 400mm MP PE	10	2.124

7.5 Options Cost Summary Table

Table 5: Summary of RIIO-GD2 Costs

Option	Volume of Interventions	Cost Breakdown (£m)	Total (£m)
1/ Gannochy Road	2.78km x 400mm MP PE		1.453
2/ Smeaton's Bridge	2.78km x 400mm MP PE		2.124

Commercial Confidentiality

8 Business Case Outline and Discussion

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

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

The development outputs have been applied to the validated network model which predicts a failure at 95% demand by winter 2025/26, putting at risk supplies to 3,000 customers.

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

For the purposes of this report, costs associated with the identified options have been collated using average contracted rates at depot level and validated against known costs for similar, completed projects.

8.1 Key Business Case Drivers Description

Pre-emptively Repair: Option 1, Gannochy Road

This option provides a robust reinforcement solution in support of the sites identified by the Perth and Kinross Local Development Plan and associated documents, for development during RIIO-GD2.

Disruption to the public, and engineering difficulty, will be mitigated by avoiding crossing the River Tay.

Pre-emptively Repair: Option 2, Smeaton's Bridge

This option provides a robust reinforcement solution in support of the sites identified by the Perth and Kinross Local Development Plan and associated documents, for development during RIIO-GD2.

Theoretically, this is the optimal reinforcement strategy by starting immediately after Perth Bridge DPG. However, this option would cross Perth Bridge, which spans the river Tay, incurring substantial extra cost, disruption to the public and engineering difficulty.

Table 6: Summary of Key Value Drivers

Option No.	Desc. of Option	Key Value Driver
1	Gannochy Road	Reduced engineering challenge, minimally disruptive.
2	Smeaton's Bridge	Significant disruption and engineering challenge, greater capacity return.

8.2 Business Case Summary

Table 6: Business Case Matrix

	Gannochy Road	Smeaton's Bridge
Cost (£m)	1.453	2.124
Positive Benefit (Pros)	A robust reinforcement solution. Reduced disruption to public by avoiding busy roads and river crossings.	A robust reinforcement solution. Greater capacity return by reinforcing closer to the pressure source.
Negative Impact (Cons)	Leaves a 10" ST bottleneck across the bridge.	Significant public disruption by following busy roads and crossing the River Tay. Engineering difficulty – river crossing.

Costs inclusive of Overheads and Efficiencies

9 Preferred Option Scope and Project Plan

9.1 Preferred Option

Pre-Emptively Repair – Option 1, Gannochy Road: 2.78km x 400mmPE MP reinforcement

9.2 Asset Health Spend Profile

Table 8: Summary of Schedule of Spend

Asset Health Spend Profile (£m)						
Pre GD2	2021/22	2022/23	2023/24	2024/25	2025/26	Post GD2
0	0	0	1.453	0	0	0

Costs inclusive of Overheads and Efficiencies

The requirement for reinforcement of the Perth – Blairgowrie MP system is demand driven, primarily by development within the Perth & Kinross Local Development Plan and associated documents. Through this determination SGN has identified this reinforcement is required within the RIIO-GD2 period.

Risk exists that the planned development does not materialise or proceeds more slowly than anticipated. As reinforcement will not be required until the latter half of RIIO-GD2, the progress of development will be modified to suit at that time.

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

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

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

Appendix A - Development Trajectory Summary

Domestic Site Name	GD1	GD2	Post GD2	Total
GLENREE SITE, ALYTH	0	9	18	27
LAND 200 METRES SOUTH WEST OF ALYTH PRIMARY SCHOOL	14	44	6	65
LOYAL ROAD/AIRLIE VIEW	4	13	0	17
STRATHMORE TERRACE 1	13	13	0	26
CRUDIE FARM, ARBIRLOT ROAD WEST	0	67	17	84
ERNEST STREET/PALMER STREET, ARBROATH	27	27	0	54
ST MARTINS ROAD	9	44	18	70
CORALBANK ROAD, MARFIELD HOUSE, RATTRAY	0	32	0	32
GLENALMOND ROAD RATTRAY	29	74	44	147
PERTH ROAD, COTTAGE HOSPITAL PERTH ROAD BLAIRGOWRIE	0	117	144	261
LAND 220 METRES SOUTH WEST OF ENTRANCE TO MAPLE PLACE, BLAIRGOWRIE	0	54	27	82
FORMER ANDOVER P.S, NURSERY LANE	12	6	0	18
EASTERN PRIMARY SCHOOL 2 - 4 WHINNY BRAE BROUGHTY FERRY DUNDEE	4	14	0	18
LINLATHEN, ARBROATH ROAD	0	52	52	103
CHURCH ROAD, WOODSIDE	4	13	0	17
MAIN ROAD, BURRELTON	0	20	0	20
SECURE LORRY PARKING AREA PANMURE INDUSTRIAL ESTATE CARNOUSTIE	0	31	0	31
LARGHAN, COUPAR ANGUS (EAST OF)	17	42	25	84
PLEASANCE COTTAGE 2 (DEMOLISHED)	7	10	0	17
BLACKNESS NURSERY, DUNDEE	4	4	0	8
EAST KINGSWAY WORKS, KINGSWAY EAST - SITE2	0	44	0	44
FORMER CHARLESTON PS, DUNHOLM PLACE, DUNDEE	0	33	0	33
FORMER DOWNFIELD PRIMARY SCHOOL, EAST SCHOOL ROAD	10	10	0	20
FORMER GOWRIEHILL PS, ETIVE GARDENS, DUNDEE	0	17	10	27
FORMER HILLSIDE PS, DENOON TERRACE, DUNDEE	0	21	13	34
FORMER LAWSIDE ACADEMY, RANNOCH ROAD	10	40	0	51
FORMER SCHOOL, DONALD STREET	12	6	0	18
FORMER SCHOOL, ST LEONARD PLACE	10	10	0	20
JAMES KEILLER BUILDINGS, 32 - 34 MAINS LOAN, DUNDEE (PHASE1)	6	22	0	28
JAMES KEILLER BUILDINGS, 32 - 34 MAINS LOAN, DUNDEE (PHASE2)	0	15	10	25
JAMES KEILLER BUILDINGS, 32 - 34 MAINS LOAN, DUNDEE (PHASE3)	0	6	23	29
LAND AT CLATTO WATER TREATMENT WORKS, CLATTO GARDENS	9	35	0	44
LAND AT KELLYFIELD, DRUMGEITH ROAD, DUDEEE	0	31	39	70
LAND EAST OF FOGGYLEY GARDENS	0	17	0	17
LAND TO EAST OF BALLUMBIE ROAD, BALLUMBIE ROAD	0	34	20	54
LONGHAUGH NEIGHBOURHOOD CENTRE, 189 - 197 PITKERRO ROAD	8	12	0	20
QUEEN VICTORIA WORKS, BROOK STREET	0	31	0	31
RAILYARDS, SOUTH DUNDEE	15	77	0	92
SITE 1 - WHITFIELD	0	38	0	38
SITE 2 - WHITFIELD	7	36	7	50
SITE 5 - WHITFIELD (HADDINGTON AVENUE)	0	31	0	31

SITE 6 - WHITFIELD	23	23	0	45
SITE 7 - WHITFIELD	0	47	0	47
SITE OF BUCKLEMAKER AND BUTTERBURN COURTS, STRATHMARTINE ROAD	0	70	28	98
STOBSMUIR ROAD, DUNDEE	7	20	0	26
STUART LANE, LIFF ROAD	10	20	0	31
WALLACE CRAIGIE WORKS, 2 BROUGHTY FERRY ROAD	10	48	0	58
GOWANBANK	31	15	0	46
PRINCESS ALEXANDRA HOUSE, DUNDEE ROAD	12	59	0	71
TURFBERG	46	114	0	160
WESTFIELD	11	126	69	205
LAND SOUTH OF BEECHWOOD PLACE	5	27	43	74
ARDLER ROAD	0	26	0	26
FORFAR ROAD	8	30	0	38
LAND SOUTH EAST OF VICTORIA STREET, MONIFIETH	25	126	50	201
GANNOCHY ROAD	48	0	0	48
NORTH OF SCONE	0	148	318	466
PERTH AIRPORT	9	28	0	37
	475	2176	980	3631

The sites listed in Section 3.1 as the primary drivers for this reinforcement are highlighted above.

Non Domestic Site Name	GD1	GD2	Post GD2	Total
WEST OF BLAIRGOWRIE AND RATTRAY COTTAGE HOSPITAL PERTH ROAD BLAIRGOWRIE	0	66	0	66
EAST KINGSWAY WORKS, KINGSWAY EAST - SITE1	23	92	0	116
STUART LANE, LIFF ROAD	12	24	0	36
SUPERMARKET DEVELOPMENT, FORFAR ROAD, KIRRIEMUIR	21	21	0	42
	56	204	0	260

Appendix B - Categorisation of Potential Load Growth

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

DEFINITION TABLE				
Confidence	Definition	Factors to be considered	Base Growth	High Growth
Highly probable (>90% confidence)	Connection expected in RIIO-GD2 for all sites	<ol style="list-style-type: none"> 1. Quotation accepted but not yet on stream 2. Building is in progress. 3. Detailed planning permission granted. 4. Economic conditions indicate that sites for consumers of a particular type are likely to be developed, e.g. <ol style="list-style-type: none"> a. Domestic sites where there is a high demand for housing and there is a shortage of land available. b. Interest has been shown in having a connection made to a non-domestic site and economic factors suggest development will go ahead. 	✓	✓
Probable (>75% confidence)	Connection Likely in RIIO-GD2 for majority of sites	<ol style="list-style-type: none"> 1. Outline planning consent has been granted. 2. Recent development has been carried out in the area. 3. The land is a prime site for development, but no connection enquires have yet been received. 4. Adopted Local Plan Site 	✓	✓
Good prospects (>50% confidence)	Connection expected for some sites in RIIO-GD2	<ol style="list-style-type: none"> 1. Proposed Local Plan Site 2. No indication of planning permission being granted for the site. 3. The site is outside existing gas supply areas. 4. The site would involve physical problems in delivering a gas supply. 5. The site would require substantial additional infrastructure, e.g. additional roads, schools. 6. Site marked “reserve” in Local Plan. 7. Site is known to be contaminated ground. 8. Site has “protection” orders served over it – e.g. SSSI. 		✓
Poor prospects (<50% confidence)	Significant time or investment required to progress	<ol style="list-style-type: none"> 1. Does not meet the above planning criteria. 2. Site has been deemed as ‘speculative’. 9. The site would require significant additional infrastructure, e.g. additional roads, schools. 		

Appendix C - List of Acronyms

Acronym	Backronym (spelled out acronym)	Definition / explanation
Pressure Tiers ○ IP ○ MP ○ LP	○ Intermediate Pressure ○ Medium Pressure ○ Low Pressure	○ Intermediate Pressure i.e. 2 – 7bar ○ Medium Pressure i.e. up to 2bar ○ Low Pressure i.e. up to 75mb
CSEP	Connected System Exit Point	A connection point for one of more Individual System Exit Points, most usually supplying a GT Network (see GT below).
DG	District Governor	Pressure regulator primarily used for reducing pressures from IP and MP tiers to LP.
DPG	Distribution Pressure Governor	Pressure regulator primarily used for reducing pressures from IP tier to MP.
GT	Independent Gas Transporter	GT networks are directly connected to the Gas Distribution Network (GDN) via a Connected System Entry Point or indirectly to the GDN via another IGT.
HDPE	High Density Polyethylene	Pipe material for use in 7bar rated systems.
HLA	Housing Land Audit	Local Authority planning document.
LDP	Local Development Plan	Local Authority planning document.
PE	Polyethylene	Pipe material.
RIIO-GD1	Revenue=Incentives + Innovation + Outputs – Gas Distribution 1	8-Year price control period (2013-2021)
RIIO-GD2	Revenue=Incentives + Innovation + Outputs – Gas Distribution 2	Proposed 5-Year price control period (2021-2026)
SHP	SHP File Format	SHP is a file extension for a Shapefile shape format used in geographical information systems (GIS) software.
ST	Steel	Pipe material.
TRS	Transmission Reduction Station	Pressure regulator primarily used for reducing pressures from Local Transmission System tier to IP/MP.
1:20	1:20 Demand Conditions	Designing a network to operate whilst experiencing demand conditions historically only seen every 20 years, during severe weather events.