Gas to the West

High Pressure Operational Business Plan

Submitted to: The Northern Ireland Authority for Utility Regulation under Gas Network Extensions in Northern Ireland, Gas to the West licence submission.

Submitted by: BGE (UK) Limited

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BGE (UK) Ltd.

Contents

Glossary

AGI	Above Ground Installation
BGE	Bord Gais Eireann
BGN	Bord Gais Networks
BGTL	Belfast Gas Transmission Limited
BPD	Building Proximity Distance
BSI	British Standards Institution
CAPEX	Capital Expenditure
CCTV	Closed Circuit Television
CDM	Construction Design and Management (Regulations)
CJV	Commercial Joint Venture
CU	Compatible Units
DETI	Department of Enterprise, Trade and Employment
DOE	Department of the Environment
GERT	Gas Emergency Response Team
GNI	Gas Networks Ireland
FMA	Fingleton McAdam
GCS	Gas Capacity Statement
GTBI	Gas Transmission Benchmarking Initiative
GTMS	Gas Transportation Management System
GTMS NI	Gas Transportation Management System Northern Ireland
GTTW	Gas to the West
HSE (NI)	Health and Safety Executive Northern Ireland
HSQE	Health, Safety, Quality and Environment
IAC	Investment Approval Committee
IC2	Second Interconnector
ISO	Organisation for Standardization
ITT	Invitation to Tender

Km	Kilometre
kscmh	Thousand Standard Cubic Metres per Hour
KPI	Key Performance Indicator
mg	milligram
mm	millimetre
MW	Mega Watt
NI	Northern Ireland
NIAUR	Northern Ireland Authority for Utility Regulation
NINEC	Northern Ireland Network Emergency Coordinator
NINOA	Northern Ireland Network Operators Agreement
NGEM	Natural Gas Emergency Manager
NGEP	Natural Gas Emergency Plan
NTP	Networks Transformation Programme
NTS	National Transmission System
NWP	North West Pipeline
OJEU	Official Journal of the European Union
OPC	Oracle Project Costing
OpEx	Operational Expenditure
OTL	Oracle Time and Labour
PAS	Publicly Available Specification
PBU	Package Boiler Units
PM	Planned Maintenance
PPM	Parts Per Million
PQQ	Pre Qualification Questionnaire
PSNI	Police Service of Northern Ireland
PTL	Premier Transmission Limited
RTU	Remote Telemetry Units
SCADA	Supervisory Control and Data Acquisition
Scmh	Standard cubic metres per hour
SI	Statutory Instrument

SMYS	Specified Minimum Yield Stress
SNP	South North Pipeline
SNIP	Scotland to Northern Ireland Pipeline
TSO	Transmission System Operator
UR	Utility Regulator

Published Criteria Overview

The following section addresses the criteria identified by the Department of Enterprise, Trade and Investment (DETI) in the document "Criteria for gas licence applications and applications for consent to construct major pipe-lines, gas storage or LNG facilities" referred to hereafter as the "Published Criteria".

3.17 and 3.19 of the published criteria identify particular requirements which have been addressed in this document as shown in Table 1.

Table 1 Published Criteria Reference

Published Criteria Reference	Operational Business Plan Reference
3.17 (a) (i) The Applicant's proposals as to engagement with key stakeholders	Section 3.3.2, 3.6.1, 4.2, 5.1, 7.2, Appendix C & D
3.17 (a) (ii) The skills and experience of its key members of staff	Executive Summary, section 2.1, 2.3, 3.1.2.4, 3.3.1, 3.7, 3.1.2.4 and Appendix A
3.17 (a) (iii) The skills and experience of any other persons on whom it proposes to rely, and the nature of its arrangements or proposed arrangements with those persons	We will utilise our own resources, section 2.2, 3.1.1, 3.2, 3.7, 4.1.2.4, 4.1.5, 6.1.1.1, 6.3.2, 6.3.3 and Appendix A
3.17 (a) (iv) Its identification and proposals as to the management of risk	Section 3.1.2.2, 3.1.2.3, 3.7.4, Section 4, 5, 5.7.2.2, 6.1.1 and 8.2.2
3.17 (a) (v) Its proposals as to the use of tendering arrangements	Section 3.6.3, and Section 6
3.17 (b) (i) The completeness with which it has described the derivation of that data	Section 3.1, 3.1.2, 3.1.2.2, 3.1.2.3, 3.4, 4.5.2, Section 8, 9 and 10
3.17 (b) (ii) Its identification and application of cost drivers	Section 3.1.2, 3.1.2.4, 3.4, 3.5, 3.7, Section 8, 9 and 10
3.17 (b) (iii) The robustness of any assumptions made by it	Section 3.1.1, 3.1.2, 3.1.2.2, 3.1.2.4, 3.5, 5.4.1 and Section 10
3.17 (b) (iv) Its use of evidence that is verifiable from its previous experience	Executive Summary, section 1.1, 2.1, 3.1, 3.1.1, 3.1.2.4, 3.4, 3.5, 3.6.1, 3.6.3, 3.7.3, 4.1.5, 4.2, 4.3, 4.5.1, 5.1, 5.4, 5.5, 5.5.8, 5.8, 6.3.2, 7.1, and Section 8 and 9
3.17 (b) (v) Its identification and	Section 2.3.2, 3.1, 3.1.1, 3.1.2.2, 3.6.1,

quantification of risk	3.6.2, 3.7, 3.7.1, 3.7.4, 3.7.6, 4.1 – 4.1.5 inclusive, 4.4, 5.3, 5.3.3, 5.5.7, 5.7.2.2, 5.8, and 6.1.1
3.17 (b) (vi) Its efficiency improvement plan	Section 3.6.2, 3.6.3 and section 8.4
3.19 (a) The Applicant's experience of managing the processes and resources necessary to construct a high pressure network	Section 2.1, 2.2, 2.3, 2.4, 3.1, 3.1.1, 3.1.2.4, 3.2, 3.3.2, 3.5, 3.6, 3.7, 3.7.3, 4.1.1, 4.1.5, 4.5.1, Section 5, 5.5.8, 5.8, Section 6, 7.1, 7.2, Section 8, 9 and Appendix A
3.19 (b) The skills and experience of any other persons on whom it proposes to rely in managing the processes and resources necessary to construct a high pressure network, and the nature of its arrangements or proposed arrangements with those persons	We will use our own resources, section 2.2, 3.2, 3.6.3, 3.7, 4.1.5, 4.5, 5.8.1, 6.3.2, 6.3.3, 7.1, 7.2 and Appendix A
3.19 (c) Its experience of system operation in the context of a high pressure network	Section 2.1, 2.2, 3.1.2.4, 3.3.2, 3.5, 3.6.1, 4.1.2.2, 4.1.2.3, 4.1.5, 4.5, 4.5.1, Section 5, Section 6, 7.1, 7.2 and Section 8
3.19 (d) The skills and experience of any other persons on whom it proposes to rely in the operation of a high pressure network, and the nature of its arrangements or proposed arrangements with those persons	Section 2.2, 3.1.1, 3.2, 3.6.3, 3.7, 4.1.5, 4.5, 5.8.1, 6.3.2, 7.1 and 7.2
3.19 (e) Its proposals as to the securing, mobilisation and management of the internal resources necessary to construct a high pressure network	Section 2.1, 2.2, 2.4, 3.1, 3.1.1, 3.1.2.4, 3.5, 3.6, 3.6.3, 3.7.3, 4.5.1, 5.3.1, 5.5.8, 5.8, Section 6, 7.1, 7.2 and Appendix B
3.19 (f) Its proposals as to the securing, mobilisation and management of the external resources necessary to construct a high pressure network	Section 2.1, 2.2, 3.1, 3.2, 3.5, 3.6.3, 3.7, 4.1.2.4, 4.1.5, 4.5, 4.5.1, 5.5.8, 5.8, Section 6 and 7.2
3.19 (g) Its proposals as to the engagement with external stakeholders including all relevant regulatory authorities and statutory agencies other licence holders, and private entities necessary to construct a high pressure network	Section 3.1, 3.1.2.4, 3.3.2, 3.3.3, 3.3.4, 3.7.3 4.1.5, 4.2, 5.1, 5.4, 5.5.3, 5.8, Section 6, 7.1, 7.2 and 8.4.4
3.19 (h) Its proposals as to the timely delivery of the high pressure network	Section 2.4, 3.1, 3.1.1, 3.1.2.4, 3.2, 3.3, 3.6.2, 3.6.3, 3.7.2, 3.7.3, 4.5, 4.5.1, section 6 and Appendix B

Executive Summary

Introduction

The extension of the gas network to the west of Northern Ireland is a major infrastructure project which requires an organisation with a proven track record to overcome the many challenges projects of this nature face to ensure the successful delivery within programme and budget. BGE (UK) is offering the consumers of Northern Ireland, our experience, capability and proven track record to deliver this project.

We firmly believe that we are best placed to deliver this project based on our history of pipeline management, routing and construction expertise, and set out our high level achievements in this regard.

The Competition

The Northern Ireland Authority for Utility Regulation (NIAUR) on 6th February 2014 launched the licence application process to bring gas to the towns of Strabane, Omagh, Enniskillen, Derrylin, Dungannon, Coalisland, Cookstown and Magherafelt. The competition will see upwards of £200 million invested in new gas pipelines to the west of Northern Ireland.

Applicant

BGE (UK) is submitting a licence application to design and construct the extension to the transmission network in Northern Ireland. As requested in Section 4.41 of the Applicant Information Pack for the 'Gas to the West' project, we are making our application for this licence on the basis of a 'Revenue Cap' model.

Company History

Bord Gais Eireann (BGE) is a utility and energy company in the Republic of Ireland. BGE owns and operates transmission and distribution gas networks in the Republic of Ireland (ROI) and transmission networks in Northern Ireland (NI) and Scotland. BGE (UK) Limited is a wholly owned subsidiary company of BGE which owns and operates parts of the transmission gas network in Northern Ireland as well as the Interconnectors that link the National Grid Transmission System to NI and ROI.

BGE (UK) Limited has built c. 300 km of transmission pipelines in Northern Ireland since 2004. A total of c. £180m has been invested to date. BGE carry out the management, design, construction and operation of these Northern Ireland assets on behalf of BGE (UK) Limited. BGE(NI) is the trading name of BGE (UK) Limited in Northern Ireland.

Our Company's Key Success Factors

The expansion of the gas network will bring energy and choice to the people of Northern Ireland; to achieve this successfully will require an organisation with a proven track record in delivering major gas transmission pipelines within programme and budget. We outline key achievements which will demonstrate our ability to deliver this project successfully;

- *We continue to build and operate one of the most modern and safe gas networks in the world and we continually strive to be innovative through sustainable design, construction and operation of the gas network.*
- *We operate in multiple jurisdictions with over 13,500 km of transmission and distribution gas networks, two sub-sea interconnector pipelines, delivering a reliable and secure service, which has proven to be resilient through recent 1 in 50 severe winters.*
- *We have constructed c.1,260 km of transmission pipelines equating to an investment of c. €1.1bn within the last 14 years, of which £180m relates to Northern Ireland. These projects have been delivered within programme and budget.*
- *We have an excellent track record in acquiring wayleave agreements through a mutual consenting process and manage a relationship with c.7,000 landowners. We have successfully negotiated 5,500 wayleave agreements within the last 14 years of which c. 850 relate to Northern Ireland.*
- *We have an impeccable track record in Health and Safety which is subject to the scrutiny of the regulatory authorities in all jurisdictions in which we operate. This is complemented with an excellent track record in risk management.*
- *We excel in operational excellence. We have operated gas networks over the past thirty five years. Also we have extended gas networks, completed pipeline diversions, live gas connections and pigging operations. We monitor all our networks 24/7 through our SCADA system.*
- *We have an excellent track record in managing the delivery and construction of projects within programme and budget, with costs being verified and deemed appropriate by the regulatory authorities in all jurisdictions.*
- *We have built, developed, and maintained relationships with key stakeholders, such as landowners, farming organisations, local sporting and community organisations, environmental agencies, health and safety authorities, roads authorities, statutory bodies and planning departments in all jurisdictions, which will be critical to the success of this project. Our approach during new pipeline projects focuses on early and comprehensive engagement with all stakeholders including local communities to ensure they are adequately informed and kept up to date.*
- *We have constructed and operate the Natural Gas Interconnector system in South West Scotland, connecting to the National Grid Transmission system that currently supplies 100% of the Natural Gas used in Northern Ireland and the Isle of Man, and over 97% of the Natural Gas used throughout Ireland. Both the onshore sections of the Interconnectors and the subsea sections are*

operated to the highest standards, maintaining 100% availability in all jurisdictions since construction in 1991 with an impeccable safety record.

- *We have a pool of talented employees, with the right skills and capabilities which has delivered our success. This is reinforced by a Technical Competency Framework which allows us to identify the training needs at both role and individual levels to ensure no competency gaps occur when personnel changes occur.*

The foundation of our success in the continued expansion and operation of the gas networks is achieved through;

People Excellence

BGE (UK) and its parent organisation have over thirty five years experience in the gas industry. We have a diverse talent pool, highly proficient in the management, design, construction and operation of transmission pipelines.

We offer the Utility Regulator an unrivalled expertise, proven track record in the delivery of transmission pipelines.

Our performance is driven by our ability to manage risk and we offer a service which delivers new gas projects and ensures the reliability of our networks. We encourage and enable;

- *People to learn, train, perform and develop to reach their potential*
- *Dedication and high performing teams*
- *Focus on achieving clear targets and measures*
- *Performance related management*
- *Employees to feel valued and recognised for individual and team achievements*

Our employees grow with the organisation and strong relationships develop with external parities over time, which are built on trust and mutual respect. This is beneficial as both parties have working relationships which contributes to the success of the projects we deliver.

To assist our employees, we have developed a Career Path Model which defines behavioural competencies integral to the future of the organisation. The Career Path Model is used for the appointment and development of all staff throughout the organisation, which delivers high calibre professionals. This is reinforced by a Technical Competency Framework which allows us identify the training needs at both role and individual levels to ensure no competency gaps occur when personnel changes occur.

We will utilise the capability and experience of our people who have developed strong relationships in Northern Ireland over the past ten years for the successful delivery of the Gas to the West project.

Asset Management and Information Excellence

BGE (UK) is an Asset Management focused organisation that ensures a systematically and sustainable approach to managing its core assets through;

- *Utilisation of asset focused information systems which allow real time data visibility through field mobility devices which assist in making investment decisions regarding planned maintenance and refurbishment activities.*
- *Industry leading systems and processes; we are currently in the process of preparing for accreditation for Public Available Specification PAS 55 which will assist in managing performance, risk and cost over the life of the assets.*
- *Innovative processes and techniques, such as standardised pressure reduction, boiler and control and instrumentation packages which allow easy site assembly.*

This capability will result in benefits for the Gas to the West project through;

- *Optimised whole life asset costs throughout the asset lifecycle.*
- *Improved asset performance, reliability and management of risk.*
- *Innovation through optimised planning and design that delivers cost and efficiency savings.*

This exists in our business and will be applied to the Gas to the West project.

Engineering Excellence

BGE (UK) will bring unparalleled expertise in management, mobilisation, design, construction and operation to the Gas to the West project, which we will deliver through our proven track record in delivering over 13,500 km of gas transmission and distribution networks, on programme, within budget and with an impeccable safety record.

We will utilise our engineering excellence in;

- *Sharing best practice engineering and management through optimised design to the benefit of Gas to the West project.*
- *Effective communication with key stakeholders based on existing relationships such as Ulster Farmers Union regarding our wayleave capability. This will be a crucial part to the success of the Gas to the West project. We will draw on our relationships to mobilise timely and effectively for the project.*
- *Seamless mobilisation for the Gas to the West project team based on our knowledge and experience of the network and availability of our key internal resources to accelerate the programme. We have already made assessments regarding the route and mobilised a highly competent team as part of this licence submission.*

Contract and Material Management Excellence

BGE (UK) and its parent organisation have key relationships in place with all of the contract and material suppliers that will be required for the Gas to the West project.

This will be crucial in the timely delivery of the project. We have framework contracts in place for engineering services and engineering materials. This will allow seamless mobilisation of the project along with time savings during project delivery. The construction contract will be tendered to ensure the most economically advantageous tender is chosen for the Gas to the West project. Other advantages of our bid include;

- *Utilisation of the purchasing power of BGE (UK) parent organisation to deliver best value for services, materials and equipment.*
- *Utilisation of the multiple frameworks in place which have achieved best value through European Procurement processes for contract for services and materials.*
- *Utilisation of a proven set of approved suppliers for transmission services and materials which reduces risk of quality issues and cost overruns.*

Operational Excellence

Key to the success of the Gas to the West project will be the operational interaction of the new pipelines with the existing network;

- *We have an excellent track record in operating our transmission and distribution networks over the past thirty five years, of which ten years relate to the operation of the transmission network in Northern Ireland.*
- *We will utilise our existing resources to optimise all activities including emergency response.*
- *We will integrate the Gas to the West project as part of the network modelling we undertake on behalf of Mutual Energy Limited via PTL in our joint assessment of the Northern Ireland network which inputs into the Northern Ireland capacity statement.*
- *We will implement our existing health and safety practice where we are committed to making a difference, with a well established health, safety, environmental and quality culture in place and will apply this to the Gas to the West project. We have a 100% track record to the satisfaction of the Health and Safety Executive Northern Ireland and strong relationships are in place.*
- *We will leverage off our existing Codes and system operations and those of the Single System Operator / Contractual Joint Venture when it is in place to seamlessly and efficiently integrate the new network and associated market processes into the existing Northern Ireland systems.*

Conclusions

We believe our extensive knowledge will deliver the Gas to the West project to the benefit of the Northern Ireland consumers.

Furthermore, our capability on transmission pipelines, pipeline routing, management, design, construct and operation is unparalleled; therefore we believe we are best placed to deliver the Gas to the West project.

We will transfer our knowledge and experience to deliver the Gas to the West project having successfully managed, designed, constructed and operated 300 km of high pressure transmission pipelines in Northern Ireland.

Finally, we are ready to mobilise a project team having already established a team as part of the licence application. We are concluding a number of transmission pipelines in 2014 and are ready to redeploy these resources which will accelerate the mobilisation phase of the Gas to the West project.

1 Business Plan Overview

1.1 Purpose of Business Plan

This Operational Business Plan sets out how BGE (UK) would deliver the 'Gas to the West' (GTTW) High Pressure (>7bar) Pipeline from award of licence, through the management, design, construction, mobilisation and operational phases of the project. Within the Business Plan we will demonstrate our experience and competencies in all areas of Designing, Building and Operating an efficient High Pressure Transmission Pipeline Network.

BGE (UK) (trading as BGE(NI)) is a wholly owned subsidiary of Bord Gais Eireann (BGE), set up to facilitate the expansion of the natural gas grid within Northern Ireland having been awarded a licence in February 2002.

We initially constructed the North-West Pipeline (NWP), which became operational in 2004. This is a 450mm pipeline extending 112km from Carrickfergus to supply the power station at Coolkeeragh. The Firmus Energy distribution network connects to the NWP to serve towns along the route of the pipeline.

The South-North Pipeline (SNP) (operational 2006) is 156 kms long and extends from the landfall of the second gas interconnector (IC2) at Gormanston, Co. Meath in Ireland to Ballyalbanagh on the Northwest Pipeline (NWP), approximately 12km west of the Carrickfergus Above Ground Installation (AGI). This pipeline facilitates supplies to towns and industries in the corridor from Newry to Belfast. Further spur pipelines were constructed off the NWP and SNP between 2005 and 2011 culminating in the circa 12 km Kernan-Derryhale pipeline which became operational in 2010.

These pipelines are each the subject of 25 year licences, awarded by the Northern Ireland Authority for Utility Regulation (NIAUR), and form part of the Postalised Transmission Network of Northern Ireland. This Business Plan will demonstrate how we propose to leverage off our previous experience of managing, designing, constructing and operating high pressure pipelines in Northern Ireland (NI) to successfully deliver a value for money, safe and efficient GTTW pipeline for the customers of NI.

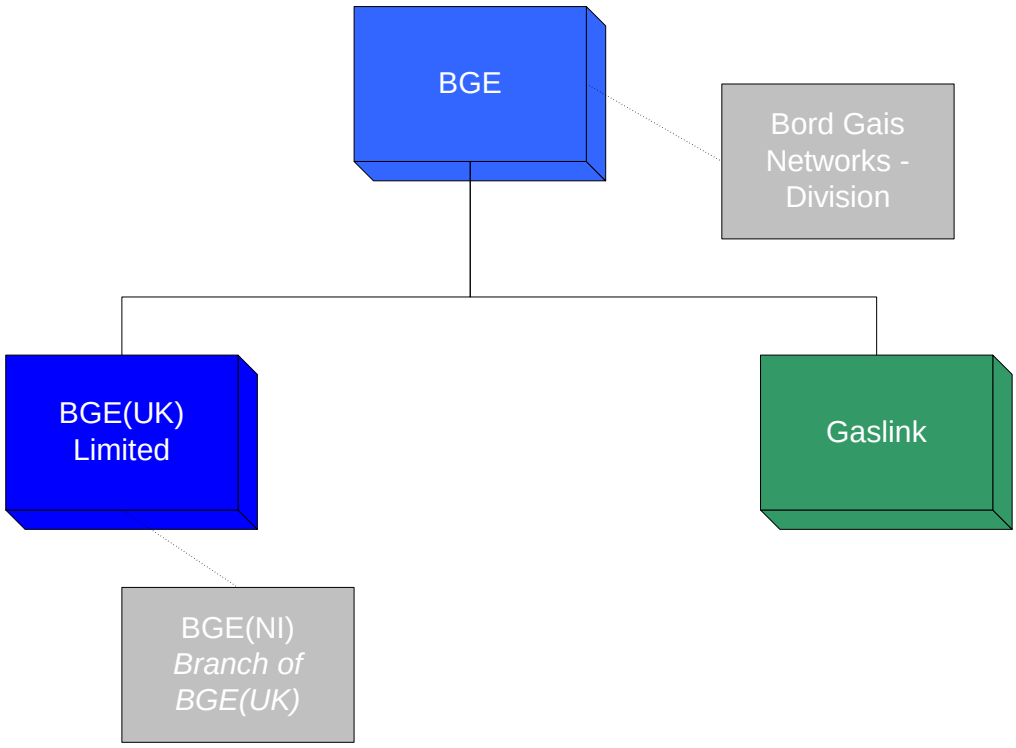
2 Organisation

2.1 Structure

Bord Gais Eireann (BGE) is a utility and energy company in the Republic of Ireland. Gaslink, a subsidiary company of BGE, is the Independent System Operator for the Transmission and Distribution networks. Bord Gais Networks, an operating division of BGE, carries out the management, design, construction and operation of the gas network on behalf of Gaslink. BGE (UK) Limited is a subsidiary company of BGE which owns and operates parts of the Transmission gas network in Northern Ireland. BGE carry out the management, design, construction and operation of the Northern Ireland assets on behalf of BGE (UK) Limited. BGE (NI) is a trading name of BGE (UK) Limited.

The following Figure 1 is the current structure of the gas element of the BGE organisation.

Figure 1 Bord Gais Eireann Organisational Structure – Gas Business



The Irish Government is in the process of selling the Energy Business of BGE with the sale expected to be completed later in 2014. This sale will necessitate the restructuring and renaming of the organisation. It is intended that the parent body will transition to a new name, Ervia with Bord Gais Networks merging with Gaslink to become a new subsidiary company of Ervia. The new subsidiary company will be known as Gas Networks Ireland (GNI) and BGE (UK) Limited will become a subsidiary of GNI with its name expected to change to GNI (UK) Limited. The following Figure 2 is the 'to be' structure of the gas business of Ervia.

Figure 2 Structure of Ervia - Gas Business

The restructuring and name changes will not affect the day-to-day operation of BGE (UK) Limited.

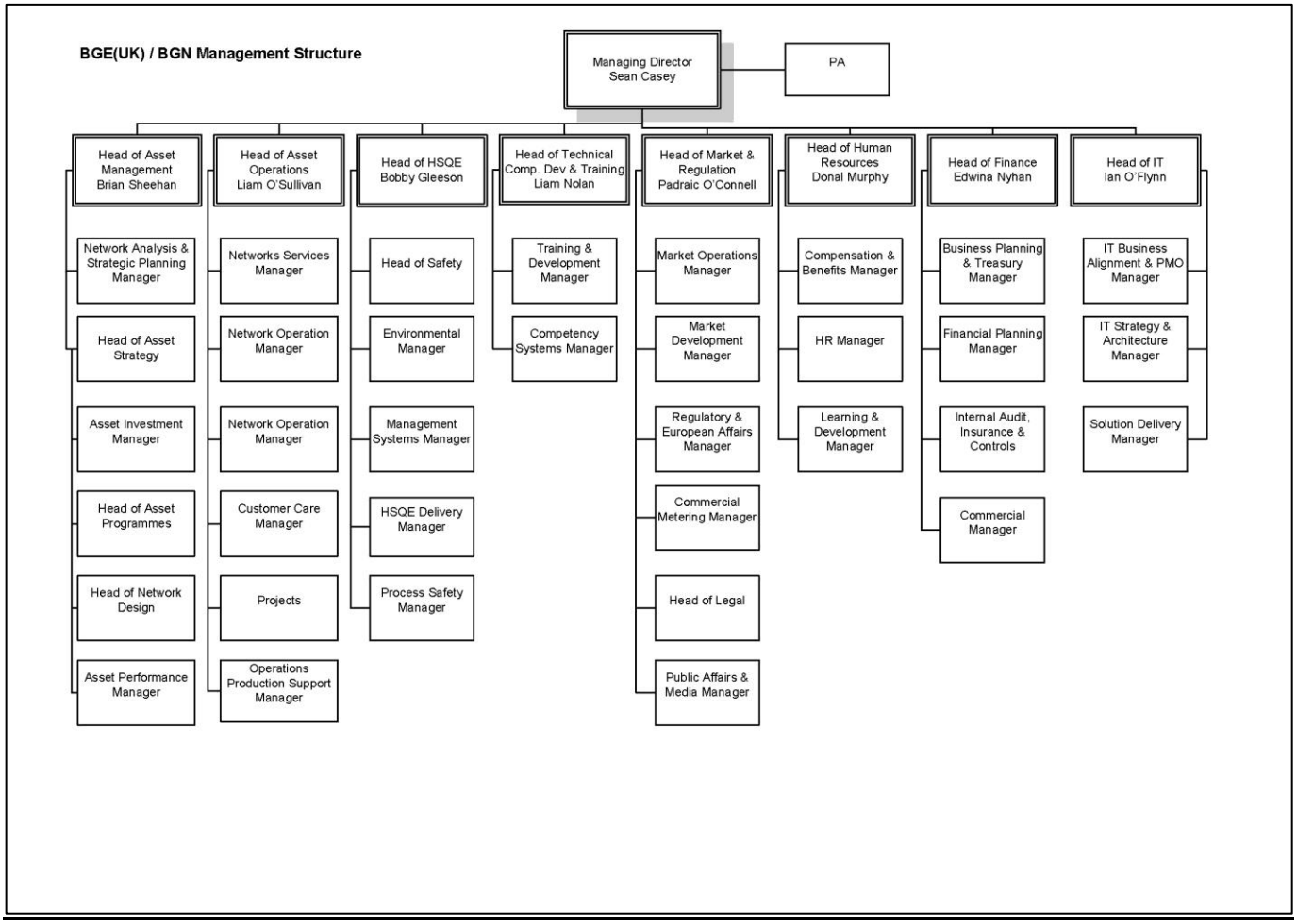
There is significant capability within the BGE group given its 35 years experience in the gas industry, with BGE (UK) operating in Northern Ireland for over ten years. BGE (UK) is currently the only NI TSO that has constructed high pressure pipelines (70 barg pressure) in Northern Ireland;

- Northwest pipeline in 2004;
- Aghadowney to Ballymoney 2005;
- Ballymena to Dunaird 2005;
- South North pipeline 2006;
- Kernan to Derryhale pipeline 2010; and
- A8 Northwest Pipeline Diversion 2013.

BGE (UK) has an exemplary safety record in high pressure pipeline construction and operation as the result of its competence, capability, and experience in the industry. BGE (UK) will be utilising the experience and capability of Bord Gais Networks for the GTTW project.

Bord Gais Networks successfully transformed during 2009 - 2010 with the introduction of asset focused information systems and restructured into an Asset Centric Organisation, see Figure 3. An Asset Centric organisation focuses on a systematic and sustainable approach to managing core assets. Technical competence-based performance management was also implemented. These are all key drivers which have successfully transformed Bord Gais Networks into a High Performance Utility Model. This model is internationally regarded as a highly efficient model capable of delivery services to a very high standard. These achievements have been integral to the growth and expansion of the business into other utility-based sectors. Bord Gais Networks has focused on maximising the use of its people, processes and technology to advance good management practices for the achievement of the business strategy.

Figure 3 Organisational Structure



Curricula Vitae for key personnel are included in Appendix A. The organisation is structured to deliver key business drivers with the help of the support functions, managing the natural gas networks and associated commercial arrangements in Ireland, Northern Ireland and Scotland as follows:

- Asset Management: responsible for asset strategy, network development, investment analysis, asset information, detailed design and asset programmes (capital delivery of projects).
- Asset Operations: responsible for, scheduling and dispatching all work activities, delivering capital construction works, executing planned and unplanned maintenance activities and operating the network safely.
- Market and Regulatory Affairs: responsible for regulatory affairs, shipper services, Legal and Corporate Affairs, market strategy, market development including Code Modifications.
- Health Safety, Quality and Environment: responsible for safety management systems, training and risk management, technical competency, business continuity, environmental planning and quality and management systems.

- Finance: responsible for financial planning, reporting, insurance, data protection, business planning, taxation, tariffs and revenue reporting.
- Networks IT: responsible for infrastructure and operations, solution delivery and service management.
- Human Resources: responsible for all aspects of human resources and training and development.

BGE (UK) in carrying out its current operations in Northern Ireland utilises the services of both Bord Gais Networks and Bord Gais Group to carry out many of the required activities and functions. By using the economies of scale, purchasing power and most importantly the industry expertise of Bord Gais Networks, BGE (UK) is able to deliver a high quality, safe and efficient service to the Northern Ireland customer.

In applying for the award of the GTTW licence we are proposing to leverage off the services of Bord Gais Networks to deliver this project, similar to the delivery of the Northwest and South North pipelines.

Bord Gais Networks is the sole operator of the Transmission system in the Republic of Ireland, operating the National Transmission Network consisting of over 2,400 km of high pressure (>19bar) pipelines of which circa 400 km are subsea interconnectors to Scotland. This operation is carried out on behalf of Gaslink, the Independent System Operator on the basis of an operating agreement between the two bodies approved by the Commission for Energy Regulation. Bord Gais Networks operates three compressor stations, one at Kinsale to connect Kinsale Energy Ltd. production/storage facility and second in Scotland to deliver Natural Gas from the United Kingdom (UK) National Transmission System (NTS) system to Ireland via the interconnector system and the Scotland to Northern Ireland Pipeline (SNIP).

2.2 Resource Levels

Bord Gais Networks has approximately 500 employees engaged across its business. The majority are engaged in the Asset Management, Asset Operations, Health, Safety, Quality, and Environment (HSQE) and Regulatory areas. The functions of Finance, Human Resources, Information Technology and Shared Services provide support services to the Networks business and help ensure the efficient and effective operation of the organisation.

This is a highly proficient and lean operating model introduced to Bord Gais Networks following a company restructuring in 2010 to an Asset Centric organisation. In parallel, new asset information software systems were introduced which allowed Bord Gais Networks real time data visibility from field mobility devices; this resulted in streamlining of operational planned maintenance activities, thereby moving to a lean field operational workforce.

Where appropriate Bord Gais Networks employs an outsourced model for certain activities. Key underlying principles are that services are provided in a cost effective manner and that Networks can react to the "peaks and troughs" of demand for services in a timely and cost effective way. The

frameworks in place are well established with key organisations that provide highly competent and competitive services. There needs to be a strong business case for utilising the framework contracts as we continually seek to develop our own in-house resources as required, for example, we have a graduate programme in place.

2.3 Competencies and Accountabilities

2.3.1 Training, Awareness and Competence

Bord Gais Networks believes that people are its most important asset and this is evident in the culture of the organisation. We continually take on new challenges through the introduction of new technology, adopting industry best practice and striving to position ourselves as a market leader in the gas industry.

As an organisation we are committed to up skilling our employees through our Employee Development Programme which provides training and development programmes to meet individual needs. We also believe in encouraging potential in order to facilitate professional development.

Our strategy is to build on our current Employee Development Programme by placing greater emphasis on matching life and career aspirations of employees with the needs and challenges of the organisation, through systematic career development and planning.

All personnel at Bord Gais Networks are recruited on the basis of the skills required to effectively carry out the duties and responsibilities of the role they are assigned to. It is acknowledged that skills and competencies evolve over time with the introduction of new methods of work, legislation etc. We have has established a Technical Competency Framework which identifies the technical competencies required for individual roles within the business.

The Gas Technical Training and Development strategy focuses on the gas technical learning and development initiatives within the organisation including: the Gas Technical Competency Framework and Performance Management System; gas technical training programmes; assessments and approvals of gas technical staff; and, mechanisms to support continued development of gas technical knowledge and expertise etc.

> "An organisation where learning is optimised and enables maximum engagement and performance for the benefit of the business”

We have a dedicated gas technical training building in Dublin.

2.3.2 Gas Technical Competency and Integrated Competency Frameworks

Bord Gais Networks has introduced a Gas Technical Competency Framework, initially commencing with safety critical roles. Safety critical roles were identified within the organisation and an evaluation of

each role was completed and documented. Employees in these roles then documented their experience and training regarding the minimum criteria set out by Senior Management.

The Gas Technical Competency framework allows Bord Gais Networks to demonstrate that its employees are technically proficient in their area of expertise.

Bord Gais Networks in 2014, embarked upon the development of an Integrated Competency Framework for the organisation. This will incorporate the Gas Technical Competency Framework as part of a wider framework which includes roles and competencies which have no impact on gas operations (for example, Human Resources, IT, Facilities, Finance, etc.). The development of a Bord Gais Networks Integrated Competency Framework is an integral part of the Organisation's Learning and Development vision. The objective is to amalgamate the Integrated Competency Framework with all relevant HR processes including recruitment, training and development, succession planning, performance management, talent and career management.

Throughout the development of the Technical Competency Framework, the Institute of Asset Management's (IAM) best practice guide 'The IAM Competencies Framework – The Requirements', Version 2 was reviewed and incorporated. The IAM framework details 7 key roles which span a wide range of areas including engineering, finance, operations, information systems, management, contract and supplier management, human resources and organisational development. The 7 key roles include:

- Policy Development;
- Strategy Development;
- Asset Management Planning;
- Implement Asset Management Plans;
- Asset Management Capability Development;
- Risk Management and Performance Improvement; and
- Asset Knowledge Management.

2.4 Deployment

BGE (UK) is ready to mobilise a project management team having already established a team as part of the licence application. We are in the construction management phase of a number of 70 barg Transmission pipelines in the Republic of Ireland, the majority of which will be completed in 2014.

In this regard, we will be in a position to redeploy these resources immediately which will accelerate the mobilisation phase of the GTTW project.

We have already mobilised an initial team which has held meetings with some of the key stakeholders in Northern Ireland. We have reviewed the pipeline route and AGI locations and held meetings with a Distribution System Operator regarding the routing of the Distribution pipelines.

We have strong relationships in place with the Ulster Farmers Union, farming representatives, roads authorities, local councils, health and safety authority and environmental agency having successfully completed circa 300 km of Transmission pipeline in Northern Ireland. This offers a major benefit for the GTTW project as there are already wayleave packages in place. We have maintained these relationships through the years and there is currently a high degree of mutual respect and trust between BGE (UK) and the parties involved.

Our operations team is already located in Antrim as part of our existing assets in Northern Ireland. The Antrim location is central to the pipeline network and allows for optimum use of resources. All construction phase interfaces between the construction team and the operations team will be completed using a mix of construction site field offices.

BGE (UK) currently completes all planned maintenance on our existing Northern Ireland pipeline network, to provide reactive and corrective maintenance.

We have 24-hour emergency response in place and 'Dial Before You Dig' facilities as part of our existing operations in Northern Ireland. We are in a position to commence promoting our safety culture and our 'Dial Before You Dig' systems on the new areas as part of the project management phase of the GTTW project.

Our existing operation will be scaled up to cover the new GTTW Pipeline Project. BGE (UK) will use existing systems to recruit new personnel to extend the maintenance and emergency response for the pipelines. All personnel will undergo project familiarisation in Antrim and will be trained on the location and route of the new pipelines during the construction phase. This will be hugely beneficial in terms of operational understanding of the new pipelines and AGIs.

We propose that new personnel would be in-situ during the construction phase to ensure training on the new systems and to allow for a smooth transition between construction, commissioning and operation of the new pipelines. Once the commissioning phase commences the BGE (UK) operations team will begin permitting work and managing activities on the live sections of the pipeline. Agricultural Liaison Officers (ALOs) will also begin developing working relationship with landowners on the new pipelines.

We propose to utilise the existing scalability in the network to include all new landowners in the Dial Before You Dig System. BGE (UK) deploys operations personnel on an annual basis to the Balmoral Summer Show in Northern Ireland and has found this exercise very beneficial in developing good relations with landowners and encouraging them to discuss any development plans they may have.

3 Mobilisation

3.1 Plans and Proposals

BGE (UK) has been operating in Northern Ireland for the past 10 years and has constructed circa 300km of high pressure Transmission pipelines. These pipelines have been constructed within programme and budget. BGE (UK) has achieved success in delivery of projects of this magnitude through development of strategic relationships and the suite of tendering framework agreements we have in place.

BGE (UK) will leverage off these relationships and agreements to deliver the GTTW project. Since 2004 when the Northwest pipeline was constructed, BGE (UK) has strived to ensure relationships are continually developed and as such we have agreements in place which would allow BGE (UK) to mobilise quickly to the benefit of the GTTW project.

We have established an Executive Steering Group at a high level, lead by the BGE (UK) Chairman, John Barry. The Executive Steering Group will play a key role ensuring the GTTW project achieves its objective, with the right balance of expertise ensuring any risks are mitigated quickly.

We have already mobilised an initial team out of our Cork office which has held meetings with some of the key stakeholders in Northern Ireland. We have reviewed the pipeline route and AGI locations. We have held meetings with a Distribution System Operator regarding the routing of the Distribution pipelines.

Currently we are in the construction phase of a number of Transmission pipelines which will be completed in 2014; therefore we will be in a position to redeploy these resources immediately. These resources will be based in our Antrim operational office along with our existing operations team which offers synergies for the GTTW project.

For the GTTW project we will put in a similar project team that delivered the Northwest, South North and Kernan to Derryhale pipelines. The Project team was also located in our Antrim operational base with our field operations team.

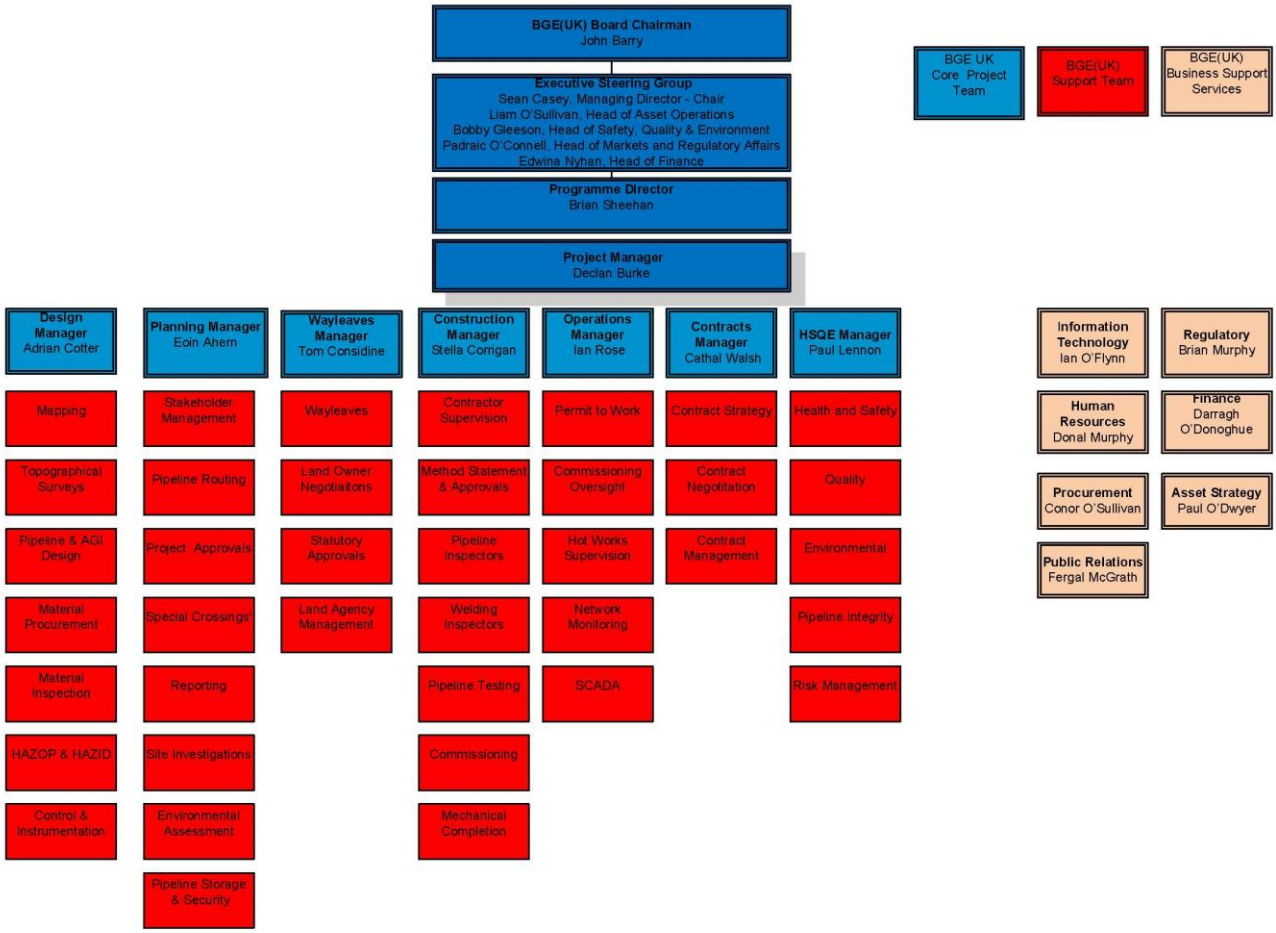
The Antrim location is central to the pipeline network and allows for optimum use of resources. Additionally, this also facilitates integration between the management, design, construction and operations team during the project.

BGE (UK) will combine a mix of construction site field staff and operational staff during the GTTW project, which allows for optimised resources and knowledge transfer between the management, design, construction and operational phase of the project.

BGE (UK) will put the following project structure in place for GTTW project as shown in Figure 4.

Figure 4of permanent BGE (UK) employees, supported by our engineering and business teams. This is the same approach for the Northwest, South North and Kernan to Derryhale pipelines which were delivered on programme and within budget.

Figure 4 Proposed Project Team Structure



The project team would work closely with the operational team, the operational team would be part of the mobilisation phase where mitigation measures would form part of the construction phase in the vicinity of the tie in connections to the existing gas network.

Appendix A sets out the CV of key personnel within the Project Team.

3.1.1 Programme Delivery and Capability

Our approach to GTTW project will be based on our experience over the past 35 years on similar projects. We are highly competent in all aspects of gas pipeline project management, design, construction and operation.

We have an extremely competent team of professionals who have worked together on Transmission pipelines and work as a cohesive team with significant combined capability. This capability will be applied to the Gas to this West project and leveraged off our track record in the delivery of major gas pipeline projects, which were delivered on programme and within budget, within the Republic of Ireland, Northern Ireland, Scotland, including two sub-sea interconnector pipelines.

Key success factors in the delivery of these pipelines within programme and budget, is our successful ability, over many years, is in understanding the aspects which are critical to achieving pipeline routing objectives.

These include;

- Selection of and familiarity with pipeline routing design for Transmission pipelines
- Understanding the requirements of stakeholder needs at various pipeline stages
- Technical excellence and importance of site investigations in route selection
- Long track record of relationships with landowners and farming organisations

For the GTTW we offer;

- Conceptual Design, our experience from designing pipelines and understanding how the network can be optimised and the interface with the existing network. Our knowledge is unparalled, and our network modelling capability will be key in determining the optimised final pipeline design sizes.
- Route Selection and Wayleaves, we exceed and excel in the area given our track record and we have a 100% success rate in securing planning permissions and our track record in securing wayleaves by mutual consent is well established and proven, by the virtue of the 2400 km of Transmission pipelines we have constructed. We have a long history with farming organisations which will be key to the delivery of the project. We understand the environmental requirements of crossing water courses, streams and rivers and have proven techniques in place, acceptable to environmental agencies.
- Project Cost Control, all our major projects have been delivered within budget, this is due to our accurate estimating techniques and understanding of what it takes to deliver major projects. We understand project cost control and have experienced all types of contract conditions from poor ground, wetlands, archaeological which we have successfully mitigated by ensuring strict project control through our quantity surveying team, ensuring that budget overruns are avoided.
  We achieve this through monthly cost reports and tracking costs against projected final costs, through Oracle financial system, which is well defined and established within the business. The significant expenditure items on GTTW will be;

    - wayleaves,
    - materials
    - construction contract.

We also mitigate cost increase through well defined design, specifications, site investigations and where necessary mitigate construction risk through pipeline re-routing or employing alternative methods of construction, such as trenchless technology.

- Construction Tendering and Evaluation, our experience through our robust conditions of contract, detailed design process, thorough site investigations provide a concise set of tender documents that we have developed over the past 30 years, which we continually evolve to ensure we mitigate cost overruns. We include schedules of notional quantities to ensure competitive prices are in place to cater for any contract variations, should they materialise.
- Project Management, based on our proven track record in pipeline management and construction supervision we offer an "end to end" process, this is based on our project and construction management experience of pipelines. Key to the success of the project;

    - Initial mobilisation phase, established project team with experience, BGE (UK) have team in place and experienced routing engineers and designers, which will be key to identify preferred route for landowner engagement.
    - Wayleaves, we have agriculture liaison officers in place with past history working in Northern Ireland to address landowner challenges to route selection process.
    - Material procurement, we have frameworks in place to mitigate the challenges on availability of steel line pipe and above ground installation through our established relationships with suppliers.
    - Strategic contracts, we have engineering service contracts in place for aerial surveys, site investigations, habitat surveys etc which will be key to mobilise the Environmental Impact Statement required for the project.
    - Construction, we have an experienced team of quantity surveyors who will ensure a robust contract is put in place which offers competitive rates and balanced risk base on our experience of previous pipelines which will be key to the success of the project.
    - Operation and commissioning, our experience on live gas networks will be key to the tie into the existing gas network, to mitigate any contractual delays and satisfy the requirements of the Health and Safety Executive of Northern Ireland. We have demonstrated our capability recently regarding the Northwest pipeline diversion for the A8 motorway.

- There will be two live gas connections required for the GTTW project to connect the pipeline to the existing network. One to the Kernan to Derryhale pipeline and one off Northwest pipeline, it will be critical to understand the requirements of the operational phase to understand "hot works" at tie in locations. Failure to recognise the risks associated with these works, will led to programme delays, resulting in claims, as these works will be overseen by Health and Safety Executive of Northern Ireland (HSENI). BGE (UK) recently completed diversion works on the Northwest pipeline for the A8 motorway which was successfully over seen by HSENI.

- Commissioning the GTTW Pipeline, it will be a requirement to successfully pig the pipelines prior to operation of the pipeline. BGE (UK) has extensive experience in this regard through operation of its existing assets in Northern Ireland, Scotland and the two sub-sea interconnectors. The process of hydro testing the pipeline prior to the introduction of high pressure gas will be crucial, to certify the pipeline as mechanically complete. We have extensive experience in this regard and the latest pipeline we successfully commissioned was a 50 km 70 barg pipeline in 2013.

We will apply all our knowledge, capability and experience to successfully deliver the GTTW project within programme and budget. We will approach the GTTW project like all other pipelines through the points noted above, this is a highly successful approach and well established experience and capability which has successfully delivered the projects in table 2 within programme and budget.

Table 2 presents' projects BGE has successfully delivered within programme and budget post 2000;

Table 2 BGE Projects Post 2000

Project Title	Length (km)	Diameter (mm)	Cost (€m)
Abbotstown to Poolbeg	16	500	€17.8m
Ballincollig to Ballineen	28.5	200/150	€11.7m
Ballough to Brownsbarn	38	900	€52m
Ballymoneen to Ballygarraun	12.7	300	€7.2m
Ballymun Diversion	1	200	€0.5m
Ballynora to Lehenaghmore Pipeline	5.5	250	€8.3m
Barnakyle to Coonagh	7.8	200	€5.3m
Beattock to Cluden	30	900	€42.4m
Bond Road Diversion	0.4	300	€0.5m
Cappagh South to Ballymoneen	17	650	€15m
Citywest Diversion Phase 1	2	450/400	€2m
Citywest Diversion Phase 2	1	450	€1m
Curraleigh West to Midleton Pipeline	47	600	€48m
East Cork Pipelines	18	450	€26m
Fairview Park Diversion	0.8	250	€0.6m
Fassaroe Diversion	0.4	300	€0.5m

Finglas Road North Diversion	0.5	250	€0.5m
Finglas to Swords Road	2.3	400	€6.3m
Gas Pipeline to the West	318	750	€378m
Gas to Aughinish	4.8	300	€4.8m
Gas to Dublin Airport	2.8	300	€5m
Gas to Huntstown	1.9	300	€3.4m
Gas to Intel	3.1	200	€3m
Gas to Tynagh	17	300	€8.4m
Gas to Wyeth, Askeaton	2.5	150	€2.4m
Gormanstown to Ballough	15	900	€17.1m
Hollybrook to Wicklow	25.5	200	€12.8m
Interconnector 2 (Subsea)	190	750	€188.4m
Isle of Man Spurline	12	250	€54.8m
Jamestown Road Diversion	0.8	250	€0.5m
Mayo Galway Pipeline	132	650	€180.2m
N2 Diversions, Kilshane	0.4	900/450	€1.5m
N3/M50 Diversions	0.5	450/200	€2.7m
N9/N10 Diversion Kildare	0.9	450/150	€1.5m
Naas Road/Luas Diversion	2	500	€4.2m
NEP Mullagh Diversion	1.4	150	€1.4m
NEP2 Lift and Relay	4	450	€2.9m
Red Cow N7 Diversion	0.4	500	€1.4m
Red Cow N7 Diversion 2	0.3	500	€1.6m
South Eastern Motorway Diversion	1.3	400	€1.2m
Waterford Bypass Diversion	2	200	€1.1m
Waterford Bypass Diversion 2	1	200	€1.1m
Total Length	**968 km**		**€1.125bn**

Northern Ireland Project Title	Length (km)	Diameter (mm)	Cost (£m)
Kernan to Derryhale Pipeline	12.5	250	£7.6m**
Northwest Pipeline	115	450	£59.5m**
Northwest Spurs	12	150	£8.4m**
South North Pipeline	156	450	£90.8m**
Total Length	**295.5 km**		**£166.6m****
****Northern Ireland Projects in GBP(£)**			

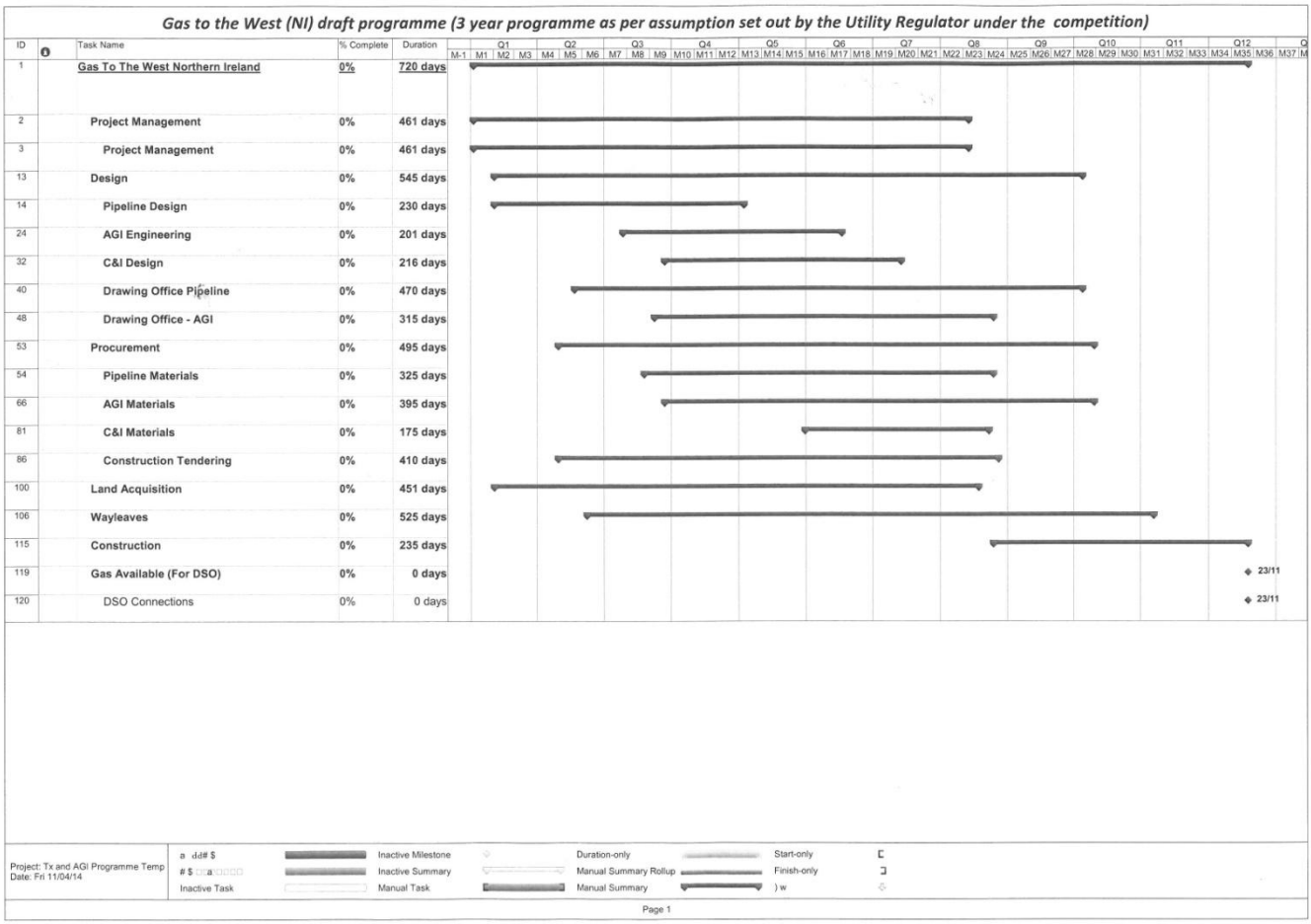
Figure 5 is a high level overview of the programme which is based on 3 years purely for the purpose of the competition, as per clarification number 2 by the Utility Regulator. We have included a programme based on 3 years to meet the requirements of the competition as set out in Appendix B, which includes a more detailed breakdown of the activities than that shown in figure 5.

We note the Utility Regulator recognises that in practice capital expenditure may continue beyond the first commencement date, per clarification number 2.

BGE & BGE (UK) have delivered programmes within time and budget as set out in table 2 above based on our past experience. We have included an additional programme within Appendix B an achievable programme based on our experience subject to statutory delivery of approvals.

The programme we set out is a four (4) year programme for a project of this magnitude.

Figure 5 Gas to the West Draft Programme



Key milestones for the GTTW project;

- Project Mobilisation Q1 Year 1
- Statutory Approvals Q3 Year 2
- Wayleave Agreements Q3 Year 2
- Material procurement Q3 Year 2
- Construction Availability Q4 Year 2
- Construction Complete Q4 Year 3

We have not included reinstatement as part of the programme, while reinstatement, pending weather, does take place during the construction phase, final reinstatement of the land can be post construction circa 18 – 24 months to cater for the maintenance period under the construction contract, to rectify any defects on the land. This facilitates regress to ensure the landowner is satisfied once all pipeline activities are complete.

The recording of 'as built' records is also post construction and we have excluded from the programme, which are typically finalised within 12 months on completion of activities such as cathodic protection testing etc.

Having reviewed the proposed route, there are considerable challenges but we are well equipped and have the capability to overcome these challenges through application of our experience.

Some of the high level challenges with the route are;

- Ground is very undulating, and pipeline route tends to be in valleys and follows the Electricity Grid for a considerable length of the route;
- Adverse ground conditions are anticipated in a number of locations along the proposed route of the pipeline. The route review conducted by BGE (UK) as part of the preparation of this submission identified extensive floodplains along the Enniskillen to Derrylin leg along with an extensive stretch of blanket bog between Omagh and Dungannon, flooding was also evident in the vicinity of the proposed River Blackwater crossing location. The terrain from Dungannon to Enniskillen also consists of a number of severely undulating terrain;
- Areas of the pipeline are routed through peat lands (e.g. Omagh to Dungannon); and
- Areas of the pipeline are routed through commercial fruit farms (e.g. Dungannon to Derryhale).

From our experience a number of steps can be taken to address these challenges;

- During the design phase of the project to understand and mitigate risks associated with adverse ground conditions, on recent projects such as Curraleigh West to Midleton and Gas to Great Island during initial route review BGE completed a fly over survey of the proposed pipeline route in winter in order to clearly identify areas of poor ground. The survey data was a key input into the subsequent route refinement process. The impact of adverse ground conditions needs to be reviewed early in the detail design phase as additional working width may be required in order to complete the constructions works through these particular areas which needs to considered when prior to issuing wayleave packages. During the design phase of projects of this scale BGE (UK) would engage an experienced Site Investigations contractor to complete investigative works along the complete route of the proposed pipeline. This would typically include as a minimum a combination of trial pit and boreholes, with groundwater ingress being noted as part of the logs. Piezometers would be installed at targeted locations and the ground water levels would be monitored for a suitable period (6 months) in order to establish water table levels. The soil conditions in addition to the water table levels as described in the factual report produced by the Site Investigations contractor heavily impact the proposed approach to dealing with adverse ground conditions at construction stage. Negative buoyancy impact on the pipeline also needs

to be considered during design. On previous projects where there were large areas of poor ground such as Pipeline to the West and the Mayo to Galway Pipeline BGE has specified weight coated pipe for the specific sections in order to counteract the effects of negative buoyancy.

- As outlined above the approach taken to adverse ground conditions can vary depending on the specific site conditions. On the Mayo Galway pipeline the pipe was installed through peat areas by excavating the peat along the running track and replacing it temporarily with a haul road constructed of imported stone and geotextile to enable construction plant to traverse parallel to the pipe trench. On the South North Pipeline an area of poor ground in the vicinity of the Poyntzpass was overcome by installing a temporary haul road constructed of timber load spreading mats (bog mats) and using wide tracked equipment to excavate the trench and install the pipe. As outlined previously additional working area width is commonly required in these areas as the trench generally needs to be widened and battered at a shallow angle for safety reasons.
- On the Curraleigh West to Midleton Pipeline project running sand and a high water table were encountered at the environmentally designated area in the vicinity of the River Blackwater crossing. The pipe was installed in this area by sheet piling the pipe trench and installing a wellpointing system to artificially lower the water table during construction. A similar approach may need to be taken on the River Blackwater crossing on the GTTW project subject to completion of the necessary Site Investigations.
- Given the nature of the terrain west of Dungannon BGE (UK) would need to review the potential benefits of including a construction contract provision for the installation of pre-construction drainage (a series of land-drains running parallel to the working width fences cross connected to header drains at suitable locations installed in advance of the main construction activities) along targeted sections of the route in order to try and minimise environmental risk and programme delay during construction due to deteriorating ground conditions during rainy periods. Drainage design will be key consideration from an environmental perspective as the undulating nature of the terrain increases the complexity around control of runoff and trench water. Measures such as silt barriers, cut-off drains and temporary filtration ponds are likely to be required during the construction phase.
- BGE (UK) has extensive experience in installing gas pipelines utilising trenchless techniques such as horizontal directional drilling (HDD), micro tunnelling, pipe ramming and auger boring. The crossing technique selected during construction of GTTW project will be dependent on the outcome of the site investigations and any pre construction trial pits conducted by the contractor following preparation of the right of way. BGE has successfully completed significant trenchless crossings on a number of recent transmission projects including a 1km HDD of the River Barrow (Gas to Great Island in 2013 400mm NB pipe), a 300m microtunell crossing of the River Barrow (Curraleigh West to Midleton in 2009 610mm NB pipe), a 400m HDD of the River Boyne (South North Pipeline in 2006 450mm NB) and a 700m HDD of the River Roe Valley (North

west Pipeline in 2004 450m NB). Auger boring and pipe ramming techniques have successfully been used for minor road crossing on both the South North and Northwest pipelines.

- During the design phase BGE (UK) would quantify and specify any specialist coatings to be factory applied by pipe vendor as required to facilitate the installation using trenchless techniques during construction such examples are Polypropylene, rib-coated Polyethylene or fibre cement.

Based on our experience we will assess the most appropriate course, inclusive of minor route amendments to ensure all risks are mitigated to deliver the GTTW project within programme and budget.

3.1.2 Assumptions Dependencies and Risks

The following are the high level programme assumptions, dependencies and risks;

3.1.2.1 High Level Programme Assumptions

- Programme is based on the three year delivery programme for the high pressure pipeline as defined for the purpose of the competition; we have assumed two year design and one year construction period. From our experience we estimate a project of this magnitude would be 4 years as set out earlier.
- We have assumed a normal construction season March to October.
- We have assumed there will be no major difficulties with the current level 1 route by FMA due to proximity of overhead power lines, we observe a significant portion of the route parallels existing Transmission electricity infrastructure.
- We note the M1 is PPP scheme and assume from our discussions with Department of Regional Development there will be no issue traversing the M1 motorway.
- We assume the high pressure pipeline does not get embroiled in the fracking Fermanagh Awareness Group in the planning process.
- We have assumed ground conditions similar to previous high pressure pipelines constructed in Northern Ireland (South North and Northwest pipelines).
- We have an archaeological timeline similar to previous pipelines (South North and Northwest pipelines).
- We have assumed wayleaves will be agreed by mutual consent.

3.1.2.2 High Level Programme Risks

- Pressure: BGE (UK) has reviewed the Fingleton McAdam design based on minimum pressure of 12 bar and has determined that it is not feasible based on the current pipe sizes to meet minimum pressure requirements of 12 bar. Significant upsizing of the pipe sizes (up to 550 mm), or compression may be required to meet minimum pressure

requirement of 12 bar, this would entail a re-design of the Fingleton McAdam study and impact on the Design and Planning timeframe.

- The Planning process: following our discussions with Mr. Simon Kirk, Acting Director Strategic Planning Division in Northern Ireland, we understand that DETI are reviewing strategic planning policy in the context of wider planning and local government reforms which involves the establishment of eleven new Council models and the transfer of the majority of the planning functions from DOE to local Councils on 01st April 2015.
- The Planning Process Timeline: we note from our discussions with Mr. Simon Kirk, that the planning process is six months, and should there be a request for further information the planning application needs to be re-advertised in the newspapers and the process restarts i.e. a further six months' timeline.
- The Planning application: following our discussions with Mr. Simon Kirk, it is not clear on the number of planning applications that may be required as part of the GTTW project, possibly a minimum of two, one to cover the section of pipeline connecting to Northwest pipeline and one for the connection to South North pipeline.
- The Fingleton McAdam feasibility Study March 2010,
    - The study relates to 2010 and note planning may have been granted for one off housing or other structures that may require possible re-routing, impacting on the Design and Planning aspect of programme.
    - We note from driving the route that the Omagh AGI location will need to be relocated, due to proximity to electricity power transformer station and domestic dwelling which will impact on the pipeline routing, hence the Design and Planning aspect of programme.
    - Dungannon to Portadown (Derryhale AGI) a section of the proposed route runs centrally through commercial fruit farms for circa 6 – 10 km and we believe this may require a re-route, impacting on Design and Planning aspect of the programme.
- The Planning and Wayleave process: following our discussions with Mr. Simon Kirk, we note the planning and wayleave process are not linked, while planning could be granted separately, we would endeavour to reach mutual agreement with the landowner on granting consent, where agreement is not reached, we note that DETI decide whether or not to grant a wayleave.
- Approval of the GTTW project by the Utility Regulator and DETI: pending on the timing of the approval, for example if it was quarter two or three, this would impact on the construction timeline which is typically March to October there by impacting on the overall GTTW project programme, this would likely push construction season out another year, from our experience and subject to weather, land agreements and conditions, AGIs could possibly be constructed over the winter season.

- Type of contract. BGE (UK) / BGE have constructed may high pressure pipelines both in Republic of Ireland and Northern Ireland, we have developed bespoke conditions of contract with fixed price activities and schedule of rates, this bespoke contract has delivered on cost and programme with value for money for BGE (UK) / BGE.

3.1.2.3 Programme Interdependencies Risks

- The Planning and Wayleave process: following our discussions with Mr. Simon Kirk, we note the planning and wayleave processes are not linked. While planning could be granted separately, we would endeavour to reach mutual agreement with the landowner on granting consent. Where agreement is not reached, we note that DETI decide whether or not to grant a wayleave which could impact on programme.
- The minimum pressure 12 bar or the optimal design pressure, to design, construct and operate the pipeline is fundamental from and economic perspective for the project and operation of the pipeline. As previously stated, BGE (UK) has reviewed the Fingleton McAdam design based on minimum pressure of 12 bar. Based on the current pipe sizes it is not feasible to meet minimum pressure requirements of 12 bar. A significant increase of the pipe sizes (up to 550 mm), or compression, may be required to meet minimum pressure requirement of 12 bar. This would entail a re-design of the Fingleton McAdam study and impact on the overall project timeframe.

3.1.2.4 Regulatory and Licensing Elements of Mobilisation

The Markets and Regulation function of Bord Gais Networks, on behalf of BGE (UK) would deliver the Network Codes and the various inter-TSO and inter-DSO arrangements required to the extent that these functions are not previously transferred to the intended Contractual Joint Venture / Single System Operator (CJV / SSO) in. These activities would run in parallel to the engineering operations.

BGE (UK) and Bord Gais Networks have significant experience in the development of new Network Codes and the Code Modification processes for making changes to these codes. We are active participants in Code Modification Forums and engage proactively with all industry stakeholders to make changes when requested to do so by Regulatory Authorities and industry participants. Both BGE (UK) and Bord Gais Networks on behalf of Gaslink are active participants in the European Network for Transmission System Operators – Gas (ENTSOG), a co-operative body for TSOs set up as part of the Third EU Energy Package. This group is working to develop EU wide Network Codes at the direction of the EU Commission and ACER which is the equivalent co-operative body for EU Regulators.

BGE (UK) and Bord Gais Networks are working with Regulatory Authorities and other NI TSOs to implement the new EU Network Codes. BGE (UK) is working with MEL to deliver the CJV/SSO in NI as well as working to transition the NI Postalised Tariff structure to an Entry/Exit based structure. Bord Gais Networks undertook a similar tariff restructuring in Ireland and is brining this experience to bear on the process in NI.

Bord Gais Networks on behalf of Gaslink, the Independent System Operator in Ireland, are active members of Gas Infrastructure Europe and Gas Transmission Europe. These are European representative bodies for the Gas Industry which seeks to develop and influence EU Energy policy on behalf of TSOs and the broader Gas Industry. These forums present TSOs with an opportunity to learn from each other and to cooperate in relation to policy initiatives.

Network Code

A number of assumptions are identified as follows:

- The Contractual Joint Venture / Single System Operator (CJV / SSO) in NI will be fully operational in advance of the commencement of operations on the GTTW high pressure pipeline;
- The single Entry/Exit Network Code for NI will be fully operational in advance of the commencement of operations on the GTTW high pressure pipeline;
- The single I.T. system (operating the NI network in accordance with the single NI Entry/Exit Code and administered by the CJV / SSO) will be fully operational in advance of the commencement of operations on the GTTW high pressure pipeline;
- BGE (UK) Network Code will no longer exist as a live document and therefore will not require amendment.
- The single NI Network Code, CJV/SSO and GTTW Licence will each be developed, insofar as is possible, to ensure that arrangements applying to existing networks (transmission or distribution) are aligned and consistent with those applying to the new GTTW networks.

BGE (UK) assumes that the single NI Network Code will be applied to the GTTW high pressure pipeline as it is to the existing NI high pressure network and accordingly, a separate network code is not required in respect of the new assets. Effectively, any changes to the single NI Network Code to account for the introduction of the GTTW high pressure pipeline will be minor, including but not limited to the following:

- Reference to new licence and any requirements thereof which are unique to the GTTW licence
- Reference to new Exit Points and any specific / unique requirements (technical or otherwise) which may relate to such Exit Points
- Any unique requirements which arise as a result of the DSO (low pressure network) licence (and consequent Distribution Code) which may require changes to the Transmission Network Code

- Reference to new TSO/DSO Agreement (or CSA) and the requirements thereof as they effect the TSO – Shipper interface

TSO and DSO Agreement

- TSO / DSO agreement to be developed between the TSO and the successful DSO on the low pressure network.
- The estimated resource commitment is as follows:
- 4 month duration
- Internal: 120 man days (1.5 man days per week)
- External Legal: 15 man days

Inter-TSO Agreement (NINOA)

- It is assumed that the holder of the new GTTW high pressure network licence will be required to become a party to the NINOA (or its successor as part of the CJV/ SSO)
- As BGE (UK) is already a party to the agreement, this represents a benefit relative to the potential requirement to introduce another entity to the agreement.
- Assuming that the TSO – TSO interface between the existing NI network and the new GTTW pipeline is BGE (UK) – BGE (UK), the information flows which may be required should the adjacent TSOs be different entities is largely eliminated as all information exists in-house.
- Any such information flows would require amendment to the NINOA

3.2 Support Resources

Similar to previous pipelines successfully delivered in Northern Ireland the Project Management Team will have the full support of the Bord Gais Networks organisation. We have set out in section 3.1 that a Steering Group will be in place and the Project Management Team will report into the Steering Group on a monthly basis. There is a commitment from the Managing Director and the Executive Management team to apply whatever resources are necessary to deliver the GTTW project for the benefit of the Northern Ireland consumer.

The Project Management Team through the various business leads for Asset Management, Asset Operations, Finance and Markets and Regulatory affairs will manage internal and external resources in the respective areas to deliver the GTTW project.

3.3 Activities

The following the key activities we would initiate for the GTTW project;

3.3.1 Establish Project Team

- As outline in section 3.1 we have already mobilised a project team for the licence application. The initial team will be based in Cork, as we have a number of projects finishing end of 2014 and will be in a position to redeploy these resources immediately to the GTTW project.

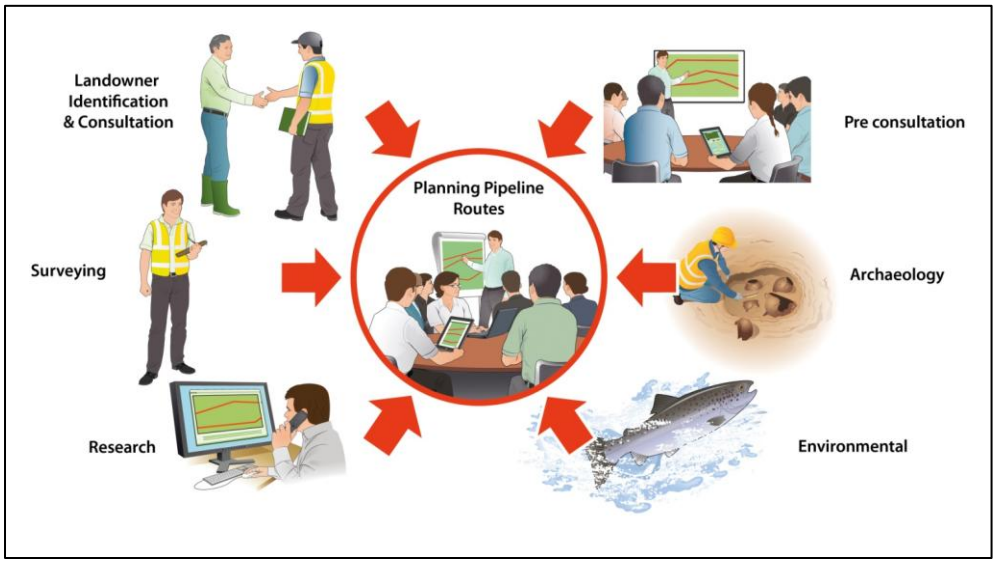
3.3.2 Stakeholder Engagement

- Wayelaves are crucial and we would initiate discussions with Ulster Farmers Union and farming representatives as we have strong relationships in place having successfully completed circa 300 km of Transmission pipeline in Northern Ireland. This offers a major benefit for the GTTW project as there are already wayleave packages in place. We have maintained these relationships through the years and there is currently a high degree of mutual respect and trust between BGE (UK) and the parties involved.
- We have held meetings with some of the key stakeholders and would firm up on details regarding the planning process and environmental agency requirements.
- We would engage with the Distribution System Licence holder regarding optimisation of the overall design.

3.3.3 Commence Pipeline Routing

We would commence review of the route utilising our expertise and the following process set out in Figure 6 for the GTTW project.

Figure 6 Planning Pipeline Routes



3.3.4 Commence Licence Arrangements

- We would commence discussions with the appointed Distribution licence holder to put necessary agreements in place regarding programme and gas availability.

3.4 Costs

Our mobilisation activities are accounted for in our estimation process, to which we have a dedicated in house estimation function. Based on our extensive experience over the past 35 years we have built up a history of project cost estimates, which have been benchmarked and adjusted to reflect actual project costs over time.

Our estimates are based on building blocks referred to as “Compatible Units” (CU) which is a function of Maximo, our Asset Management software system.

Compatible unit estimating allows costs estimates to be built up from smaller predefined building blocks, in our case, costs of AGIs, pipelines, materials, design, project management, labour and other costs. These smaller compatible units, as estimates progress become replaced with actual base costs through procurement of contracts and materials.

This essentially provides our estimators with a library of cost schedules to build up estimates, for example steel pipelines with varying diameter to above ground installations. The CU process also incorporates version management function and tracks changes made to estimates, as the estimate progress through the approval system where actual tender costs are entered into the estimate. The CU process identifies how costs are derived and it can be seen where the largest cost drivers in the CU estimate are built up.

All CUs created as part of a project are individually available within the CU library, allowing estimators to add individual CUs as necessary to project estimates.

For the GTTW project our estimators have built an estimate based on the high pressure Transmission design as set out by Fingleton McAdam (FMA) in the “Potential Extension of Natural Gas and Related Services in Northern Ireland” Feasibility Study Report March 2010 under the Utility Regulator competition, for construction of circa 169 km of high pressure Transmission pipeline.

We have built the estimate from the bottom up using compatible unit approach to estimating. The estimate reflects best cost estimate subject to market verification through the European tender procurement process for the construction contract and incorporates rates for materials based on the BGE (UK) frameworks with material suppliers.

Having material frameworks in place offer an advantage regarding the procurement process, in terms of timing to procure materials and also reflect BGE buying power.

In addition, over the past eighteen months, we have constructed a combination of Transmission pipeline sizes ranging from 200 mm to 450 mm in diameter, with combined lengths of circa 60 km which also reflect pipeline activities in the compatible units estimate library.

- Construction of 46 km 400 mm steel pipeline to 400 MW Power Station, Co. Wexford in 2013
- Diversion of 0.5 km 450 mm steel pipeline in Northern Ireland for A8 Motorway in 2013
- Construction of 10 km 300 mm steel pipeline, Dublin City Refurbishment in 2013.

We have adopted the compatible unit estimate approach to build up the activities for the GTTW project based on our pipeline construction experience.

The estimate provides an indicative capital cost for the high pressure pipeline section of the GTTW competition based on FMA March 2010 design. While we note, materials, construction, site investigation, wayleaves, SCADA and control and instrumentation are a pass through our estimate reflects "bottom up approach" based on our CU methodology for the purpose of the competition.

Table 3 presents the figures being entered by BGE (UK) Limited in connection with this licence application.

Table 3 BGE (UK) Licence Submission Bid

TASK	Cost (£)
Design and Project Management	12,241,866
Contingency	4,327,712
Mobilisation	300,000
Other Applicant Costs	0

Table 4 Cost Estimate provides an overview of activities with a breakdown in the respective areas, which is essentially the capital cost expenditure. The cost of mobilisation, which relates to putting conveyance licence in place, agreements with other TSOs, Gas Transportation Management Systems (GTMS) etc. will run in parallel with initial design and planning phase. BGE (UK) has existing assets, operational systems, IT systems, licences, codes etc. in place in Northern Ireland; we foresee the GTTW project merging in to our existing systems with relatively light modifications to reflect the new project.

Table 4 Cost Estimate

Activity	Description	£ Capital Cost	£ Capital Cost
Project Management	Engineering Services	7,500,000	
	Project Management	1,338,829	8,838,829
	Mobilisation	300,000	300,000
Design and Planning	Drawing Office Pipeline	76,363	
	Drawing Office AGI	56,280	
	Pipeline Engineering	76,860	
	AGI Engineering	130,851	
	Project Services	2,690,783	
	Construction Tendering	71,900	3,103,037
Material Procurement	Line Pipe and Bends	11,364,726	
	AGI Materials	4,165,108	
	Material Storage	635,000	
	Material Inspection	275,000	16,439,834
Construction	Construction Contract	47,604,832	
	Operational Services	1,153,796	
	Construction Management	441,700	
	Archaeology	1,729,750	50,930,078
Wayleaves	Wayleaves	14,261,208	
	Land Acquisition	1,815,504	16,076,712
C&I	C&I Materials	950,031	
	C&I Construction	300,000	
	C&I Design	42,000	1,292,031
Total Cumulative Budget			£96,980,521

3.5 Systems

BGE (UK) and Bord Gais Networks already having existing systems in place such as the asset management system "Maximo" and GTMS. These are used in the Republic of Ireland and Northern Ireland and therefore we do not envisage any new systems.

The GTTW project will leverage off these existing systems, which is an advantage for the project.

We have previously mentioned we will run in parallel to the project management phase the merging of the GTTW project into the existing operational systems, IT systems, licences, codes etc, where only relatively light modifications are required to reflect the new project.

The Gas Transportation Management System Northern Ireland (GTMSNI) IT system was developed in 2003 to provide parties involved in the transportation of Natural Gas through the BGE Northern Ireland Transportation System with a fully integrated IT system that reflects all of the rights and obligations contained in the BGE Northern Ireland Transportation Network Code. The GTMSNI system provides functionality for Capacity, Nominations, Allocations, Balancing, Scheduling, Shrinkage, as well as Billing.

All Shippers transporting gas on the BGE Northern Ireland Transportation System are required to accede to the BGE Northern Ireland Transportation Network Code. The system currently comprises of one Transmission Connected offtake at the Coolkeeragh Power Station and an offtake to the 10 Towns Distribution Zone owned by Firmus Energy Distribution Limited. For clarity, all Shippers operating in the 10 Towns Distribution Zone are also Shippers on the BGE Northern Ireland Transportation System.

The system in its current form is easily scalable and additional offtakes, for Transmission, Distribution or Virtual Exit Point Zones can easily be added to the system.

It is anticipated that the current GTMSNI system will be replaced by a new IT system to meet the needs of all Transmission Operators in Northern Ireland. A Commercial Joint Venture (CJV) has been put in places to manage this process. The information provided in this document is in respect of the GTMSNI IT system currently in use as no assumptions can be made in respect of any prospective future system.

3.5.1 Supervisory Control and Data Acquisition (SCADA)

The existing SCADA Network has sufficient spare capacity to accommodate additions to the Network. This will involve additional configuration only to accommodate an expansion to the Network, i.e. no procurement as such. The configuration work would be similar to that required in the case of a new Transmission Connection entering the Network. However, in the event of additional signals which are outside BGE (UK)'s SCADA signalling philosophy, or any new functionality required within the existing SCADA system, a detailed requirements, design development and testing process will need to be agreed with the vendor. In the case of the replacement of SCADA with a new IT system, it is expected that a full procurement process, including the selection of a vendor, would need to be entered into.

3.5.2 Cathodic Protection (CP) Remote Monitoring

The existing CP Remote Monitoring system has sufficient spare capacity to accommodate additions to the network, requiring configuration only, i.e. no procurement. The configuration work would be similar

to that required in the case of a new Transmission connection entering the network. However, in the event of additional signals which are outside of BGE (UK) CP Remote Monitoring signalling philosophy, or any new functionality required in the existing CP Remote Monitoring system, a detailed requirements design development and testing process will need to be agreed with the vendor (Technosystems). In the case of the replacement of CP Remote Monitoring with a new IT system, it is expected that a full procurement process, including the selection of a vendor, would need to be entered into.

3.6 High Pressure System Construction

3.6.1 Stakeholder Engagement

BGE (UK) has been operating in Northern Ireland for the past 10 years and has constructed circa 300 km of high pressure Transmission pipelines. These pipelines have been constructed within programme and budget. BGE (UK) has achieved success in delivery of projects of this magnitude through development of strategic relationships and the existing agreements it has in place.

BGE (UK) will leverage off these relationships and agreements to deliver the GTTW project. Since 2004 when the Northwest pipeline was constructed, BGE (UK) has strived to ensure relationships are continually developed and as such we have agreements in place which would allow BGE (UK) to mobilise quickly to the benefit of the GTTW project.

A key driver of the GTTW project will be the consenting wayleaves, BGE (UK) has an excellent track record in acquiring wayleave agreements through a mutual consenting process and manages relationships with c.7,000 landowners. We have successfully negotiated 5,500 wayleave agreements within the last 14 years of which c. 850 relate to Northern Ireland.

Table 5 shows the wayleaves successfully acquired on the following projects;

Table 5 Number of Wayleaves on Previous NI Projects

Project	Year	No. Of Wayleaves
Northwest Pipeline	2004	369
South North Pipeline	2006	360
Kernan to Derryhale	2010	56

The following is the approach we take with landowners where any remedial works arise which we successfully address, hence our well established relationships with landowners and farming organisations;

- On completion of the pipeline construction, initial land reinstatement and registration of wayleaves BGE (UK) Ltd. continue to maintain and update our landowner database.

- On receipt of a communication (written or verbal) to BGE (UK) from a landowner or his/her land agent regarding a land drainage or remedial issue we arrange for our Agricultural Liaison Officer ('ALO') to call to site and inspect the situation on the ground. Following inspection and discussions with the affected landowner and once the identified issue is confirmed to be associated with the existence of the pipeline a scope of works is then proposed and agreed with the landowner/land agent.
- The average number of cases where such issues arose on the Northwest and South North pipelines is 7%.
- Where remedial drainage, excavations, sub-soiling, re-seeding, reinstatements etc. works are identified and agreed these are carried out to a particular programme by a BGE (UK)'s contractor or where agreed by the landowner under the supervision of BGE (UK). On completion of these work and where appropriate the landowner is paid compensation for any additional appreciable disturbance/crop loss incurred.
- There is also a clause in the Deed of Grant of Easement that in the event of a dispute on any issue between BGE (UK) and the landowner which remains unresolved same maybe referred on the application of either party to the Land Tribunal for Northern Ireland whose decision (including as to costs) shall be final and binding on the parties. To date no such application has being taken in respect of any pipeline constructed by BGE (UK).

Some of the key parties BGE (UK) has developed relationships and agreements with are as follows;

- Premier Transmission Limited (PTL);
- Phoenix Natural Gas;
- Firmus Energy;
- Ulster Farmers Union;
- Northern Ireland Road Authority and Utilities Committee;
- Department of Regional Development; and
- Centre for Protection of National Infrastructure.

These relationships are critical in order to operate successfully and continually provide a safe, secure and robust gas network for the consumers of Northern Ireland. Relationship range from inter Transmission and Distribution Operator agreements, operational maintenance agreements with regard to planned works.

We also conduct networks analysis on behalf of the Utility Regulator of Northern Ireland where both BGE (UK) and PTL, jointly feed into the annual gas capacity statement for Northern Ireland.

It is our intention, if successful; to transfer this knowledge and working relationships we have developed over the past ten years into the GTTW project to the benefit of the consumers of Northern Ireland. The benefits would include but are not limited to the following;

- Rapid Mobilisation of GTTW project;
- Utilizing Existing and Working Relationships; and
- Gas to West rolled into existing agreements or slight amendments to existing terms and conditions.
- Inter knowledge of existing pipeline and AGI assets

BGE (UK) is the only organisation which has constructed 70 barg pipelines in Northern Ireland; with over ten years operational capability and our proven track record through successful landowner negotiations in obtaining the necessary consents, these skills and experiences will be applied to deliver the GTTW project.

We also work closely with external bodies and are affiliated with Business in the Community Ireland. We have demonstrated our commitment to stakeholder management which saw the publication in conjunction with other organisations of the Stakeholder Engagement Report, published in December 2013. The public report, the first of its kind in Ireland, shares and documents company experiences and practical advice on stakeholder engagement for the benefit of other companies and development agencies.

We are committed to effective and meaningful stakeholder engagement and;

1. Encouraging active involvement of stakeholders
2. Ensuring stakeholders have the opportunity to have a say
3. Explaining at the outset what elements of the project can be influenced, when and in what way
4. Understanding and responding to stakeholder needs and concerns with considered and timely responses
5. Engage respectfully with stakeholders and expecting the same in return
6. Evaluating and improving engagement with stakeholders on an ongoing basis

The following Stakeholder Management Plan will be put in place for the GTTW project, taking into account our previous experience of constructing Transmission pipelines in Northern Ireland.

Our experience is unparalleled in this regard and what it actually takes to deliver a project of this magnitude from conception to operation, the fact we are the only Transmission System Operation to have successfully constructed 70 barg pipelines in Northern Ireland, with a proven track record will greatly reduce public

opinion and perception of the GTTW project, in contrast, to an organisation that does not have this experience.

This will greatly benefit the mobilisation, design and project management phase of the project regarding the stature BGE (UK) holds in Northern Ireland based on its impeccable record of safety, and the relationship BGE (UK) holds with the Health and Safety Executive of Northern Ireland.

The Stakeholder Management Plan for the GTTW will incorporate all learning's from previous pipelines constructed and will aim to;

- Establish and maintain mechanisms for effective and timely communication;
- Inform on the progress of the project;
- Coordinate all levels and types of communication in relation to the project with those involved;
- Manage expectations on project progress; and
- Develop over the course of the project through the accumulation of further information from the different business functions.

The Stakeholder Management Plan will be developed in the following stages for GTTW;

Stage 1 – Stakeholder Liaison Programme – Scope

- Establish Communications Team and Responsibilities with the Project Manager, Community Liaison Office, Public Relations, Asset Management and Asset Operations
- Define Objectives and Key Messages of the Project
- Timeframe and Milestones
- Agree frequency and methods of communication (internal and external meetings, written communications, newspaper notices, public information meetings, literature such as brochures, leaflets, web page)
- Prepare Questions and Answers for the project

We have successfully adopted this approach on previous projects, see Appendix C

Stage 2 – Stakeholder Assessment and Mapping

- Desk-based research
- On-site inspection
- Risk assessment

Stage 3 – Stakeholder Liaison Programme – Consultation

- Consult with all agreed stakeholders including
  - Landowners;
  - Third Parties;

- Community Groups;
- Statutory Bodies;
- Local Authorities;
- Elected Public Representatives ;
- Contractor(s);
- Internal Stakeholders, Other Departments, Agricultural Liaison Officers, points of contact and our call centre; and
- Media via Corporate Affairs Department.

- Brief Call Centre with future project details
- Outline and agree Communication tools e.g. Brochures, leaflets, postcards, maps, signage, etc.

Stage 4 – Stakeholder Liaison Programme – Refine for Project Go-Live

- Finalise and produce communications materials for issue
- Brief agreed stakeholders
- Prepare and Issue invitations to public information evenings
- Brief Contractor and collaborate for dispersal of communications materials (depending on scale of project)

Stage 5 – Go Live

- PR Activities – as determined by Corporate Affairs Department
- Public Information Evenings
- Issue communication materials, pre-start letters, brochures, etc.
- Monitor feedback and address queries from stakeholders
- Update stakeholder list with any previously unidentified stakeholders
- Continually update website, briefing notes for media and contact centre
- Liaise with key identified stakeholders as necessary

Stage 6 – Learning and Evaluation

- Measure accuracy of risk assessment
- Review stakeholder map
- Review strengths and weaknesses
- Adopt changes for future projects

We have already held meetings with the following parties regarding the project to understand their requirements;

- Mr. Simon Kirk, Acting Director Strategic Planning Division in Northern Ireland
- [redacted] and [redacted] Road Services, Department of Regional Development

- Mr. Terry A'Hern CEO, Northern Ireland Environment Agency

We are embedded in Northern Ireland through our existing assets working closely and well with following parties,

- Premier Transmission Limited (PTL)
- Phoenix Natural Gas
- Firmus Energy
- Ulster Farmers Union
- Northern Ireland Road Authority and Utilities Committee
- Department of Regional Development
- Centre for Protection of National Infrastructure

We communicate planned works through the Northern Ireland Street Works registration and notification system regarding street works.

It would be our intention to present to the Northern Ireland Road Authority and Utilities Committee (NIAURC) regarding the proposed project, we are already a member of this forum through our existing infrastructure assets.

As part of the routing process we would engage initially with landowners to agree on the route, we would prepare brochures for the landowners so they understand the need of the project and how the project would be constructed, Appendix C sets out a sample of the brochure used on similar type projects, in addition to a developed landowner handbook.

It would be our intention to hold a series of public information evenings to set out the requirements of the project and capture any concerns prior to finalising the route, we would propose meetings at the following locations given the scale of the project and minimise the impact on the need of people to travel to ensure people have an opportunity to have a say, in addition to setting up web links.

Proposed locations;

- Strabane
- Enniskillen
- Omagh
- Dungannon

Appendix D shows a sample of display boards used on similar type projects at public information evenings.

Prior to any public information evenings we would present separately to local representatives and Councillors as required in order to ensure they are apprised fully about the project and are aware of the benefits and anticipated timelines. This is the approach we previously adopted for Northwest and South North pipelines, which were delivered successfully.

We have strong relationships with the Environmental agency through our existing presence in Northern Ireland, we have discussed the project and discussed with them ways in which we would address areas of National Heritage, Archaeological, and Habitats and that we are accredited to ISO 14001:2004 with an Environmental Management System in place, embedded in our planning and design process which will be utilised in the GTTW project. Our discussions were positively complemented.

Regarding other licence holders we have existing relationships in place through the development of the Northern Ireland Gas Capacity Statement within our Asset Management Division. We will leverage off our existing relationships to develop and roll out the Transmission network to ensure we deliver the proposed Transmission network in a timely manner securing the necessary interoperability agreements as required through our Markets and Regulation Division of the business.

3.6.2 Efficient Network Optimisation

We have reviewed the existing design based on the 2010 Fingleton McAdam Feasibility Study. We are of the view based on our considerable experience the design could be optimised and what we offer would benefit the GTTW project. We set out our initial thoughts as follows;

- Above Ground Installations (AGI) locations, the design can be optimised and have set out an alternative in Appendix E which will reduce the Transmission network and allow more customers to be connected as the Distribution feeder main increases. This would also reduce the construction time on the Transmission pipeline and hence will get customers connected to the Distribution system in a shorter timeframe and the reduction in Transmission pipeline will also minimise disruption to landowners.
- Special Engineering Crossings, through our past experience and the build out of the towns and Transmission network in Northern Ireland, optimising the AGI location can mitigate the special crossings on the Distribution feeder main mitigating cost and construction risk. We utilised this approach in the build out of previous networks in Northern Ireland.
- Bord Gais Networks has a number of pipeline supply frameworks in place with European steel mill manufactures. From our experience, under certain conditions, such as the quantity of pipe for heavy wall or light wall defined under final design, there can be significant scrappage, up to 40% from the production of 150 mm as opposed to 200 mm steel line pipe. In this instance it can be more economical for the steel mills to produce 200 mm pipe rather than 150mm pipe to mitigate the amount of scrappage. This would increase the capacity of the 150 mm pipeline section by 70% by utilising 200 mm line pipe.

3.6.3 Supply Chain Optimisation

BGE (UK) will leverage off existing agreements from its parent organisation with material suppliers and engineering service providers.

This is a major advantage for the GTTW project as it would reduce the procurement phase of materials and accelerate the engineering phase through early mobilisation of environmental surveys, pre-

construction archaeological works and site investigations. We estimate a six months saving to the benefit of the GTTW project through existing frameworks.

We set out below a brief description of the contracts in place which would benefit the GTTW project in terms of programme timeline and cost efficiency.

Table 6 Contract Frameworks

Reference No	Tender Name	Brief Description
12/014	HFI Line Pipe Framework	The scope of this framework includes the provision of a suite of HFI Linepipe Materials This is a multiparty framework agreement for the provision of the manufacture, supply and delivery of linepipe in accordance with specified standards and specifications.
12/016	Pressure Reduction Systems Framework	Framework for experienced Pressure Reduction System manufacturers Pressure Reduction Skid packages with associated pipework, electrical and instrumentation equipment: • Filters • Turbine / ultra sonic Gas Meters • Heating Exchangers • Pressure Regulation Streams • Fuel Gas Let down Unit • Acoustic GRP enclosures
13/008	Engineering Services Contract	The Engineering Services Contract is sub-divided into ten (10) separate lots. Lot 1 - Large Gas Specific Design Services Lot 2 - Construction Supervision and Project Management of Pipelines and Installations in ROI Lot 3 - Survey and Design of Existing Gas Installations and Sites Lot 4 - C&I Design including conceptual, preliminary and detailed design of new installations and upgrade of existing BGE installations Lot 5 - ATEX Survey, Review and Risk Assessment: Lot 6 - Compressor Stations Design, Project Management and Construction Supervision: Lot 7 - Drawing Office Services: Lot 8 - Civil and Structural Design Services: Lot 9 - Statutory Documentation and Applications: Lot 10 - CNG Stations Design, Project Management and Construction Supervision

To be re-tendered	Pressure Boiler Framework	Framework agreement for the design, manufacture, supply, testing, on-site installation, supervision, commissioning, training, certification (including electrical and instrumentation works) and performance evaluation of Package Boiler Units.
14/008	Tech Specialist Consultancy Framework	This is a multiparty framework agreement with competent entities whose responsibilities include but are not limited to giving advice, examining, analysing and reporting on certain issues that may occur in relation to processes, procedures, materials, risks and incidents within Bord Gais Networks as required. The provision of Technical Specialist Consultancy Contract is sub-divided into fifteen (15) separate lots; Lot 1 - Material Testing, Investigation and Approval Lot 2 - Integrity Specialist Lot 3 - Risk Management Specialist Lot 4 - Audit Specialist Lot 5 - Hazardous Area and ATEX Specialist Lot 6 - Accident/Incident Investigation and review Lot 7 - Provision of Procurement Services Lot 8 - Network Analysis Support Transmission Specialist Lot 9 - Network Analysis Support Distribution Specialist Lot 10 - Third Party Inspection Services Lot 11 - Environmental Compliance Specialist Industrial Lot 12 - Process Control and Engineering Lot 13 - Turbo Compression Consultancy Lot 14 - Cathodic Protection and High Voltage Interference Specialist (for Gas Pipeline Networks) Lot 15 – Noise Testing and Analysis/Assessment
12/065	Tech Survey Services	Framework agreement, for the provision of Technical Surveying Services associated with the design, construction and modification of Gas pipelines, installations, associated ancillary equipment and fibre optic duct network.

		The contract will cover the Republic of Ireland and Northern Ireland
08/038	Design/Engineering Consultancy and Project Management Services	For the design, engineering and project management services in relation to certain projects. These services are provided under a multiple provider framework agreement.
12/001	National Pipeline Inspection Contract	Framework agreement for Inspection Services to support Bord Gais Networks installation and pipeline safety management. The service is provided nationwide for the Networks Division of BGE, covering Transmission pipelines and occasionally on Distribution pipelines in the Republic of Ireland.
12/002	Land Agency Services	LAND AGENCY SERVICES Landowner pre-scheme consultation and issue package arrangements with Land owners, farming community, forestry organisations and Statutory Bodies. Valuation assessment for development lands. Land pre-entry consultations for gas infrastructure projects. Attendance at arbitrations hearings. Assistance with route evaluations on all types of gas infrastructure projects. Liaising with land owners and their advisors, including surveying and maintaining landowner record updates. Completion of planning investigations and advising on development valuations of lands impacted by gas infrastructure projects. Providing Agricultural and Agronomy Services, inclusive liaison officers. Co-ordination of Specialists, Advisors, and Subcontractors for landowner requirements for gas infrastructure projects. Updating BGE (UK) records remotely and providing administration services. All aspects of Rural Consultancy. Preparation of reports, briefing notes, files, and electronic records to complete duties set out in above scope. Land reinstatement and drainage resolution, agricultural liaison officer function.
12/026	National Aerial Surveillance	Provide aerial surveillance service of the Bord Gais Natural Gas Network to report on ground activity and encroachments that may affect the integrity of the gas pipeline

		nationwide.
12/022	Health and Safety Consultancy	The scope of the contract is to cover the provision of Health and Safety Consultancy Services (including health, safety and environmental audits and inspections) for Bord Gais Networks, throughout the Republic of Ireland, Northern Ireland and Scotland.
10/003	Cathodic Protection Maintenance and Monitoring	Provision of a Cathodic Protection Engineer Resource to undertake remedial repairs, surveying for new designs, pre and post readings of new designs, fix faults, diagnose issues, report on problems, liaise with survey crew and be the point of contact, attend to issues with remote monitoring equipment and fix as required

3.7 Construction Project Management

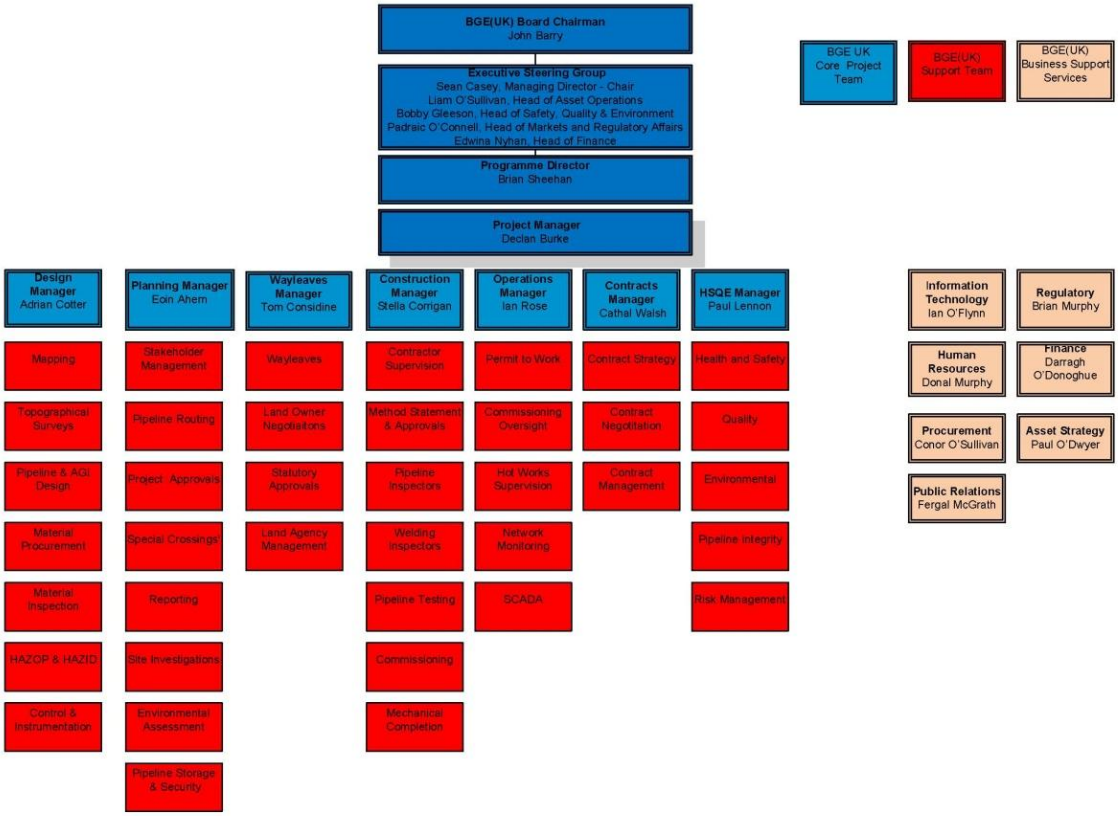
Our approach to management of this project is based on our experience over the past 35 years. We have set out our proposed project team Figure 7, supported by our engineering and business support services.

GTTW will be approached like all our projects; we will maintain control of the project by closely monitoring all phases of the design, construction and operational phases. Our philosophy is to be proactive in our approach. We do not simply monitor the project, we try to anticipate any potential difficulties and issues that may arise and seek to work closely with external parties and our contractors to ensure any risks are mitigated.

An important aspect of this philosophy is to ensure all third parties are contacted at an early stage in the project, for example key stakeholders (landowners, community and statutory bodies).

The construction project team will be based in our Antrim operational offices. They will be supported regionally from our Dublin and Cork offices where required.

Figure 7 Proposed Project Team



3.7.1 Construction Process and Timing

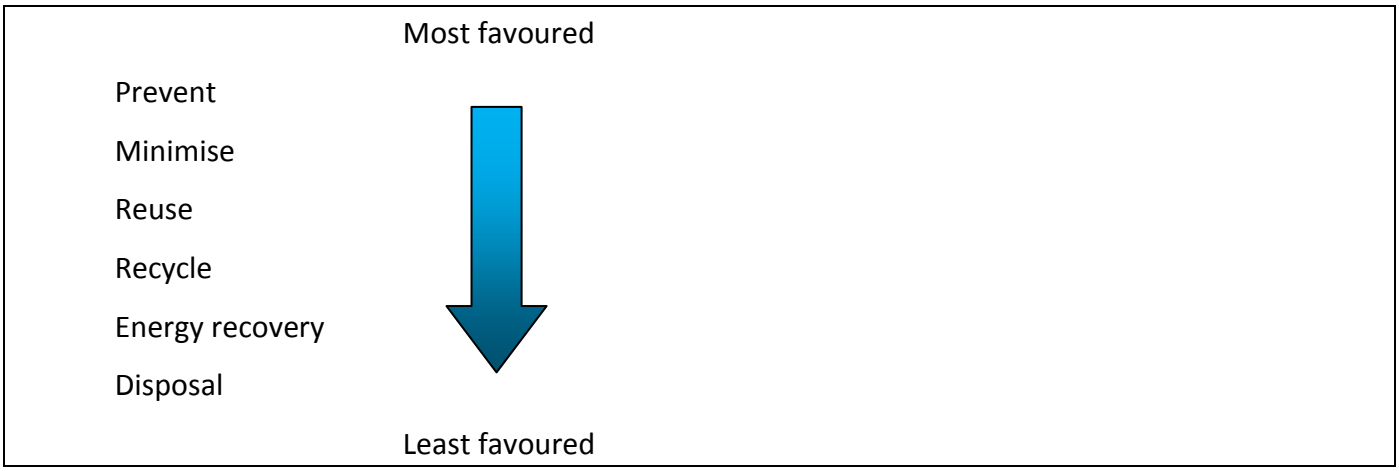
Pipeline construction is a sequential process, and comprises a number of distinct operations. The rate of progress of each operation is dependent on a number of factors, including the ground conditions, the nature of the task and the weather. A key constraint on the seasonal timing of construction activities is the habitats along the route. ***The construction work is typically from March to October, therefore the timing of approvals will dictate when the construction season will commence.*** Ecological survey works would be carried out as required prior to this, and advanced preparatory work may also be carried out first, on more difficult terrain such as bogs or wet ground.

Work on river crossings, motorways, road and rail crossings and other areas which require non-standard construction methods may commence next, within the seasonal ecological constraints, and this will be followed by the construction of the remainder of the pipeline. In advance of the construction works, ground investigation will be carried out to confirm the ground conditions along the pipeline route. The investigation will consist of excavating trial pits, drilling boreholes and geophysical surveys as required.

The appointed contractor in consultation with BGE (UK), will develop risk registers, pollution control plan, environmental management plan, construction waste management plan, and a contingency plan to control and monitor all key aspects of performance of the project.

For example, Figure 8 waste arising during the construction phase will be carefully managed according to the following hierarchy;

Figure 8 Waste Management Hierarchy



A construction supervision team will be employed by BGE (UK), overseen by our Construction Manager, Stella Corrigan for this project. Our construction management team will monitor the construction of the pipeline and audit the works to ensure they comply with the method statements and other quality procedures.

Figure 9 gives an overview of the sequential process to high pressure Transmission pipeline construction which would be adopted on the GTTW project.

Figure 9 Transmission Pipeline Construction

Fencing and Topsoil Stripping


Pipe Stringing and Bending


Pipeline Trenching and Lowering In

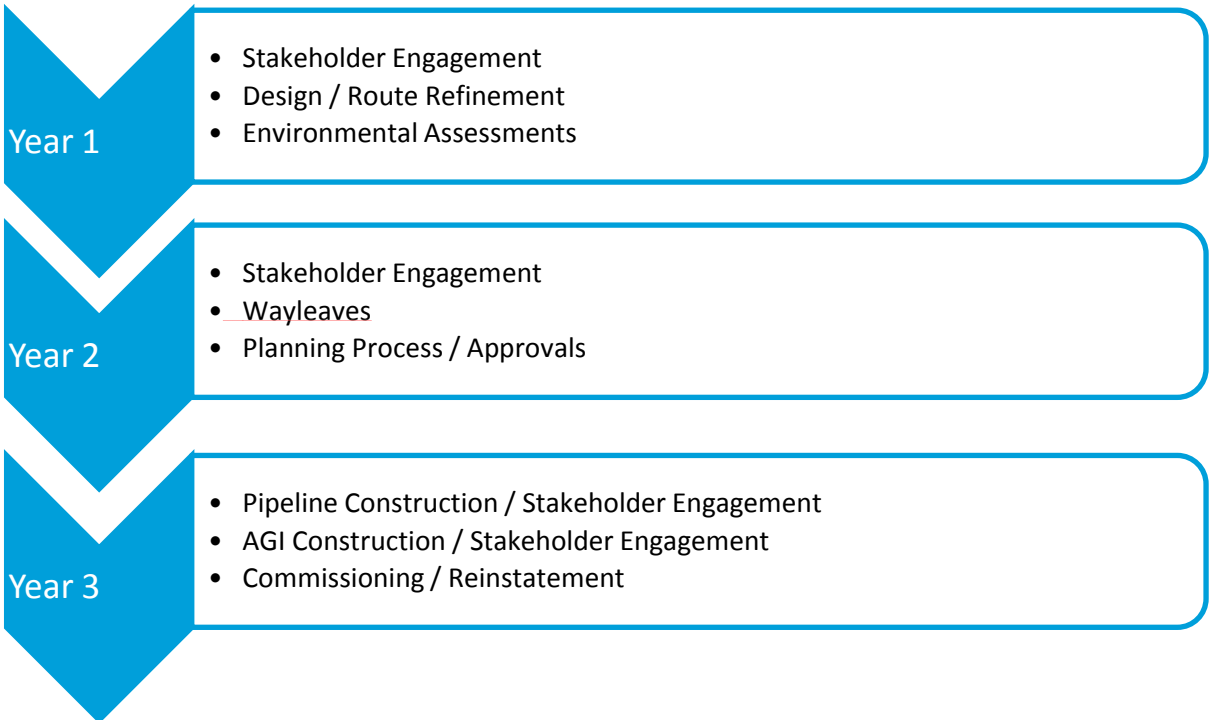

Reinstatement of the Pipeline Spread

Typical Above Ground Installation and Pig

The programme for the Transmission pipeline is over a three year period as specified under the competition. This is an ambitious programme and subject to successful approvals, such as statutory consents for planning and securing necessary wayleaves, the three years for the high pressure Transmission pipeline has been set out in Figure 10.

As noted in section 3.1.1 we set out a more detailed 4 year programme in Appendix B.

Figure 10 Transmission Pipeline Programme



3.7.2 Project Cost Control and Reporting

The Project Manager, Declan Burke will have overall responsibility for this project, overseen by the Programme Director, Brian Sheehan, the Executive Steering Group and BGE (UK) Chairman, John Barry.

The Construction Manager, Stella Corrigan will be responsible for administration of the construction contract, and managing costs on a day to day basis. The Project Manager, Declan Burke will have overall visibility and responsibility for project cost control for the successful delivery of the GTTW project.

We have delivered all our projects within budget, which have been reviewed by Regulatory Authorities which has been achieved through our accurate estimating techniques and understanding of what it takes to deliver major projects. We understand project cost control and have experienced all types of contract conditions from poor ground, wetlands, archaeological which we have successfully mitigated by ensuring strict project control through our quantity surveying team, ensuring that budget overruns are avoided.

At the start of the project a control budget will be agreed and approved within the business. We will report monthly costs through actual expenditure, year to date and projected final costs. These costs are recorded, tracked and monitored in our Oracle financials system which is well defined and established with the business. The significant expenditure items on projects like GTTW will be;

- wayleaves,
- materials
- construction contract.

Generally costs on site will be monitored and controlled by ensuring all aspects of the works are

recorded, this will feed back into our Oracle financial system, where the Project Manager will have overall cost visibility. The onsite supervision team will record the works on a daily basis to include: weather, plant and labour, location and descriptions of the works being carried out, to track any potential variation on costs.

The contractor will also provide a daily resources report detailing all aspects of the work. This will be checked against the BGE (UK) records and amended as appropriate. Maintaining detailed records on a daily basis will ensure strong control of the construction costs. Photographic records will also be maintained.

Monitoring of the Contractor's actual progress versus planned progress is also a key aspect of cost control as slippage in actual progress will potentially lead to increased costs; this will be closely managed by the Project and Construction Manager.

The format of the project reports would be agreed with the Utility Regulator along with any key performance indicators (KPIs). A typical progress report might include;

- Introduction and Executive Summary
- KPIs (Safety and Construction)
- Progress vs. Actual and Cost Reports
- Stakeholder Management
- One Month Look Ahead
- Project Risks / Areas of Concern

Within BGE (UK) there are strict governance controls in place regarding project capital expenditure. This governance control would apply to the GTTW project.

The following is an abstract from the Investment Appraisal Committee (IAC) where all capital investment expenditure must be approved. The GTTW project would be set up on the BGE (UK) asset management system, which will record all expenditure on the project, with reporting and audit capability.

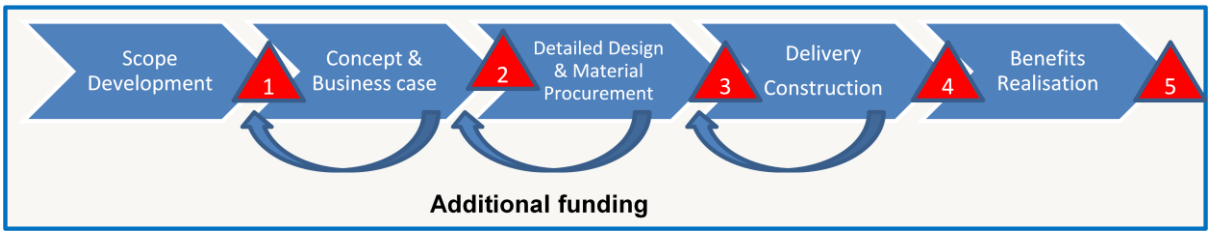
The IAC committee is made of Executive Management team (Asset Operations, Finance and Regulatory), with Asset Management as the Chair of the committee. The IAC convenes every two weeks, where programme managers and project owner's present capital and operational projects, accompanied with relevant business case for approval. There is a strict governance and sign off's in place regarding capital and operational expenditure.

3.7.2.1 IAC Gate Process – Overview

- Investment approval process is divided into 5 separate phases:
  - Scope development;
  - Concept design, option analysis and business case;
  - Detailed design, materials procurement and preferred bidder;
  - Deliver / construction; and
  - Benefits realisation.

- To pass from one phase to the next the project must move through 5 control points (gated approval process). A set of criteria must be met at each gate in order to proceed.
- Concept Design may be merged with detailed design for small projects where concept is not required and a project can go directly from gate 1 to gate 3.
- A control budget is set at each gate, sufficient to move the project through the next phase. A loop back for extra funding may be required if there are cost overruns, increased activity, or clarity on materials.
- The gating structure helps to ensure that the appropriate governance was followed in the previous phase.

Figure 11 IAC Gate Process



3.7.3 System Operations

BGE (UK) has an operational base in Antrim. We have been present since the operation of the Northwest pipeline in 2004. We are well integrated and the GTTW project will merge into the existing operational function where all responsibility for day to day operation of the network, including SCADA, Planned and Unplanned Maintenance Activities, Emergency Preparedness, Gas Response and Emergency Repairs will be accounted.

We have previously stated the construction team will be based with the operational team which will provide synergies on the day to day management of the GTTW project, including transfer of learning through status of the project.

While the construction and operations are integrated, controls and policies exist with regard to respective functions. The Operational team would be involved from the outset regarding GTTW, from design reviews to hazard identification, safety etc. In particular, the time of year for construction tie in to the existing BGE (UK) network would be important with regard to operational flexibility and security of supply in the event there was an incident on the gas network.

The integration of the construction and operational function into single Asset Operations function offers similar interaction between project design, planning, construction and commissioning phase.

3.7.4 Risk Management and Reporting

BGE (UK) similar to all other pipelines will manage risk through a project risk register which will be prepared during the design phase of the project. Given our years of experience in the gas industry, combined with our knowledge in planning, designing, constructing and operating high pressure Transmission pipelines, we are highly proficient in managing and anticipating risks, given our success in delivering projects within programme and budget, which is evident in our proven track record in the gas industry.

The risk register will include risks associated with programme, planning and permitting, material procurement, land acquisition, environment and risks associated with the construction phase. This register will be reviewed in advance of the construction start up and a specific risk register will be prepared for the Construction Phase. The register would then be updated regularly and included in the monthly reports and reviewed at the bi-weekly meetings. BGE (UK) has a risk management policy which is used in conjunction with other safety related documents for managing risks and achieving a safety focused culture.

This policy is supported by a risk organisation framework and an IT enabled, risk mitigation based, risk management system for managing project, organisational and compliance risks.

While a project risk register will be maintained for GTTW, the project will also be overseen and supported by the Major Projects Risk Review Committee. This committee is comprised of senior BGE (UK) managers with extensive experience in managing gas network construction projects. Risks can be escalated to the Chair of this committee in real time if considered significant but will also be reviewed and mitigation actions reported on, in line with the BGE (UK) risk management schedule. Risks can be further escalated by this committee to the Networks Risk Management Committee and Board Risk Committee as deemed appropriate.

Figure 12 Project Risk Register below shows a sample of project risk register on a recent Transmission pipeline.

Figure 12 Project Risk Register

Gas to Great Island Risk Register

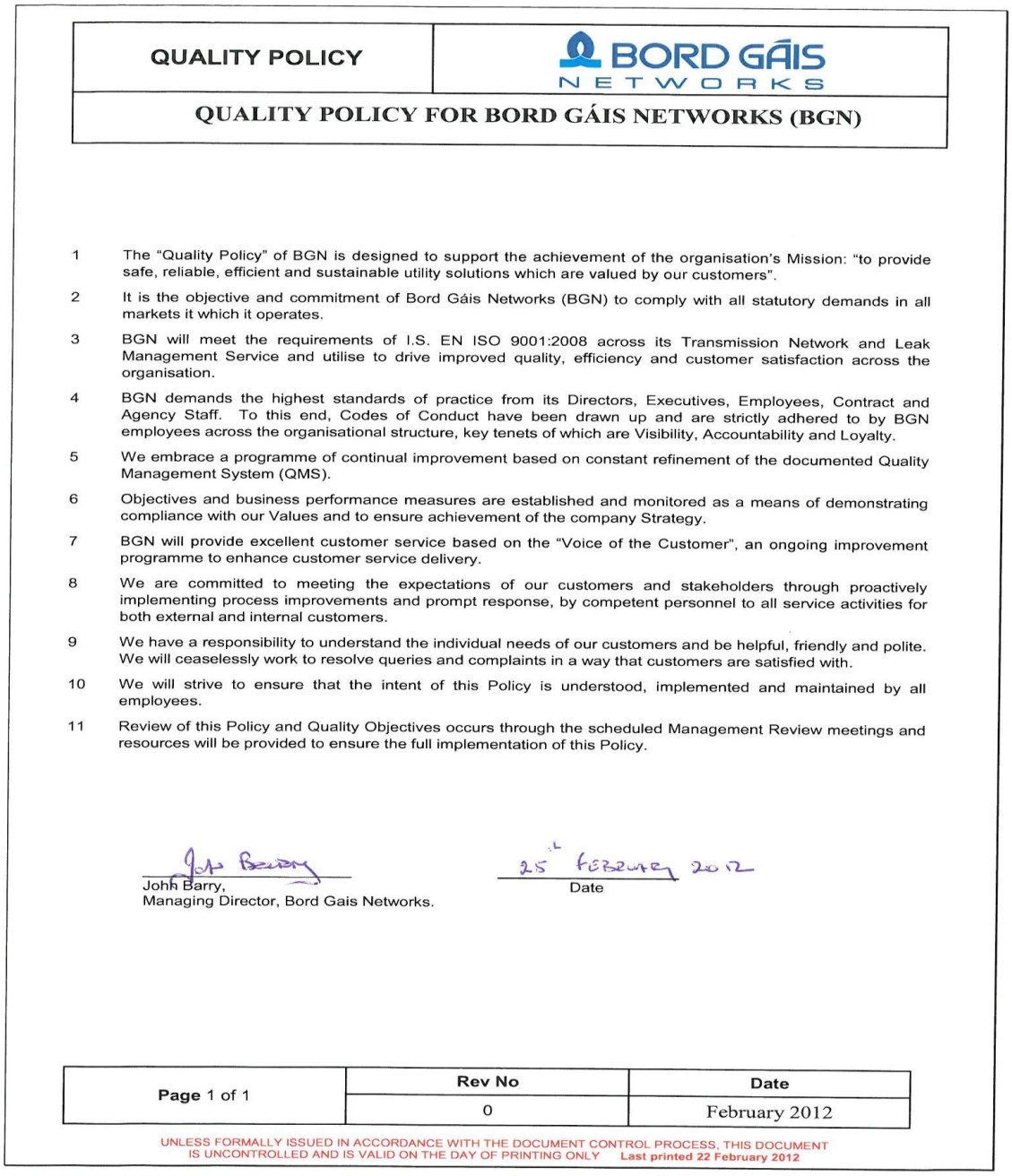
Description	Risk Type	Vulnerabilities/weaknesses	Consequences	Description of Existing Controls in Place	Current Impact Rating	Current Probability	Heat Map Rating	Detailed Action Plans	Progress	Owner/Responsibility	Target Completion Date
Unknown Ground Conditions	Construction; Programme; Financial	Ground conditions unknown until site investigation is carried out.	Constructability and planning issues	Desktop routing carried out using available information	2	2	Green	Detailed site investigation scheduled for summer 2010.	Site investigation commenced in September 2010.	Eoin Ahern	12/2010
Foreshore Licence	Program;Construction; Financial	Approval timeframe not defined. EIS required for foreshore licence application. Licence application originally programmed for June 2010.	Construction delay to River Barrow pipeline crossing.	Detailed EAR produced to accompany the the Foreshore Application to minmise queries.	2	2	Green	Environmental Consultancy Contract includes separate phase to submit Foreshore Licence. Licence Application submitted in September 2010.	Meeting held with DOE to clarify requirements. EAR completed and application submitted Septeber 2010. DOE now responsible for processing Foreshore application and have advised current typical process timeframe is 4-6 months.	Eoin Ahern	31/03/2011
2 month delay with Endesa planning permission	Programme	Conclusion of Connection Agreement linked to Power Station approval process	Potential delay to overall programme	Pipeline Works Agreement in place to progress engineering/ environmental works.	3	3	Yellow	Revised pipeline programme is based on completion of connection agreement in October 2010. Further PWA to be put in place to cover work to Febraury 2010.	Wayleave Issue Pushed to 10/12/2010. Plannig submission programme pushed out as a consequence. No programme slack remaining .	Eoin Ahern; Brian Sheehan	30/05/2011
Feasibility of River Barrow Crossing	Programme; Financial; Construction	Only desktop information available currently	Significant reroute may be required	1. Pipeline crossing report using desktop information. 2. RPS crossing report.	4	2	Yellow	Detailed site investigation to be carried out on receipt of landowner consent. Specialist trenchless contractor to assist in assessing crossing feasibility on receipt of SI information	Landowner consent received SI Contractor mobilised June 2010. SI completed August 10 and VolkerInfra have produced a draft alignment. Final report to be issued Nov 2010	Eoin Ahern	30/11/2010
An Bord Pleanála Planning Process	Programme; Financial	New process for pipeline approvals	1. Delay to programme. 2. Stringent conditions	Currently engaged in pre-consultation process	3	2	Yellow	Pre-consultation process ongoing with An Bord Pleanála. Next meeting mid Jan 2011	Preconsultation meeting held with An Bord Pleanála. Revised structure of Environmental study in order to revert faster to An Bord Pleanála. Consultation process with key consultees now complete. Next meeting arranged for Jan 2011	Brian Sheehan; Eoin Ahern	31/12/2010
Landowner Difficulties	PR, Programme	Concerns around landowners in the vicinity of the Endesa Plant. Reroute options restricted due to timescale, Barrow Crossing location, and landbased obstacles.	Negative PR for the project, potential planning objections	BGN currently investigating alternative route options available.	3	3	Yellow	Complete alternative route investigation.	Ongoing	Declan Burke, Eoin Ahern	17/12/2010

3.7.5 Quality Control and Asset Records

Bord Gais Networks is accredited to I.S. EN ISO 9001:2008. We have a range of control and quality assurance measures in place, ranging from design reviews, environmental management plans, construction waste management plans which all act as quality control and assurance points throughout the project life cycle.

These will be applied to the GTTW Project. Figure 13 outlines our quality management policy with commitment by senior management.

Figure 13 Quality Policy



QUALITY POLICY

BORD GÁIS NETWORKS

QUALITY POLICY FOR BORD GÁIS NETWORKS (BGN)

1 The "Quality Policy" of BGN is designed to support the achievement of the organisation's Mission: "to provide safe, reliable, efficient and sustainable utility solutions which are valued by our customers".

2 It is the objective and commitment of Bord Gáis Networks (BGN) to comply with all statutory demands in all markets it which it operates.

3 BGN will meet the requirements of I.S. EN ISO 9001:2008 across its Transmission Network and Leak Management Service and utilise to drive improved quality, efficiency and customer satisfaction across the organisation.

4 BGN demands the highest standards of practice from its Directors, Executives, Employees, Contract and Agency Staff. To this end, Codes of Conduct have been drawn up and are strictly adhered to by BGN employees across the organisational structure, key tenets of which are Visibility, Accountability and Loyalty.

5 We embrace a programme of continual improvement based on constant refinement of the documented Quality Management System (QMS).

6 Objectives and business performance measures are established and monitored as a means of demonstrating compliance with our Values and to ensure achievement of the company Strategy.

7 BGN will provide excellent customer service based on the "Voice of the Customer", an ongoing improvement programme to enhance customer service delivery.

8 We are committed to meeting the expectations of our customers and stakeholders through proactively implementing process improvements and prompt response, by competent personnel to all service activities for both external and internal customers.

9 We have a responsibility to understand the individual needs of our customers and be helpful, friendly and polite. We will ceaselessly work to resolve queries and complaints in a way that customers are satisfied with.

10 We will strive to ensure that the intent of this Policy is understood, implemented and maintained by all employees.

11 Review of this Policy and Quality Objectives occurs through the scheduled Management Review meetings and resources will be provided to ensure the full implementation of this Policy.

John Barry,
Managing Director, Bord Gais Networks.

25th February 2012
Date

Page 1 of 1	Rev No	Date
	0	February 2012

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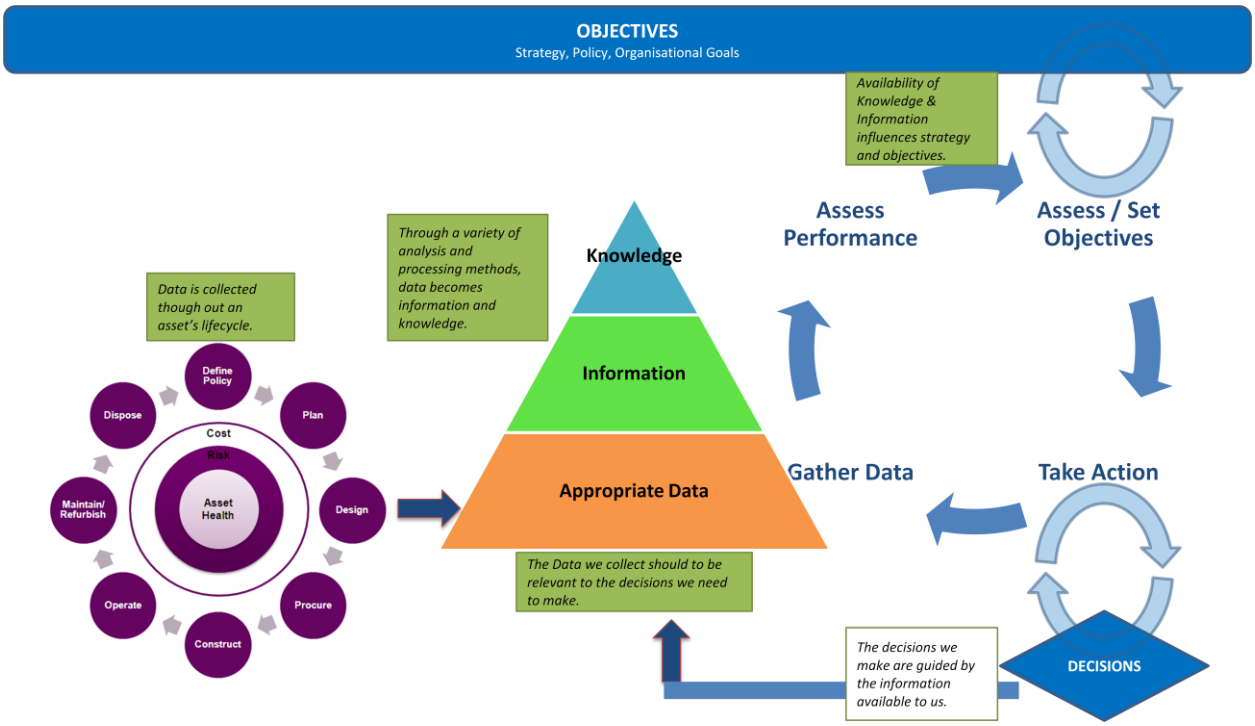
3.7.6 Asset Records

It is recognised within BGE (UK) that asset data is of key importance. As such it is managed as an asset in its own right and is governed by an Asset Information Strategy that is underpinned by data management

processes and procedures. A core principle of this strategy that BGE (UK) will strive to ensure that appropriate information is available to support decision making.

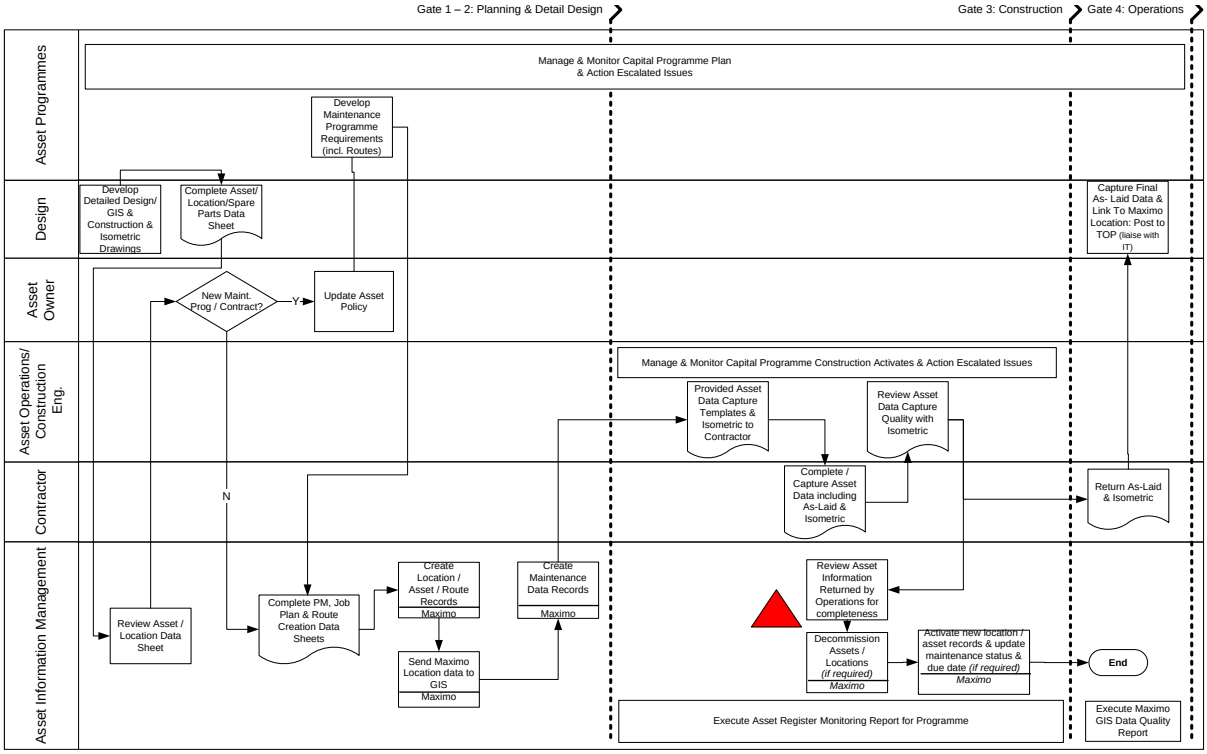
The model by which appropriate data is transformed into information and knowledge to support decision making and achievement of objectives is outlined in Figure 14 below.

Figure 14 Process of Transforming Data to Information and Knowledge



The asset register process outlines the process by which information in relation to new assets is gathered and captured on the various BGE (UK) IT systems for future use. The process is cross-functional and outlines responsibilities and points of contact for numerous departments involved in the register of new assets from design stage through to commissioning. A clear and well understood process is important to ensure that all relevant data is captured successfully. Figure 15 is an example of the asset register process as it applies to Capital Projects. Process maps are also in place for minor capital works.

Figure 15 Business Process Map for the Asset Register Process as it applies to Major Capital Projects



The data captured during the asset register process can be categorised in a number of ways, from location data, asset data and maintenance data. The capturing of data will be applied to the GTTW Project.

4 Governance

4.1 Risk Management

BGE (UK) has a risk management policy which is used in conjunction with other safety related documents for managing risks and achieving a safety focused culture.

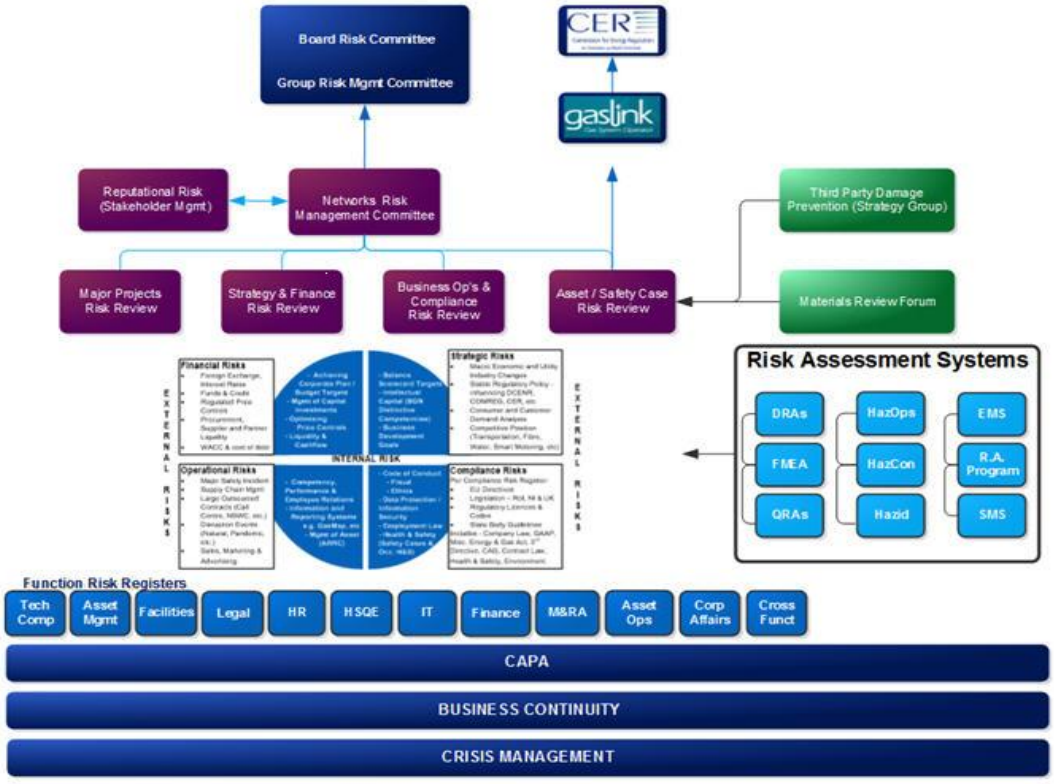
This policy is supported by a risk organisation framework and an IT enabled, risk mitigation based, risk management system for managing project, organisational and compliance risks.

Major capital projects such as the GTTW project will maintain a project risk register but will also be overseen and supported by the Major Projects Risk Review Committee. This committee comprises senior BGE (UK) managers with extensive experience in managing gas network construction projects. Risks can be escalated to the Chair of this committee in real time if considered significant. Such risks will be reviewed and mitigation actions reported on, in line with the BGE (UK) risk management schedule. Risks can be further escalated by this committee to the Networks Risk Management Committee and Board Risk Committee as deemed appropriate.

Risks are identified through Risk Assessment best practice tools and techniques and quantified using a standard set of risk criteria ratings as defined by the BGE (UK) Risk Assessment Procedure.

An illustration of the BGE (UK) risk management framework is provided in Figure 16.

Figure 16 BGE (UK) Risk Management Framework



BGE (UK) is responsible for providing a safe place of work, safe systems of work and for assessing the risks associated with work activities. It is not possible to provide generic procedures and risk assessments which will cover every aspect of every job. Each job is different and may contain hazards that may not have been assessed. For this reason we have developed a HAZCON system and a guidance booklet for reporting hazards for health, safety and environmental hazards which may be found on site and in the office. Figure 17 shows a Hazard Report Form.

This process is widely used within the organisation and KPI targets exist within the business to achieve hazard reporting to mitigate risks.

BGE (UK) will employ this approach on the GTTW project.

Figure 17 Hazard Report Form

BORD GÁIS **HAZARD REPORT FORM** HAZCON

GENERAL INFORMATION

Your Name		**Your Company**	
Phone No./Email		**Department (BGE Personnel Only)**	

HAZARD DESCRIPTION

Hazard Code (from HAZCON)	☐☐☐	**Date**		**Job No.** (if applicable)	
Place/Location of Hazard (tick the box)	☐ Office ☐ Yard / Depot ☐ Stores ☐ BGE Regulating Station (e.g. AGI, DRI)	☐ Developer Site ☐ 3rd Party Contractor/Utility Site ☐ Public Road ☐ Private House/Apartment		☐ Industrial/Commercial Facility ☐ Other (Please specify) _____ _____	
Address					
Description of Hazard	_____ _____ _____				

ACTION TAKEN

Hazard Removed (if safe to do so): Yes ☐
How was hazard removed? _____
Job/Activity Stopped: Yes ☐
Reported to Supervisor: Yes ☐ Name of Supervisor: _____
Other: ☐ Details _____

Comments / Recommendations	_____

RETURN COMPLETED FORM BY FAX TO 1850 42 77 24 OR EMAIL TO hazardreports@bge.ie

BGE/GSFM/001 Rev 0

Introduction | Emergencies/ Accident Reporting | Useful Contacts | Safety Signs and Symbols | PPE
Quick Find | ABC | DEF | GHI | JKL
MNO | PQRS | TUV | WXYZ | Hazard Report

4.1.1 Management of Change

BGE (UK) recognises the issues associated with change in an organisation. Change may include such matters as changes in equipment, operating conditions, procedures or organisational change of personnel. BGE (UK) has a change control board in place comprised of senior managers. They are responsible for change management in the organisation and direct through effective communication between different parts of the organisation and where necessary by procedures.

We have a company zone area to communication information, in additional to quarterly core briefs, management meetings, and team meetings and ensure information is communicated effectively from Managing Director to field personnel through these communication outlets. The company is registered and operates to the international quality standard ISO 9000.

4.1.2 Control of Major Hazards – Identification of Hazards

In any installation carrying hazardous fluids at high pressures there are inherent hazards associated with the facilities. This section identifies some of the main hazards and the following section assesses the risks and describes what precautions are taken to design out and minimise these risks.

4.1.2.1 Construction

During the construction phase of the pipeline and associated facilities there are the normal hazards linked to the implementation of large engineering projects. Some of these include:

- Moving of heavy plant and equipment
- Heavy lifting gear and equipment
- Earth moving and trenching equipment
- Excavations
- Pipe laying equipment
- Welding and associated activities

Construction hazards are managed by following the requirements of the CDM[1] Regulations. These required hazard identification and risk assessment to develop detailed safety practices and procedures to be followed with the appointment of personnel with specific safety responsibilities.

At no stage during the construction phase will process fluids (gas) be present apart from the hot tap connection into the existing pipeline. Any one off activity is subject to detailed procedures, safety checks and supervision. BGE (UK) has non-routine operational procedures in place.

1 Construction (Design and Management) Regulations (NI) 1995 (SR 1995 No. 209)

4.1.2.2 Commissioning

The commissioning phase covers the integrity testing of the pipeline including hydraulic pressure testing, drying, and final tie-in to the live gas main. Hazards are similar to those present at the operation phase when the main is live. Other hazards could include:

- Production of flammable mixtures if purging is not effective
- Potential corrosion if drying and purging are not effective
- High pressure test failure (water is used to minimise hazards from such failures to eliminate the risk of generating high energy missiles or projectiles if a failure occurs)
- Risk of hydrate formation and possible damage from internal ice.

Commissioning of the pipeline is undertaken to detailed procedures. The main function of the pressure testing before introduction of the gas is to confirm the integrity of the pipeline after the completion of the construction phase. Due to the nature of this work personnel are present and monitor the process continually.

4.1.2.3 Operation

During pipeline operation the gas is transported for all of the spur lines by underground pipeline. At either end of the line there are Above Ground Installations (AGIs) where the pipeline emerges from below ground and certain facilities will be provided. These include pigging stations for receipt and launching of pigs for pipeline cleaning and inspection as well as pressure reduction facilities. Valve stations for isolating the pipeline will be located at strategic locations. All AGIs and valves stations are provided with security fencing to prevent unauthorised access Security arrangements at these sites will be designed in conjunction with the Centre for the Protection of National Infrastructure (CPNI), Northern Ireland.

During pipeline operation the loss of containment of high pressure flammable gas presents the following hazards:

Release from AGIs:

- Release of gas causing a flammable gas cloud if not ignited
- Jet flames if a jet of high pressure gas is ignited.

Release from buried pipelines:

- Release of gas causing a fissure in the ground and creating a flammable gas cloud as it enters the air (for smaller releases)
- From a large release of high pressure gas a crater could be formed allowing the release to form a momentum jet of gas or a jet flame if the release is ignited.

A fireball may be created by the ignition of a flammable cloud once a cloud had formed. The release of gas from a buried line may be as an initial ‘puff’ of gas as the momentum is reduced and the energy is

used to form a crater. As the leak develops a momentum jet will be predominant which may be more or less hazardous than a fireball.

Another theoretical hazard is a vapour cloud explosion. This might occur if a flammable gas is ignited, if the flame front accelerates to a speed at which a shock wave results so that an overpressure can be produced. Some degree of confinement is required for such events and as any release from the pipeline is unlikely to be confined and likely to be buoyant a vapour cloud explosion is considered improbable.

In order to prevent these hazards arising there will be safeguards in the design to protect the integrity of AGIs and the pipeline. These safeguards are identified in Table 7, section 4.1.3. In addition the pipeline route will be confirmed to avoid occupied buildings and centres of population. Also, high standards of fabrication and quality assurance will be employed covering materials and welding in order to minimize the risks.

4.1.2.4 Maintenance and Surveillance

Maintenance of the pipeline involves the implementation of a Planned Preventative Maintenance schedule and non-intrusive testing such as Cathodic Protection (CP) monitoring external surveillance and internal inspection (as required) which does not pose a risk to the pipeline. However, some activities may involve isolation and breaking into pipework which can present a risk from:

- Uncontrolled release of gas due to ineffective isolation
- Possible flammable mixtures if purging subsequent to maintenance is omitted or ineffective.

All maintenance activities will be covered by strict maintenance and isolation procedures with special operations and work done by external contractors conducted under the Safety Management System Permit to Work System. By the nature of maintenance activities there will generally be personnel present during such activities.

4.1.3 Pipeline Hazards and Safeguards

Table 7 gives a summary of the likely hazards and failure mechanisms for handling gas in a high pressure Transmission system. It includes an indication of the likely consequence if there was a failure and a list of the safeguards to prevent such events occurring. These safeguards are defined and discussed in more detail in the next section.

Table 7 Pipeline Hazards and Safeguards

Hazard Category	Hazardous Event / Cause	Safeguards
Mechanical		
- pipe failure (Impact or material defect)	In the extreme a full bore rupture	Integrity of pipe design, pipe grade, depth of cover, design factor and wall thickness.
- connection weld failure	Jet release or jet flame from stub connection which might be typically 2".	Design minimises connections. All connections are minimum 2" before first isolation valve. Design code and 100% weld radiography. All pipework is pressure tested before putting into service.
- valve, flange or instrument failure.	Smaller release /flame from say 1" diameter orifice equivalent	Pipeline is predominantly buried with only small sections above ground. Flanges and valves are minimised. Instrument and other connections will be of robust design.
Operational		
- Pigging	Incorrectly operated pig trap. Door opened under pressure. Release of high pressure gas.	Pigging undertaken under procedure. Safe design of pig trap doors including key interlock protection system and mechanical interlock to prevent from opening when under pressure
- Valve operation	Leak if there is any open pipework. Leak from valve stem.	Operating and maintenance procedures and maintenance of valve stems and seals.
- Maintenance (incorrect isolation, or isolation valve leaking)	Leak of gas from opened up pipework or removal of fitting	Isolation valves are double block and bleed by design. Maintenance procedures including leak testing prior to maintenance.
- Maintenance (incorrect inerting)	Air ingress to residual gas in pipe and possible Internal explosion if ignited.	Maintenance procedures and inerting. (Historically not a common failure cause)
- failure of utility supplies	No leak of gas	Loss of power may result in loss of some control functions. ESD valves are backed by alternative motive systems and AGIs supported by UPS and emergency generators. HIPPS systems are pneumatically activated.
-failure of control system	No leak	The SCADA system has a dual redundancy and unlikely failure of both systems results in an as-is situation, requiring on-site manning.
Corrosion		
- Internal	Reduction in wall thickness from internal corrosion and release of gas from consequent corroded pipe	Internal epoxy coating for protection of the inner wall. The fluid transported is dry gas and has no significant sulphur content. Pipeline thickness by design is 'standard' wall thickness with around 34% 'heavy' wall thickness pipe at more vulnerable locations. Periodic use of intelligent pigs.
- External	Reduction in wall thickness from external corrosion and release of gas from consequent corroded pipe	3 ply polyethylene wrap for protection of external pipe. Tested both at factory and following installation for integrity. Cathodic protection – impressed current.
Natural		
- Road, River and Rail Crossings, in areas with high density of development.	Increased potential for damage to pipe at crossings leading to potential for leak of gas.	Use pipe of higher wall thickness and greater pipe protection. Routing avoids areas of high density of development where possible.
- Earthquake	Pipe fracture or rupture leading to full bore release.	Not an active earthquake zone. Flexible nature of pipe is generally quite resistant to such stresses.
- Flood damage	Rupture or cracks due to stresses induced by pipeline buoyancy.	Pipe route selection to minimise river crossings and bog lands and areas at risk from flooding. Appropriate design precautions and selection of techniques following detailed site investigation. (e.g. bored crossings, trenchless crossings, weight coating,-concrete slabs and protected pipe)
- Subsidence and landslide	Possible rupture of pipe and release of gas.	Pipe route avoiding areas of unstable soil conditions. If this is not feasible then special protection measures such as impact protection by concrete slabs.

Hazard Category	Hazardous Event / Cause	Safeguards
- Extremes of temperature	Unlikely to be significant. Solar radiation causing increase in pressure at location of closed valves above design pressure. Possible rupture of pipe but highly unlikely. Possible leakage from valve stem seals.	All pipelines are underground. Above ground pipelines are only at AGIs and pigging stations. Typical operating temperature of gas is 0 to 15ºC. Not in a permafrost location. Isolation procedures avoiding closure of upstream and downstream isolation valves on standby equipment. Thermal relief valves provided if required.
Third party		
- Damage from construction / excavation work	Likely rupture of pipe and leak of gas with possible ignition	Control of third party interference. Regular patrols and inspections by foot vehicle and by air. As soon as hydrotesting of the pipeline is complete and thereafter, the pipeline will be subject to fortnightly aerial survey. Planning Applications in vicinity of pipeline referred to HSE.
- Collision	Likely rupture of pipe and leak of gas with possible ignition	All pipelines are buried unless at AGIs. All AGIs are double fenced with restricted access and strict vehicle speed limits enforced. Impact barriers also provided at vulnerable locations. Kerbing is provided on all internal roads.
- Deliberate acts	Possible rupture of pipe and leak of gas with possible ignition	Security protection in place.

4.1.4 Control of Major Hazards – Mitigation of Risks

4.1.4.1 Proximity Distances

The Institute of Gas Engineers and Managers Technical Document One (IGE/TD1) minimum proximity distances are given for different pipeline operating pressures, different pipeline diameters and different area types. A tabulation of typical minimum proximity distances for the Northwest Pipeline is given in Table 8:

Table 8 IGE/TD1 Minimum Proximity Distances for Main Pipeline

Description	**Area Type R**	**Area Type S**
Design Factor	< 0.72	< 0.30
Proximity Distance at Operating Pressure 70barg	39 meters	3 meters
Proximity Distance at Operating Pressure 85barg	45 meters	3 meters

- Type R – Rural areas with a population density not exceeding 2.5 persons per hectare
- Type S – Areas intermediate in character in which population density exceeds 2.5 persons per hectare and which may be developed extensively with residential properties, schools etc.

For type R areas these proximity distances are based on the more likely credible failure scenarios and the likely ignition of a jet flame for example. Whilst credible these are still of a very infrequent occurrence. The short proximity distance for type S areas takes into account the significant reduction in risk associated with an increase in pipe wall thickness of over double the standard wall thickness.

4.1.4.2 Measures to Prevent and or Mitigate Major Accidents

This section discusses some of the design features that enhance the integrity of pipelines. Routine maintenance, monitoring and inspection during operation are dealt with in the section on Safety Management Systems.

4.1.4.3 Design – Mechanical Integrity (Steel Selection and Thickness)

IGE/IGE/TD1 defines areas R, S and T depending on the population density around where the pipeline is to run and uses these to determine certain design criteria. This includes the design factors of 0.72 and 0.3 for area types R and S respectively. From the pipeline diameter and standard wall thicknesses the appropriate steel grade can be selected given its Specified Minimum Yield Stress (SMYS). This is the grade that will comply with the appropriate design factor, which for standard duty pipe is steel grade X65. For consistency similar grades are selected for heavy and standard pipe. Specifying the grade determines the steel's mechanical properties, which allows prediction of its behaviour and hence minimises the risk of partial failure or rupture.

Table 9 Demonstration of Steel Grade Selection

Pipe OD	**Nominal Thickness**	**Grade**	**SMYS (N/mm^2)**	**Design Factor**
457mm	7.1mm	X60	413	0.736
(grade selected)		X65	448	0.678
		X70	482	0.631

By a similar manner the steel grade will be selected for the spur lines.

An area type classification study will be carried out for the main pipeline and the spur lines as per the recommendations of IGE/TD1 to determine type S and type R areas. Allowances may be made for middle to long term developments by liaison with local councils, planners, land agents and presuming current applications are granted and developed.

BGE (UK) policy documents allow for the use of intermediate wall pipe at road, river or rail crossings or in areas where a reduced building proximity distance (BPD) is required. However, where a more stringent design factor may be stipulated heavy wall pipe may be used.

In general it may be concluded that the design and selection of heavy wall pipes for the main line and the spur lines would go beyond the requirements of IGE/TD1 and hence may be deemed to be conservative.

4.1.5 Emergency Response

BGE (UK) has put in place a comprehensive major emergency response service that includes management, technical back-up, personnel, equipment and related services to deal with incidents and to repair damage to or affecting the system.

BGE (UK) provides this service in terms of:

- 24 Hour Emergency Response
- Free phone Emergency Telephone Number - 0800 085 8851
- On call duty personnel – Engineers and Technicians
- The facilities of the Ambergate Pipeline Maintenance Centre.

The HSE (NI) will develop an Emergency Response Plan which will incorporate the emergency procedures of BGE (UK) and Phoenix Natural Gas. The Northern Ireland Network Emergency Coordinator will be responsible for coordinating any emergency response that may be required. Manpower and equipment would be provided by the operators as required.

An emergency procedure for the pipeline would follow the principles defined in the BGE (UK) Control of Emergencies documentation[2]. The category of emergency response is given as either an emergency or an incident. Emergency response types are defined in the manual for each category. Generally if the event threatens the pipeline or the general public potentially leading to isolation of the pipeline then it will be classified as an incident. An emergency covers events that, whilst significant, are unlikely to result in pipeline isolation.

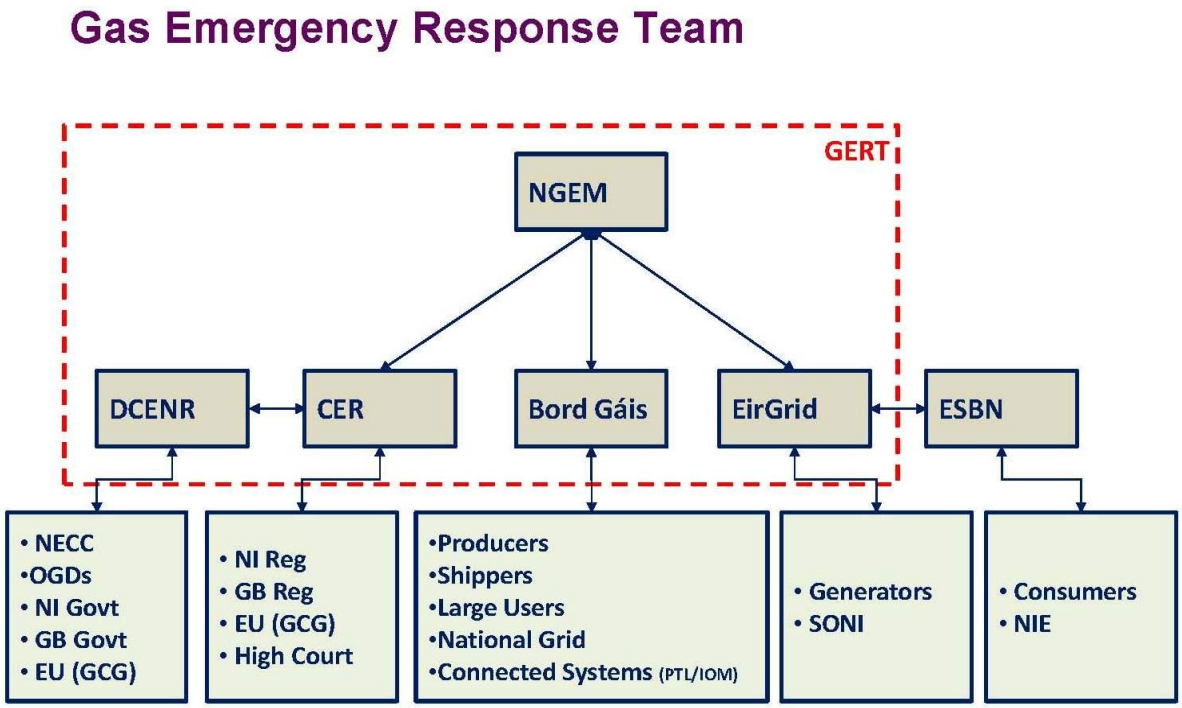
The Emergency Response Procedure for the BGE(Northern Ireland) Pipelines[3] outlines the main steps to be taken in the event of an incident or emergency. The emergency response procedure will evolve and be developed throughout the life of the pipeline.

[2] BGE (UK) Control of Emergencies Work Instruction Manual No.9 – Issue 12

[3] Emergency Response Procedure for the BGE(Northern Ireland) Northwest Pipeline

BGE (UK) works closely with Regulators and Government Departments with regarding to the requirements of EU 994/2010. The Regulation aims at demonstrating to gas customers that all necessary measures are being taken to ensure continuous supply, particularly in the case of difficult climatic conditions and in the event of disruption. As part of the regulation BGE (UK) has a Gas Emergency Response team in place, Figure 18, which is lead by the BGE (UK) Operations Manager, as the National Gas Emergency Manager (NGEM).

Figure 18 Gas Emergency Response Team



The NGEM is responsible for coordinating actions across affected parts of the Network to take action to prevent, as far as possible, a Gas Supply Emergency developing, and where it cannot be prevented, to manage the emergency in accordance with the Natural Gas Emergency Plan (NGEP).

The aim of the NGEP is to:

- Protect the safety of the general public.
- Protect property and key infrastructure.
- Minimise disruption resulting from a gas supply emergency.

To ensure robustness of the NGEP it is subject to annual testing, via emergency exercises. The following emergency exercises have taken place since 2009 which GTTW would be part of.

- Exercise Ler (October 2013) – BGE led
- Exercise Titan (September 2012) – UK led
- Exercise Saffron (November 2011) – UK led
- Exercise Megawatt (December 2011) – Eirgrid led
- Exercise Avogadro (June 2010) – UK led
- Exercise Gailleann (December 2010) – BGE desktop exercise

The GTTW Project will be included under existing emergency response arrangements.

4.2 Interaction with Utility Regulator

The Market and Regulatory Affairs function will work with the Utility Regulator, and the proposed CJV/SSO to integrate the GTTW project into the existing Northern Ireland regulatory structure. BGE (UK) is an existing Transmission System Operator in Northern Ireland and will be party to the contractual joint venture and single system operator, it is anticipated that arrangements for the integration of the GTTW project will be straight forward.

BGE (UK) and Bord Gais Networks are both active members of European Network of Transmission System Operators for Gas and are working with the other TSOs in NI to implement the requirements of the EU 3rd Directive.

It is expected that all elements of this will be in place by the time the GTTW project becomes operational.

Asset Management (Programme Director and Project Manager as required) in conjunction with the Regulatory Affairs Department will meet as required with the Utility Regulator regarding progress and cost reporting.

This follows the current reporting arrangements under the existing licence arrangements.

4.3 Policies and Procedures

4.3.1 Quality Control and Asset Records

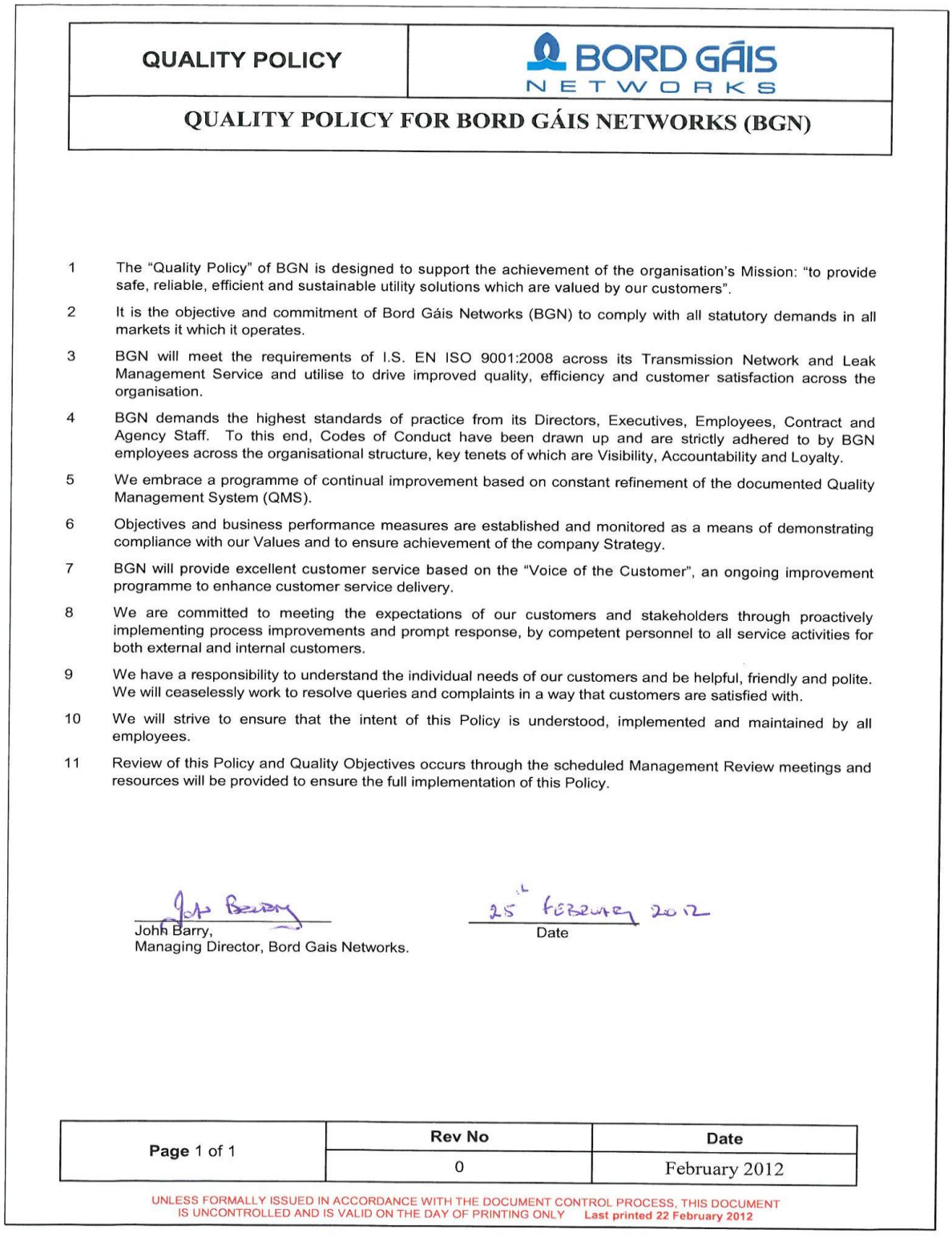
Bord Gais Networks is accredited to I.S. EN ISO 9001:2008. We have a range of control and quality assurance measures in place, ranging from design reviews, environmental management plans, construction waste management plans which all act as quality control and assurance points throughout the project life cycle.

All Internal Documentation relating to ISO 9001 and ISO 14001 with the exception of drawings, are controlled by Management Systems in HSQE function within the Business. Drawings are controlled through a drawing register, managed by National Design Department within Asset Management. By adopting and adhering to Document Control Processes and Procedures, BGE (UK) promote a standard approach to document management across the organisation and enable alignment to the Document templates. All the controlled documents have associated templates which are managed by HSQE, who assign document numbers. Where a Controlled Document is updated, the most up to date template is used to ensure any changes are captured so policies and procedures templates are aligned with the business.

The document triangle provides the foundation and hierarchy of policies and procedures, Figure 19. This is used so that there is a common understanding within the business, how policies, procedures and processes are linked together. Our Quality Policy is set out in Figure 20.

Figure 19 the Document Triangle

Figure 20 Quality Policy.



QUALITY POLICY	BORD GÁIS NETWORKS

QUALITY POLICY FOR BORD GÁIS NETWORKS (BGN)

1 The "Quality Policy" of BGN is designed to support the achievement of the organisation's Mission: "to provide safe, reliable, efficient and sustainable utility solutions which are valued by our customers".

2 It is the objective and commitment of Bord Gáis Networks (BGN) to comply with all statutory demands in all markets it which it operates.

3 BGN will meet the requirements of I.S. EN ISO 9001:2008 across its Transmission Network and Leak Management Service and utilise to drive improved quality, efficiency and customer satisfaction across the organisation.

4 BGN demands the highest standards of practice from its Directors, Executives, Employees, Contract and Agency Staff. To this end, Codes of Conduct have been drawn up and are strictly adhered to by BGN employees across the organisational structure, key tenets of which are Visibility, Accountability and Loyalty.

5 We embrace a programme of continual improvement based on constant refinement of the documented Quality Management System (QMS).

6 Objectives and business performance measures are established and monitored as a means of demonstrating compliance with our Values and to ensure achievement of the company Strategy.

7 BGN will provide excellent customer service based on the "Voice of the Customer", an ongoing improvement programme to enhance customer service delivery.

8 We are committed to meeting the expectations of our customers and stakeholders through proactively implementing process improvements and prompt response, by competent personnel to all service activities for both external and internal customers.

9 We have a responsibility to understand the individual needs of our customers and be helpful, friendly and polite. We will ceaselessly work to resolve queries and complaints in a way that customers are satisfied with.

10 We will strive to ensure that the intent of this Policy is understood, implemented and maintained by all employees.

11 Review of this Policy and Quality Objectives occurs through the scheduled Management Review meetings and resources will be provided to ensure the full implementation of this Policy.

John Barry,
Managing Director, Bord Gais Networks.

25th February 2012
Date

Page 1 of 1	Rev No	Date
	0	February 2012

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We have a significant volume of policies, procedures, processes (circa 900) in place within the business covered under the various headings for our assets in various jurisdictions. We have included our policy for quality and environment in this document, and limited our submission to these policies, but if requested, we can submit further detail. The following are some of the procedures in place and GTTW will be included as part of the next review phase.

Document Control

- Quality Policy
- Documentation and Records Management Governance Procedure
- Documents Control Process
- Document Change Proposal Form
- Engineering Requirements Document ERD
- ERD Listing

Northern Ireland Documents

- BORD GAIS NETWORKS/AO/PR/019 Management of Northern Ireland Pipeline Systems
- BORD GAIS NETWORKS/HSQE/PR/062 – Internal Audit
- BORD GAIS NETWORKS/HSQE/MN/035 – Networks Safety Management
- BGE/QP/93 Minimum Health and Safety Requirements for Construction Projects in Northern Ireland
- BGE/WI/421 Joint Procedure for Balancing the Northern Ireland Network
- BORD GAIS NETWORKS/AO/PR/011 Northern Ireland Safety Case
- BORD GAIS NETWORKS/AO/PR/012 Northern Ireland MAPD

4.4 Inspection review QA Audit

BGE (UK) recognises the important inspections and audits hold in order to continually improve work practices, internally and externally with our contractors and suppliers. We take an active role in the management, supervision, auditing and inspection of work performed by contractors and support schemes which promote continuous improvement.

Measures we take include;

- Quality Assure the work we do by documented audits and inspections of work done to our procedures and processes
- Audit processes under the various management systems we are accredited to ensure that work is delivered to the required standards. We are accredited to the ISO 9001 Quality Management System for Transmission and Leak Management and are in the process of accreditation to

Publicly Available Specification (PAS) 55 an internationally recognised Asset Management System.

- We use technical and Workmanship inspections to ensure work is delivered to the requirements of our Construction and Operations procedures.
- We use process and Supplier Audits to ensure work is delivered to our requirements, including where this work is contracted out to third party suppliers and service providers.
- Systemic non conformances identified in audits and inspections are addressed through the Corrective Action Preventative Action (CAPA) process.
- Where non-conformances identify a requirement for improvements to our documented policies procedures or work instructions, these changes are made in accordance with our document control process.

We will apply the processes and procedures we have developed to the GTTW project to ensure best practice are adhered to and seek to continually improve on any existing processes to the benefit of the GTTW project.

4.4.1 Publicly Available Specification (PAS) 55

BGE are presently implementing an Asset Management System in line with an industry best practice to achieve BGE's organisational strategic plan, by optimising and sustainably managing our assets; their performance, risks and cost during their entire lifecycle.

The Asset Management System further enhances our capabilities in an integrated and systematic way to a recognised industry standard; PAS 55. This standard, details 28 requirements, provides a tested framework for Asset Management and an auditable link back to the business' objectives while demonstrating to stakeholders that the physical assets are being properly managed.

PAS 55 has been based on the familiar International Organisation for Standardization (ISO) format and will easily integrate with the existing ISO 9001 and ISO 14001 systems to which BGE is presently accredited.

The PAS 55 Asset Management System implementation programme commenced in June 2013. A dedicated project team and governance structure has been established and project programming has identified a number of key work-streams:

- Definition of BGE's Asset Management System (AMS) Framework
- Definition of the core AMS documentation; scope, templates, as per table X above.
- Definition and development of an Asset Information Strategy
- Phased Health Checks – focused and detailed, company wide gap analysis against PAS Clauses
- Pre-certification Audit
- Communication Plan

Key milestones achieved to date:

- Three Functional Specification and Requirements documents completed and cross functionally reviewed:
    - Cathodic Protection;
    - Pressure Reduction System and;
    - Compressed Natural Gas Fast Fill units.
- High level Asset Management Strategy completed
- Draft A of Asset Information Strategy completed
- Phase 1 of Health Checks completed
- Communication Plan finalized and commenced

4.4.1.1 PAS 55 offers a number of benefits including:

When PAS is implemented it will offer the following benefits to the organisational;

- Alignment between the Organisation Strategic Plan, Asset Management Strategy, Policy and Asset Management Programmes. This provides an auditable link back to the business' objectives;
- Demonstrates to stakeholders that the physical assets are being properly looked after;
- Externally recognised good practice standard and a tested framework for Asset Management;
- Whole life cycle asset management planning and cross-disciplinary collaboration
- Structured documentation and transparent processes and improved control of workflow;
- Better understanding of asset risk and risk based decision making and risk based asset interventions.
- More thorough prioritisation and optimisation of asset performance, cost and risks;

The above benefits will build on existing organisational efficiencies and enhance BGE's asset management capabilities.

This capability will result in pass through benefits to Northern Ireland consumer in the GTTW project and existing assets. Benefits will be realised through;

- Optimised whole life asset costs throughout the asset lifecycle.
- Improved asset performance, reliability and management of risk.
- Innovation through optimised planning and design that delivers cost and efficiency savings.

4.5 Information systems

BGE (UK) IT capability and experience will be a significant contributor to support the GTTW project.

This experience and the relevant systems portfolio and investment which already exists within BGE (UK) will support the GTTW project and at a lower cost than any new green field organisation as outlined in Table 10.

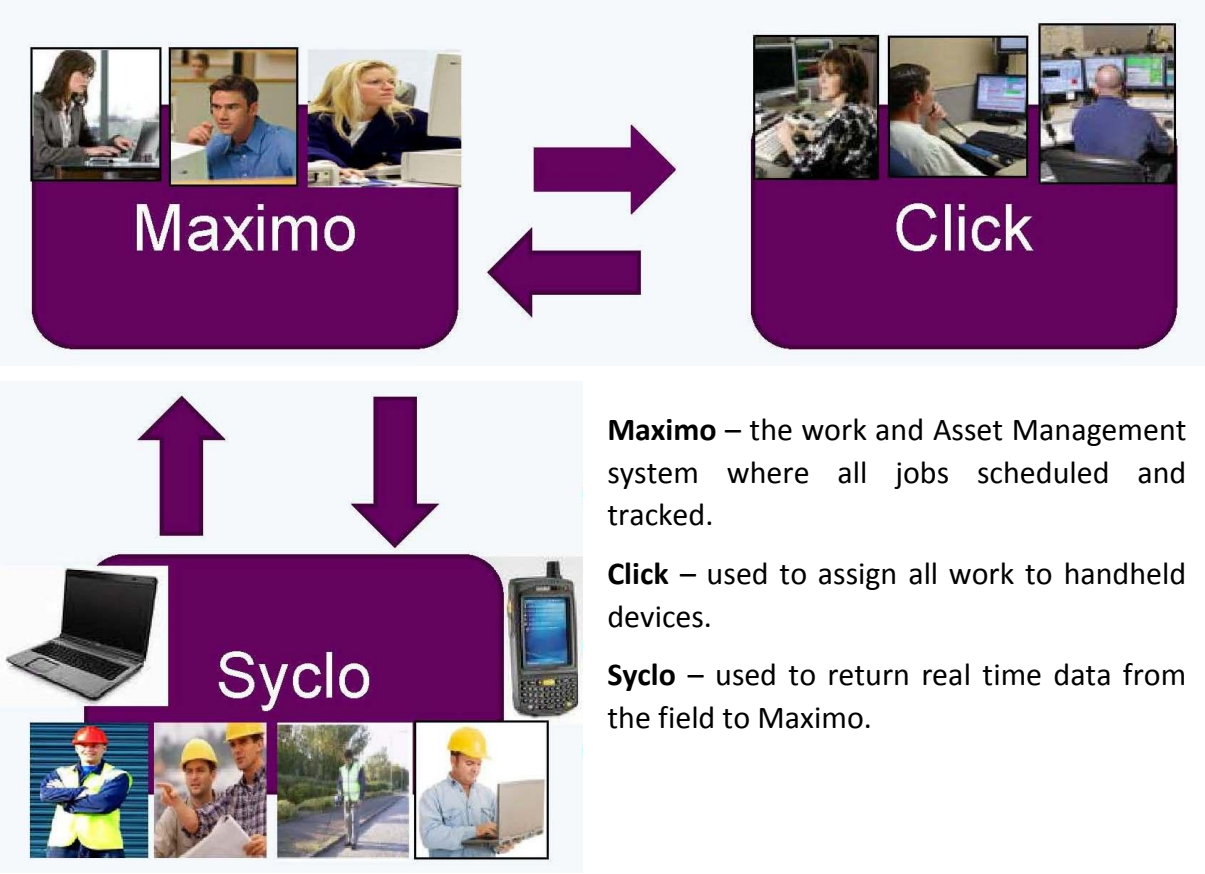
Table 10 Summary of BGE (UK) IT Advantages

	IT: A significant competitive advantage for Bord Gais in supporting the GTTW project
Technology Footprint	Over the last 10 years Bord Gais has made well over €70m of investment in 'best in class' IT systems which are directly applicable to the GTTW project.
	Over the last 10 years Bord Gais has invested thousands of man years of effort in implementing these systems and retains access to this technology knowledge and expertise.
	Bord Gais can leverage the existing IT platforms to support the GTTW project at significantly lower cost and at a faster pace than a green field organization.
	The Bord Gais ability to use existing systems will significantly reduce the requirements for many time consuming and demanding procurement processes.
	Bord Gais IT has infrastructure and data centre facilities supporting a high availability 24 x 7 operation and existing disaster recovery capabilities which can be leveraged by the GTTW project.
Process Capability and Experience	Bord Gais IT has a capability in enterprise architecture which will support the GTTW project in selecting the right systems and ensure that these systems integrate and communicate.
	Bord Gais IT has a proven Project Management capability which will deliver system and organisation projects on time and to budget.
	Bord Gais has considerable experience in collecting data on pipes, meters and other assets and complex data conversion which will be a core requirement in the GTTW project.
	Bord Gais IT has invested in the foundation technology (middleware) and skills to support the Integration of the GTTW project
	Bord Gais IT has an established Service Management capability which supports internal and external customers of Bord Gais system.
	Bord Gais IT has skills and experience in running and operating the technical infrastructure required to support a utility including pipeline monitoring and telemetry.
People Skills	The Bord Gais IT functions are organized in line with best practice structures and retain the skills, knowledge and experience critical to development of the GTTW project.
	The Bord Gais IT Leadership Team have considerable experience and a successful track record in delivering Large Complex Transmission Programmes
	Bord Gais has a number of partnerships and outsourced arrangements already in place which could be leveraged in support of a complex utility project that must be completed at pace.

Bord Gais Networks is an asset centric organisation and IBM Maximo Asset Management is the key Enterprise Asset Management system used by both Asset Operations and Asset Management. Assets are managed in Maximo through the full lifecycle from commissioning through to disposal. The version of Maximo in use is Maximo for Utilities as this gives Bord Gais functionality specific to Gas Transmission & Distribution organisations. Integrated into Maximo is SAP Syclo Work Management which provides mobile work management capabilities used by field workers and additionally Click Schedule is also integrated to provide job scheduling, optimisation and dispatch functions. Operational and Management reporting is provided both by BIRT reporting in Maximo as well as through SAP Business Objects which reports against an Enterprise Data Warehouse.

Bord Gais Networks has automated its business processes through its change to an Asset focused organisation with the implementation of the following software;

Figure 21 Automated Process Flow



Maximo – the work and Asset Management system where all jobs scheduled and tracked.

Click – used to assign all work to handheld devices.

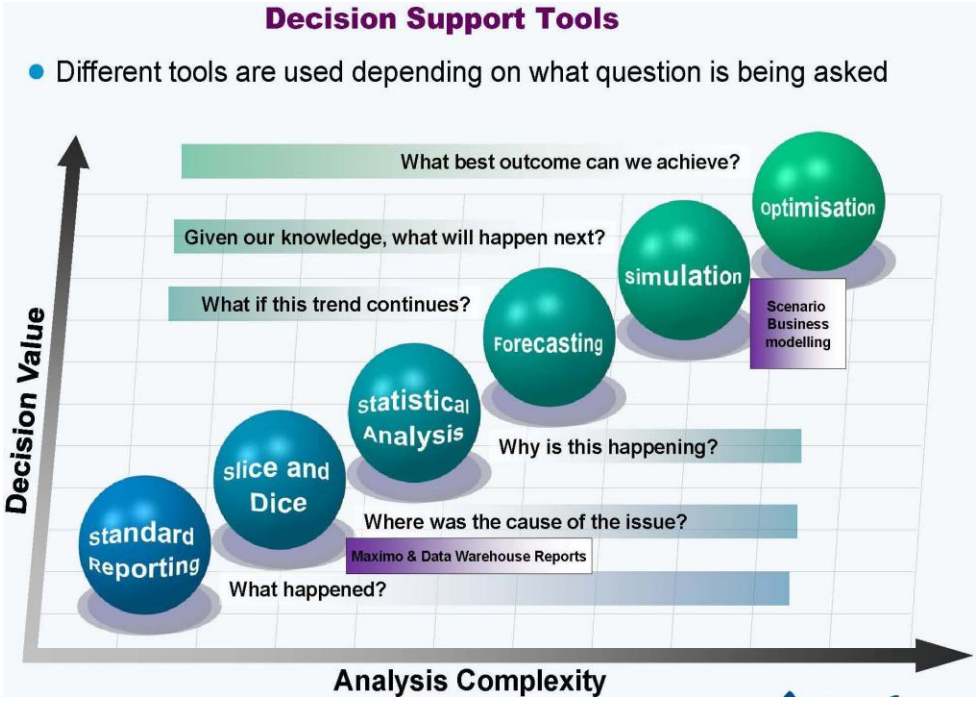
Syclo – used to return real time data from the field to Maximo.

- Maximo is an enterprise work and asset management application platform designed to support the Transmission and Distribution of gas utilities. It is currently used in to support functions such as asset management, project management, work management, resource management, preventive maintenance, leak management, purchasing, and inventory and call centre support.

- ClickSchedule is specifically designed for the field service industry and enables service organisations to define the balance between the conflicting needs of service operations efficiencies, customer satisfaction, field resource satisfaction and revenue considerations. ClickSchedule continually adjusts the schedule throughout the day to ensure that all jobs and resources are optimally matched and provides an automatic scheduling service that creates an optimised schedule, while providing the dispatcher with the necessary tools to support unexpected events that are typical for any service organization.
- Syclo's SMART Mobile Suite for Maximo is built on Syclo's Agentry Mobile Platform and is a set of pre-built, pre-integrated mobile applications that extend IBM's Maximo asset management and work management application to a variety of mobile devices. Syclo's SMART Mobile Suite for Maximo allows field workers to download, review and complete complex work orders on their mobile devices. It also enables field workers to conduct asset audits and enter measurement date from the field and supports asset calibrations as well. SMART also facilitates the use of mobile devices in storerooms and warehouses by supporting material tracking, stock counts, material issues and transfers and other inventory operations.

This software allows real time data to be recorded in the field, thereby allowing interpretation of asset data through decision support tools, Figure 22, so the most optimum and informed decisions can be made to renew or replace the assets.

Figure 22 Decision Support Tool



4.5.1 Gas Transportation Management System (GTMS) Northern Ireland

The Gas Transportation GTMSNI IT system was developed in 2003 to provide parties involved in the transportation of Natural Gas through the BGE Northern Ireland Transportation System with a fully integrated IT system that reflects all of the rights and obligations contained in the BGE Northern Ireland Transportation Network Code. The GTMSNI system provides functionality for Capacity, Nominations, Allocations, Balancing, Scheduling, Shrinkage, as well as Billing.

In relation to financial information at the end of each month all billing information is sent from GTMSNI to Oracle. See also GTMS item in Section 3.5 systems.

4.5.2 Cost Information

Maintenance costs are managed through BGE's Works management System Maximo (which is interfaced with Oracle Financials) and are driven by policy. Prior to commissioning of every individual asset, the asset is set up on Maximo in compliance with a formal asset register update process as illustrated in the figure below. Part of this process is setting up the Planned Maintenance (PM) schedule for the asset.

In Maximo there are job plan templates which contain the standard instructions and standard costs for doing each individual unique activity on the asset base. A Job Plan is a detailed set of instructions for work to be performed and they generally contain:

- Tasks (procedures) to be performed including Crew Type
- Estimated Labour hours / Materials / Cost / Tools required to complete the work
- Pre-requisites that must be completed before or on completion of the work
- Scheduling parameters & constraints

Job Plans describing reactive or planned maintenance activities always conform to asset policy - *how the asset is to be maintained, any tools or materials that must be employed during the maintenance activity and data collection requirements for storage against each work order.* Job Plans are used in conjunction with PM Schedules, Routes, Assets, Locations, Rounds, projects and finally work orders to capture work execution actual. For every individual asset, there are Planned Maintenance Schedules (PMs) set up against the asset and location. These PM schedules set out the maintenance activities to be carried out on the asset, the information to be gathered and the frequencies that maintenance it is to occur. PMs are effectively templates for scheduled preventive maintenance work. They are used to generate PM work orders. They generally contain:

- The Location or Asset, or possibly a Route of Locations or Assets, at which the preventative maintenance is to take place.
- One or more Job Plans specifying what preventative maintenance is required. The system copies the job plan to work orders generated from the PM. The generated work order inherits the tasks, services etc from these job plans.
- The frequency with which the PM is to be carried out and the due date for the next time it is to be carried out.

The frequency with which a PM is to be carried out can be determined by the following:

- Elapsed time since the target start date or completion date of previous work. PMs for this work are called time-based PMs.
- Metered asset usage since the target start date or completion date of previous work. PMs for this of work are called meter-based PMs.
- A combination of elapsed time and metered usage. For example, you can schedule a PM to trigger work every 6 months or every 300 hours, whichever comes first.
- You can create flexible schedules by using lead times, seasonal and extended dates, and by triggering work outside of a PM frequency cycle.

PMs are grouped into hierarchies that model the assets and create PMs for routes. Prior to the date maintenance is due; the system generates a work order (the PMs select the appropriate job plan template and sends it to work flow progression for completion). On completion of the activity (work order), the actual time, materials and service costs are recorded against the work order through handhelds and it is routed for approval and payment. Any variations from the standard are highlighted and require separate approval.

A forecasting tool is used to forecast the workload from maximo based on the PMs and asset base. The forecast workload can them be refined and optimised to generate efficiencies.

Similar to the planned maintenance described above, follow on work or reactive work will also be done on foot of a Maximo work order and all costs, materials and asset information is logged on the work order which is linked to the individual asset. The Maximo system allows for capture of a wide range of data on individual assets which enables strategic decisions to be made to optimise performance, gain efficiencies and reduce costs.

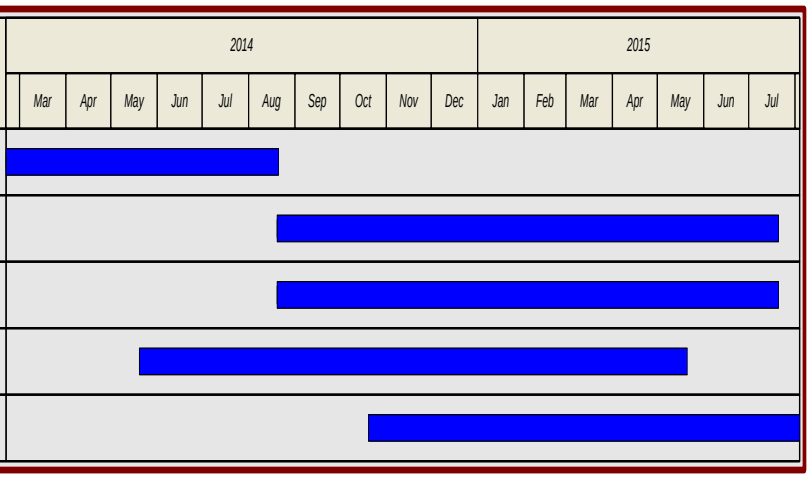
5 Technical

5.1 Safety Case

Table 11 presents the proposed timetable for updating and approving the Safety Case and Major Accidents Prevention Document (MAPD) documentation including liaison with HSE NI.

Table 11 Safety Case and Major Accidents Prevention Document Timetable

ID	Task Name	Start	Finish	Duration
1	Consult with HSE NI	20/02/2014	20/08/2014	26w
2	Update Safety Case	20/08/2014	20/07/2015	47.8w
3	Update MAPD	20/08/2014	20/07/2015	47.8w
4	Engage Integrity Consultant	20/05/2014	20/05/2015	52.4w
5	Implement BGE Document Control system	20/10/2014	16/02/2016	69.4w



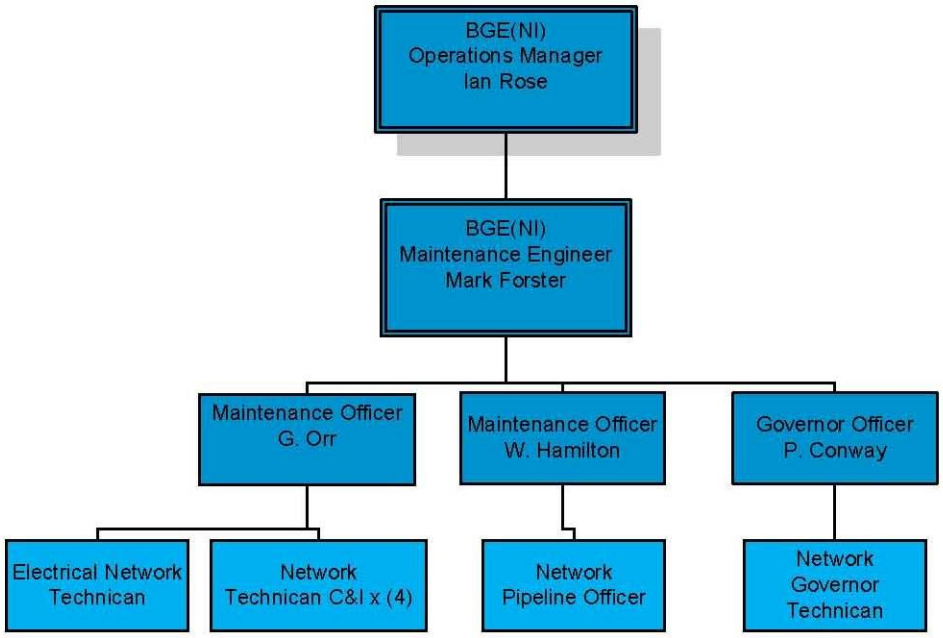
Existing BGE (UK) relationship with Health and Safety Executive in Northern Ireland (HSENI) will be used to facilitate Safety Case and Major Accidents Prevention Document (MAPD) commitology. The Antrim operational base will be utilised for planning meetings with HSE NI and BGE (UK) due to its strategic central location to the network. BGE (UK) has liaised and consulted successfully in recent years with HSE NI on several major Transmission projects, including the A8 Northwest Pipeline diversion project completed with full regulatory consent and delivered on program, on budget and with Zero accidents/ incidents or injuries in 2013.

The Kernan- Derryhale spurline project delivered in 2010 again with Zero accidents, injuries or incidents, 14 km of 10” gas Transmission pipeline successfully constructed and commissioned by BGE (UK) in full consultation with HSE NI, BGE (UK) received full Safety Case and MAPD review and approval from HSE NI in relation to this project.

All operational changes will be fully documented using BGE (UK) document control system, this is fully systemised process managed centrally by BGE (UK) Quality department, a dedicated document controller manages the change process and a dedicated quality manager will review and approve all changes, all Transmission system changes will be subject to a full BGE (UK) design stage risk assessment process (DSRA), where all risks are studied and mitigation measures suggested and incorporated in to the final detailed design.

The following is the overall organisational structure within Asset Operations, Figure 23, for managing the commissioning and operation of the project.

Figure 23 Proposed Organisation Structure for Field Operations



5.2 Technical policies, procedures and reference standards

BGE has policies and procedures in place for all activities covered within the business. This provides a systematic approach to the planning, coordination, implementation and evaluation of the activities in the organisation to ensure industry best practice and benchmarking exercises of our processes.

The Learning & Development Policy sets out the policy of BGE;

- To have a systematic approach to the planning, coordination, implementation, recording, and evaluation of learning and development activities. The company recognises that such an approach is critical to its continued success.
- To ensure the steps entailed in organising all types of learning and development activities, include Gas Technical Competency Framework which sets out the gas technical competencies required for roles in Asset Operations, Asset Management, HSQE and Technical Competency Development (TCD).

The Networks Technical Training Centre is part of Technical Competency Development department and aims to ensure that all personnel have the necessary gas technical skills, knowledge and abilities to undertake their activities in the field safely and efficiently.

Some of the high level polices we have in place include;

- Health, Safety, Quality and Environment
- Asset Management

- Learning and Development
- Emergency Response and Leak Management
- ATEX

We will apply our existing and new policies and procedures to the GTTW project to ensure we draw on all the experience to deliver the project successfully.

5.3 Compliance with relevant legislation, industry standards and best practice:

To ensure BGE are in compliance with relevant legislation, industry standards and best practice, BGE through its Health Safety Quality and Environment (HSQE) department and Markets and Regulatory department have developed processes/procedures to monitor and review of Compliance with relevant legislation, industry standards and best practice.

5.3.1 The Health Safety Quality and Environment (HSQE)

The HSQE department is responsible for working with all Bord Gais Business Units to ensure that effective processes and procedures are developed, implemented and maintained. The team also supports the document control process and Bord Gais Networks is certified to ISO 9001 and ISO 14001 and are in the process on implementing an Asset Management system (PAS 55 Specification) and is also getting the existing Safety system certified to OHSAS 18001 for the business. The National Training Centre in Finglas provides Health & Safety, gas technical and operational procedures training to staff and contractors.

The business units within HSQE department have established legal and regulatory requirements registers and these are updated annually or upon the introduction of a significant piece of regulatory information, or as activities change and new processes are introduced within Bord Gais Networks, and these reviews are completed either in-house or by external consultants. To help monitor any updates the HSQE department has a subscription to both SAI Global and to the Pegaus legal websites which provide communication prompts when there are changes to the register contents.

5.3.2 The Markets and Regulatory Department

The Regulatory and Market Affairs department deals with regulatory and licence compliance, and the Code of Operations' agreement which regulates how third party shippers utilises the regulated networks. In addition, the Regulatory department manages the legal function within the business.

The Legal Department is responsible for the provision of a range of services within the organisation. They advise the Business Units on the legal implications of their day to day transactions with third parties in addition to providing legal input into projects and initiatives. The key areas of responsibility are as follows:

- Provide Legal Sign – off for contracts in accordance with Authorisation Levels;
- Monitor legal and regulatory developments for potential impact on the organisation and alert the relevant Business Units;

- Provide advice to the Business Units on the selection of external Law Firms;
- Maintain a legal register of all legal issues being dealt with by external Law Firms;
- Provide internal support for each business unit; and
- Provision of Seminars on legal issues which impact on each business unit.

5.3.3 Internal Audit

Within BGE there are two main audit activities, one to monitor internal compliance against the management systems to which BGE is certified (under HSQE) and the Internal Audit function which resides within the Finance department. These use both internal and external personnel to conduct the audits and monitor the compliance within BGE.

5.4 Network Code

The Markets and Regulation function of BGE, on behalf of BGE (UK) would deliver the Network Codes and the various inter-TSO and inter-DSO arrangements required to the extent that these functions are not previously transferred to the intended Contractual Joint Venture / Single System Operator (CJV / SSO) in. These activities would run in parallel to the engineering operations.

5.4.1 Network Code

A number of assumptions are identified as follows:

- The Contractual Joint Venture / Single System Operator (CJV / SSO) in NI will be fully operational in advance of the commencement of operations on the GTTW high pressure pipeline;
- The single Entry/Exit Network Code for NI will be fully operational in advance of the commencement of operations on the GTTW high pressure pipeline;
- The single I.T. system (operating the NI network in accordance with the single NI Entry/Exit Code and administered by the CJV / SSO) will be fully operational in advance of the commencement of operations on the GTTW high pressure pipeline;
- BGE (UK) Network Code will no longer exist as a live document and therefore will not require amendment.
- The single NI Network Code, CJV/SSO and GTTW Licence will each be developed, insofar as is possible, to ensure that arrangements applying to existing networks (Transmission or distribution) are aligned and consistent with those applying to the new GTTW networks.

BGE (UK) assumes that the single NI Network Code will be applied to the GTTW high pressure pipeline as it is to the existing NI high pressure network and accordingly, a separate network code is not required in respect of the new assets. Effectively, any changes to the single NI Network Code to account for the introduction of the GTTW high pressure pipeline will be minor, including but not limited to the following:

- Reference to new licence and any requirements thereof which are unique to the GTTW licence
- Reference to new Exit Points and any specific / unique requirements (technical or otherwise) which may relate to such Exit Points
- Any unique requirements which arise as a result of the DSO (low pressure network) licence (and consequent Distribution Code) which may require changes to the Transmission Network Code
- Reference to new TSO/DSO Agreement (or CSA) and the requirements thereof as they effect the TSO – Shipper interface

5.4.2 TSO / DSO Agreement

- TSO / DSO agreement to be developed between the TSO and the successful DSO on the low pressure network.
- The estimated resource commitment is as follows:
- 4 month duration
- Internal:120 man days (1.5 man days per week)
- External Legal:15 man days

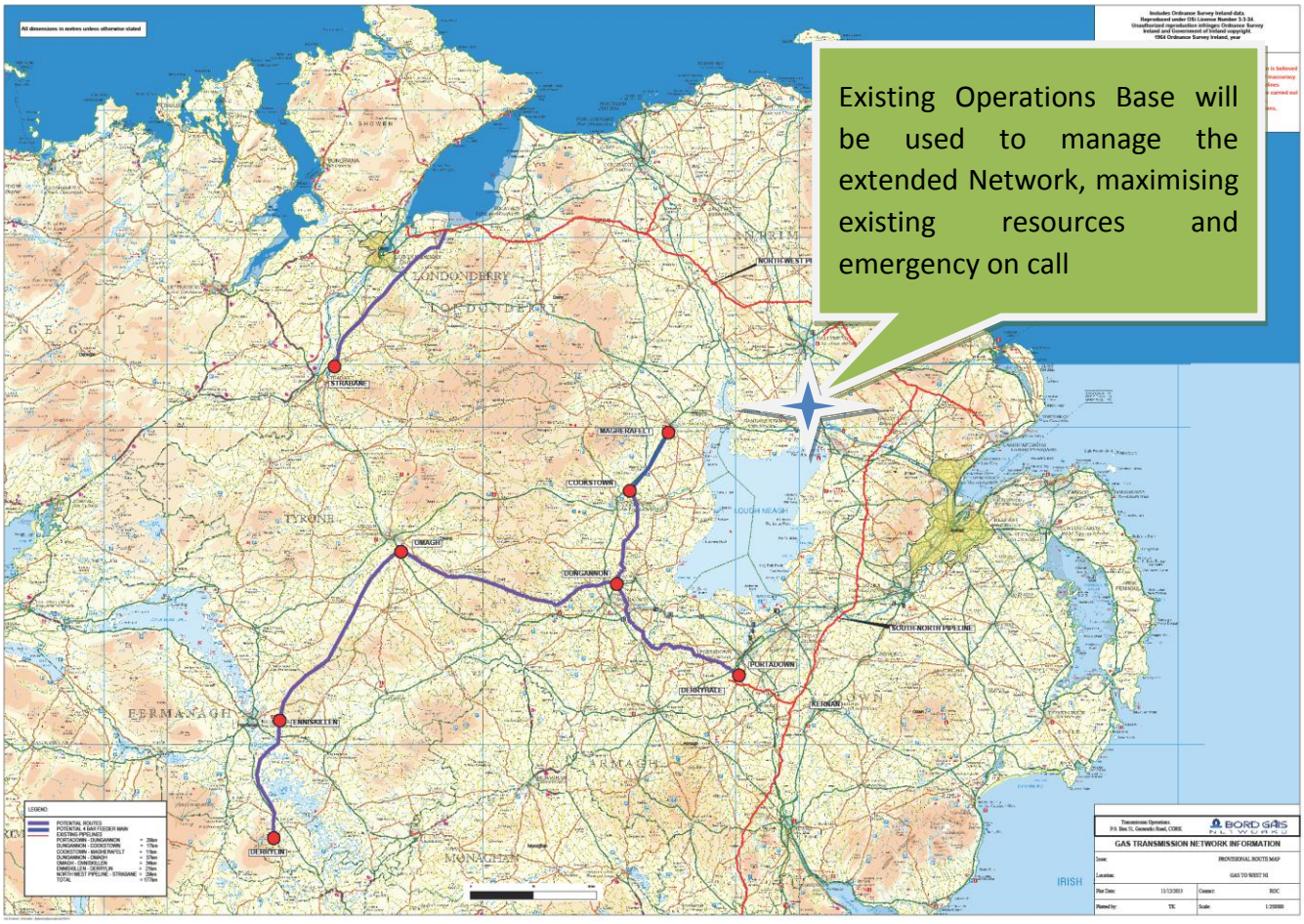
5.4.3 Inter-TSO Agreement – Northern Ireland Network Operators Agreement (NINOA)

- It is assumed that the holder of the new GTTW high pressure network licence will be required to become a party to the NINOA (or its successor as part of the CJV/ SSO)
- As BGE (UK) is already a party to the agreement, this represents a benefit relative to the potential requirement to introduce another entity to the agreement.
- Assuming that the TSO – TSO interface between the existing NI network and the new GTTW pipeline is BGE (UK) – BGE (UK), the information flows which may be required should the adjacent TSOs be different entities is largely eliminated as all information exists in-house.
- Any such information flows would require amendment to the NINOA.

5.5 System performance monitoring, system control arrangements

The existing operational base in Northern Ireland, Figure 24, allows for maximum utilisation of resources for emergency response. The existing Dial Before You Dig arrangements will be expanded to include the new pipelines with follow up managed centrally by existing resources based in the BGE (UK) Antrim field offices. Offsite emergency response will also be managed by the BGE (UK) Operations Manager and Operations Engineer. BGE (UK) has completed and documented several major emergency exercise scenarios over recent years including involvement of local emergency planners, Police Service of Northern Ireland, Fire and rescue Service, Environmental health officers, HSE NI, Firmus and the Northern Ireland Network Emergency Coordinator (NINEC).

Figure 24 Proposed Operational Base Located Centrally in Northern Ireland



5.5.1 General

Health, Safety and Environmental issues are of prime concern to BGE (UK). Pipelines and installations must be designed and constructed in a manner, which will reduce residual risks to levels, which will satisfy the Health and Safety Executive (HSENI). Additionally the design must be assimilated into its environment to the satisfaction of the various statutory bodies, consulted as part of the planning process. Of significant importance is also the need to demonstrate to landowners of both the pipeline wayleave and of Above Ground Installation sites that the entire system has been designed, constructed and will be operated, maintained in a manner which is fundamentally safe and of minimal detrimental effect to the environment and their surroundings.

5.5.2 Health and Safety

The HSENI publish Statutory Instruments (SI), which set out the requirements and conditions that the owner of a gas pipeline must fulfil prior to commissioning the pipeline system. In order to achieve the

requirements set out by the SI, the proposed Pipeline and Installations will be designed to the stringent requirements of internationally recognised codes and standards.

Every phase of the design, construction, operation and maintenance of the system is audited by the HSENI to ensure that Health and Safety is one of the primary drivers in all aspects of the project.

Since its foundation in 1978, BGE has an impeccable safety record and has never experienced a major pipeline incident.

BGE (UK) operates a comprehensive safety management system based on the guidance laid down by the Health and Safety Authority (Workplace Safety and Health Management) and in SR OHSAS 18001 (Occupational Health and Safety Management Systems - Requirements), ILO-OSH 2001 (Guidelines on Occupational Health and Safety Management Systems), Health and Safety Executive (UK) document HSG65 (Successful Health and Safety Management) and BS 8800 (Occupational Health and Safety Management Systems – Guide).

Additional guidance was been obtained from the Health and Safety Authority guidance documents on risk assessments and safety statements, responsibilities of directors and senior managers and safety representatives and consultation.

The BGE (UK) Safety Management System is built around the structure presented in the HSA Workplace Safety and Health Management guidelines, SR OHSAS 18001, ILO-OSH 2001, HSG65 and BS 8800.

The underlying principle of the structure - ***Plan, Do, Check, Act*** – will be applied to all tasks in the GTTW Project.

The BGE (UK) Safety Management System is further broken down into the following 11 core elements:

- Leadership and Responsibility
- Hazard Identification, Risk Assessment and Control
- Materials, Equipment and Assets
- Processes and Procedures
- Personnel, Competency and Behaviour
- Contractors, Services and Suppliers
- Emergency Preparedness
- Communication, Consultation and Co-operation
- Documentation and Records
- Accident and Incident Reporting and Investigation
- Performance Monitoring, Review, Audit and Improvement

5.5.3 Environment

BGE (UK) pipelines and above ground installations is the subject of a detailed planning process, which includes the preparation of an Environmental Impact Statement (EIS). We have completed numerous EIS

for previous pipeline projects in Northern Ireland and are therefore fully proficient and have existing relationships in place through our ongoing business.

All EIS documents completed by BGE (UK) has been robust and scrutinised by third parties during previous planning applications for Northwest and South North pipelines, which were successfully granted planning permission.

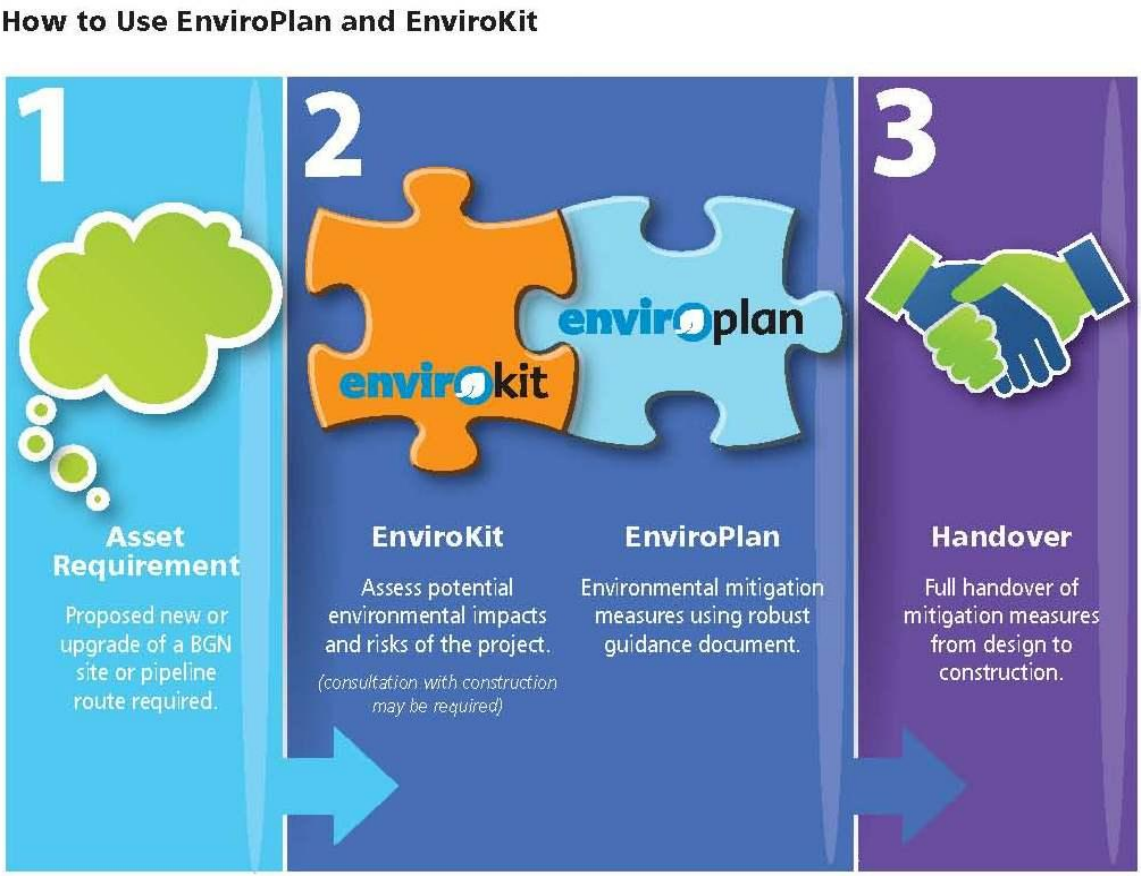
Such is the importance of the environmental phase we continue to develop in this area and we have developed an in-house system (enviroplan) regarding the planning and design phase of projects and we will apply this to the GTTW project.

The enviroplan ensures we capture the requirements of our stakeholders and we develop appropriate mitigation measures, which are then incorporated into our tendering documents. We use this to demonstrate to our stakeholders the process we have gone through to arrive at the most optimal pipeline route.

Where we engage third parties on our behalf during the design and planning phase they are required to utilise the enviroplan.

Figure 25 is an extract of the enviroplan used within the business during the planning and design phase of recent pipeline projects.

Figure 25 Enviroplan and Envirokit



5.5.4 Pipeline

The GTTW Pipelines will be buried throughout their length, with the exception of the AGIs. Following installation of the pipeline, the lands above will be reinstated to their original condition, including grass seed, tree and hedgerow planting.

Historically, various conditions have caused pipeline failures, including poor quality pipe material and excessive corrosion. Failure data for all recorded failures have been used to refine the quality procedures for material manufacture and improve corrosion protection measures to an extent that the most significant risk in recent years has been third party interference.

Particular measures will be put in place to reduce the possibility of third party interference with the pipeline these are as follows:

- The minimum depth of cover is 1.2m (4 ft.) increasing to 1.5-1.6m at various crossings. These depths exceed the typical depths of traditional services, therefore decreasing the possibility of the gas pipeline being encountered during routine servicing or installation of other services,
- A non-degradable marker tape is installed directly over the pipeline throughout its length to identify the presence of the pipeline to persons digging in its vicinity,

- BGE (UK) has signed up to MOLESEYE, a 'dial before you dig' online system for service providers and contractors to identify other services before digging in public roads,
- Visible marker posts are located at all boundaries and crossings points,
- Heavy wall pipe is installed where the pipe traverses areas of high local population density and at road crossings where future dwellings may be in close proximity to the pipeline,
- The pipeline is protected from corrosion with internal and external lining and also an impressed current system which uses sacrificial anodes to prevent corrosion of the pipeline, the workings of the impressed current system is checked regularly as part of routine maintenance.
- Routine inspection regimes are employed to ensure early detection of any pipe deterioration and to monitor the pipeline route for external interference.
- Continued contact with all landowners, the Planning Department and other bodies ensures prior knowledge of any development plans in the area of the pipeline.
- Once the pipeline becomes operational a regular surveillance programme will be put in place for the entire pipeline route.

This is the same procedure as employed for the Northwest, South North and spurlines constructed by BGE (UK) in Northern Ireland.

5.5.5 Above Ground Installations

AGIs are constructed for 2 main reasons:

- Sectional isolation of the pipeline,
- Off-takes to other pipelines or to the domestic, commercial and industrial markets.

In either of the above cases, it is necessary to install sections of above ground pipework including some or all of the following:

- Isolation valves,
- Filters,
- Meters,
- Pressure Control Valves,
- Instrumentation for monitoring pressure, temperature and gas quality.

In order to reduce the possibility of third party interference at the AGIs, they are protected by means of a double security fence reinforced by a sophisticated intruder detection system. The intruder detection system consists primarily of a power fence, door and gate contacts and Closed Circuit Television (CCTV) cameras. Contact with the power fence or release of any of the door or gate contacts causes an alarm at the remote monitoring station and activates the CCTV to the alarm zone. The cause of the alarm may be

viewed remotely to verify unauthorised access and instigate a response from Operations personnel and the Police Service of Northern Ireland (PSNI).

All Installations on the proposed pipeline will be monitored via remote telemetry at BGE (UK)'s Grid Control Centre, where any deviation from the standard operating parameters may be detected and result in a call out of the local BGE (UK) Operations personnel. Additionally, the Operations personnel visit the sites regularly to visually confirm the continued safe operation of all components.

Dispersion modelling is carried out for each installation to ensure that hazardous areas associated with controlled gas venting at AGIs are contained within the inner security fence. Such modelling is made possible due to the fact that gas is lighter than air. Therefore, at any vent point, the gas will disperse outwards and upwards, constantly being diluted with air. At concentrations below 10% Natural Gas in air, the mixture is not flammable. The design of the AGIs is such that this threshold is reached within the AGI. All electrical equipment within the identified hazardous area is rated 'Explosion Proof', meaning that even if a gas leak occurs that an ignition source is not present. During planned and unplanned maintenance, Operations personnel will ensure that the area is gas free before any work commences. As an additional precaution, no spark plug engines are allowed within the confines of the AGI sites, i.e. diesel engines only.

5.5.6 Emissions

There are no emissions from the buried gas pipeline. All joints on the gas pipeline are welded and each weld is subjected to radiographic testing prior to pressure testing the entire system to ensure that there are no leaks.

There are occasional emissions from AGIs, which may be summarised under the following headings:

- Light
- Noise
- Gas
- Boilers
- Solids

The AGI sites include interior and exterior building lighting and floodlighting. Under normal operating conditions, all lighting is off. During unavoidable maintenance or under security alarm conditions, the site floodlighting will be illuminated. Where possible such lighting is notified to and coordinated with the immediate neighbours.

The AGI and their components are designed such that there will be no net increase to background noise levels in the area. The majority of AGI components do not generate noise, those that do, for example pressure control valves, will be housed within acoustic enclosures to ensure the exterior noise is negligible.

Under normal operating conditions, there are no gas emissions from the AGIs. During maintenance operations, such as filter cleaning, there is an unavoidable small release of gas; however this gas disperses immediately in the atmosphere within the contained area. During the regular visits to site by

the Operations personnel, checks are carried out on the above ground components to ensure they are gas tight. As a safety precaution the gas is odorised and has a distinctive smell.

In some AGIs, due to the cooling effect of pressure reduction, it is necessary to install boiler packages to preheat the gas. Such boiler packages are similar to domestic units and have similar exhaust fumes. In recent years, BGE (UK) has installed condensing boilers, which operate at lower temperatures thereby reducing the exhaust emissions. The condensing boilers discharge water in the form of pH neutral condensate, which may be discharged to the drainage system.

During filter cleaning, small amounts of dust carried in the gas are removed. This solid waste is removed from the AGI sites and disposed of in a controlled manner by licenced contractors.

5.5.7 Description of Process Fluid (Natural Gas)

The Pipeline Safety Regulations (NI) 1997 applies to a dangerous fluid. A dangerous fluid is defined "A fluid which is flammable in air and is or is to be conveyed in a pipeline as a gas at above 8 bar absolute."

Natural gas to be conveyed by GTTW transmission pipeline falls within this definition.

The typical composition of the odorised natural gas will be as follows:

Table 12 Typical Natural Gas Specification

Component	**Percentage by Volume**
Methane (CH4)	87 to 97
Ethane (C2H6)	1 to 6
Propane (C3H8)	0.2 to 2
Butane (C4H10)	0 to 1
C5 to C9	0 to 0.32
Carbon Dioxide (CO2)	0 to 2
Nitrogen	0 to 5
Other Properties	
Molecular Weight	16.9 to 19.0
Density (real)	0.71 to 0.8 kg/m^3
Lower Flammable Limit	4.9 to 5.0 volume %
Upper Flammable Limit	15 volume %
Moisture content	≤ 112mg/m^3
Sulphide content	≤ 3.7 ppm v/v

The gas will be required to be dry and with a low sulphur content so that internal corrosion is minimised.

The gas characteristics are determined by a BGE (UK) Gas Networks gas chromatograph at Moffat. At the Twynholm offtake for the Stranraer and Northern Ireland pipeline the gas is supplied to Premier Transmission Ltd. and the gas characteristics are also measured by chromatograph. UK gas entering the network would normally comply with Schedule 3, Part 1 of the GS(M)R/96[4].

BGE (UK) will be installing a chromatograph combined with metering on this pipeline to facilitate independent monitoring of gas flows and energy content.

5.5.8 SCADA

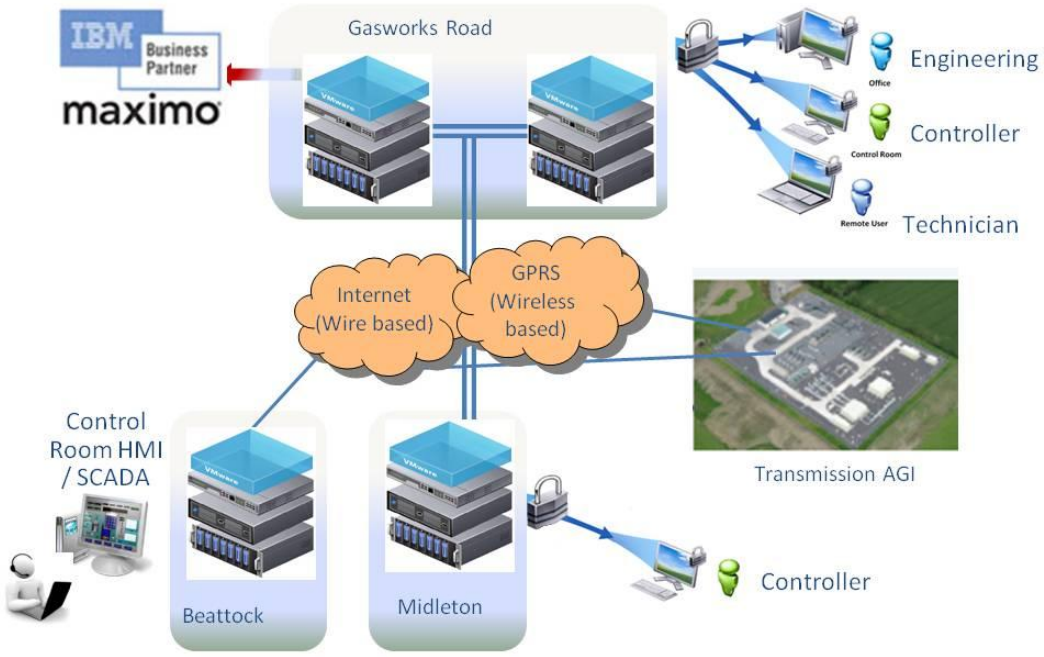
5.5.8.1 SCADA Network

The existing SCADA network provides monitoring and/ or control of remote equipment and data acquisition of process data to the data historian. BGE (UK)s existing Transmission SCADA network is a Honeywell Experion system. Currently the following parameters are connected to SCADA and the makeup may vary from site to site depending on site critically and capacity requirements;

- Metering
- Gas Quality
- Security
- Cathodic Protection
- Electrical
- Site Instrumentation

[4] Gas Safety (Management) Regulations / 1996. SI 1996 No 551 (and associated guidance L80).

Figure 26 SCADA Architecture



5.5.8.2 Network Level

Any new AGI connections shall be implemented using current procedures for adding AGIs and their associated assets to the SCADA network. Once operational, these AGIs shall follow existing operating procedures which are presently in use in other BGE (UK) AGIs. Should AGIs fall outside normal operation conditions or should an unexpected indicant occur, existing procedures shall be mobilised and escalated to the necessary pre-defined personnel, groups and organizations as outlined within the procedures.

5.5.8.3 AGI Level

Implementation of SCADA at AGI level is dependent on the size, critically and security requirements of individual sites. New AGIs will be designed as per current BGE (UK) policies, specifications, national and international standards. Site security will be designed as per local security requirements and defined by the appropriate authority. The operation of new AGIs shall follow current BGE (UK) procedures.

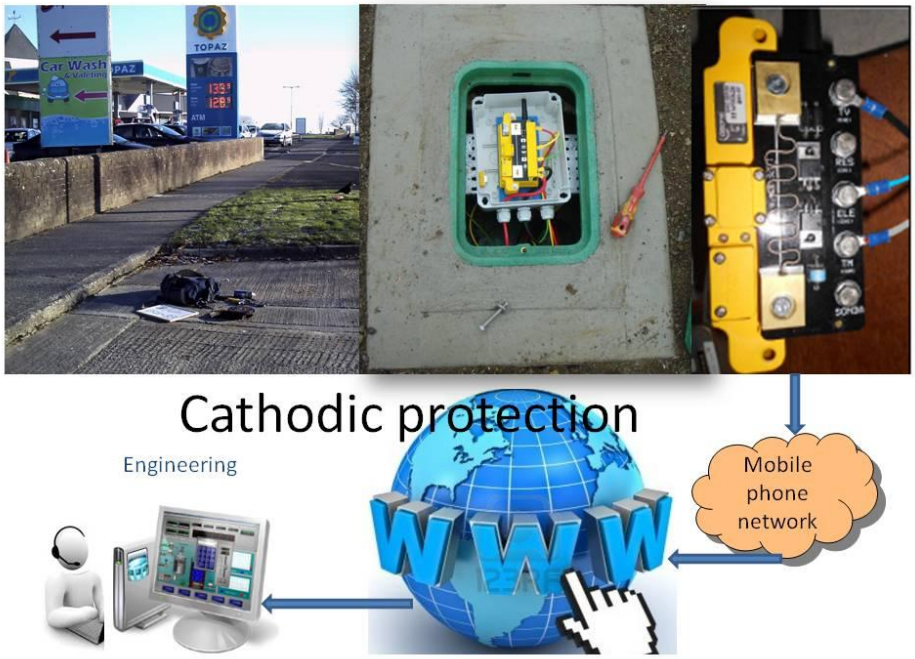
5.5.9 Cathodic Protection Remote Monitoring

5.5.9.1 Cathodic Protection Remote Monitoring Network

The existing Cathodic Protection (CP) remote monitoring network provides monitoring of remote CP assets and data acquisition for the data historian. BGE (UK)'s existing CP remote monitoring network is

an internet base system utilising GRPS communication to connect the device to the network. Selected key assets deemed of high importance due to their location and/ or critically are connected to the network.

Figure 27 CP Remote Monitoring Architecture



5.5.9.2 Network and Asset Level

New CP remote monitoring connections shall be implemented using current procedures for adding assets to the network. Once operational, these devices shall follow existing operating procedures which are presently in use in BGE (UK). Should these devices fall outside normal operation conditions or should an unexpected incident occur, existing procedures shall be executed and escalated to the necessary pre-defined personnel, groups and organizations as outlined within the procedures.

Installation of CP remote monitoring shall be decided on at design stage whilst taking into account asset importance to the gas network due to their location and or critically.

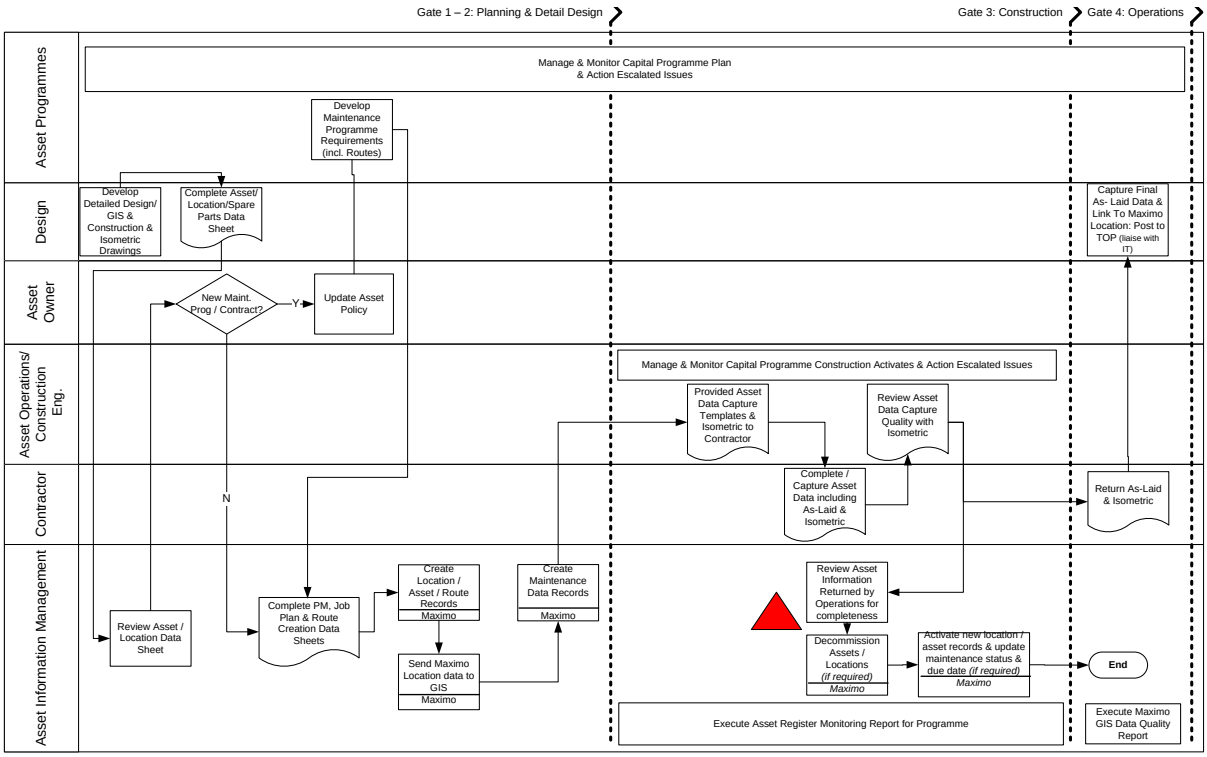
5.6 Asset Records

5.6.1 Asset Register Process

The asset register process outlines the process by which information in relation to new assets is gathered and captured on the various BGE IT systems for future use. The process is cross-functional and outlines responsibilities and points of contact for numerous departments involved in the register of new assets from design stage through to commissioning. A clear and well understood process is important to

ensure that all relevant data is captured successfully. Figure 28 presents an example of the asset register process as it applies to Capital Projects. Process maps are also in place for minor capital works.

Figure 28 Business Process Map for the Asset Register Process as it Applies to Major Capital Projects



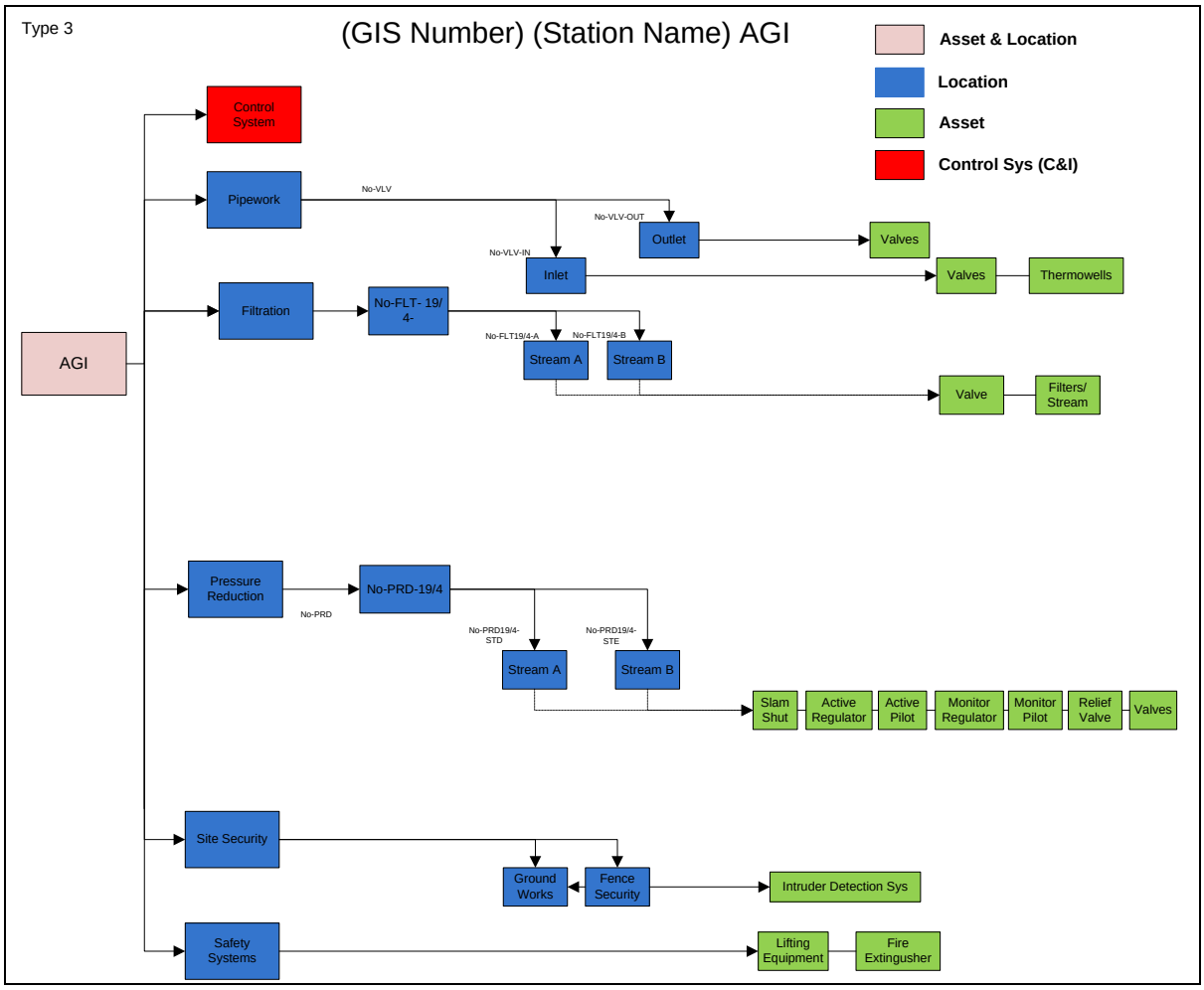
The data captured during the asset register process can be categorised in a number of ways. The following sections outline three categories of information related to assets that are captured during the asset register process;

- Location Data;
- Asset Data; and
- Maintenance Data.

5.6.2 Location Data

Location data relates to information used to group and add context to data relating to assets. Examples of location data include geospatial information, such as co-ordinates, and hierarchical data such as a description of where on site a particular asset may be found (e.g. a particular slam shut asset is located in the stream B location of the pressure reduction location of a particular AGI). Hierarchies are in place to relate locations to one another and to the assets which are linked to them. Figure 29 provides an example of a hierarchy for a particular classification of an AGI.

Figure 29 Hierarchy for a Type 3 Above Ground Installation



As can be seen in the asset register process, location data is captured by the design department at the start of the process with any changes noted by the construction department following the completion of construction.

Location data can is stored in a geospatial database (GE Smallworld GIS System) and in an Asset and Work Managements system (IBM's Maximo). Data from the Asset and Work Management system is also accessible through a reporting data warehouse accessible through a business intelligence reporting tool (SAP Business Objects).

5.6.3 Asset Data

The term "Asset Data" refers to data relating to the physical assets in place on the natural gas network.

As can be seen in the asset register process, asset data is captured initially by the design department at the start of the process with any information relating to activities on site noted by the construction department following the completion of construction.

Asset data is stored in an Asset and Work Managements system (IBM's Maximo). This data is also accessible through a reporting data warehouse accessible through a business intelligence reporting tool (SAP Business Objects).

5.6.4 Maintenance Requirements Data

Maintenance requirements data refers to data relating to what assets need to be maintained, how they need to be maintained and how often they need to be maintained. As can be seen in the asset register process, this data is decided by the Asset Owner and uploaded by the Asset Information department following consultation with the Asset Programmes department.

Data relating to maintenance is stored in the Asset and Work Managements system (IBM's Maximo). This data is also accessible through a reporting data warehouse accessible through a business intelligence reporting tool (SAP Business Objects). Whenever maintenance work is due, following clearly defined intervals, a Work Order is created automatically which is a signal that a particular piece of maintenance must be carried out.

5.6.5 Ongoing Maintenance Records

Data relating to ongoing maintenance is stored in the Asset and Work Managements system (IBM's Maximo). This data is captured on site through the completion of Work Orders on hand held devices which are interfaced back to the Asset and Work Management system, or in back office, directly on to the system as appropriate.

Maintenance data that is stored includes the date and type of work that was carried out, assets / locations that were maintained, the outcome of the work, any requirements for future unplanned work, along with any comments deemed necessary by the maintenance technician. Additional data is also collected for some types of maintenance such as calibration records for Control and Instrumentation equipment and condition assessment information for function checks of Transmission pressure reduction streams.

Maintenance completion is overseen by the Opex Programmes department and through this role the successful completion of work orders is also monitored.

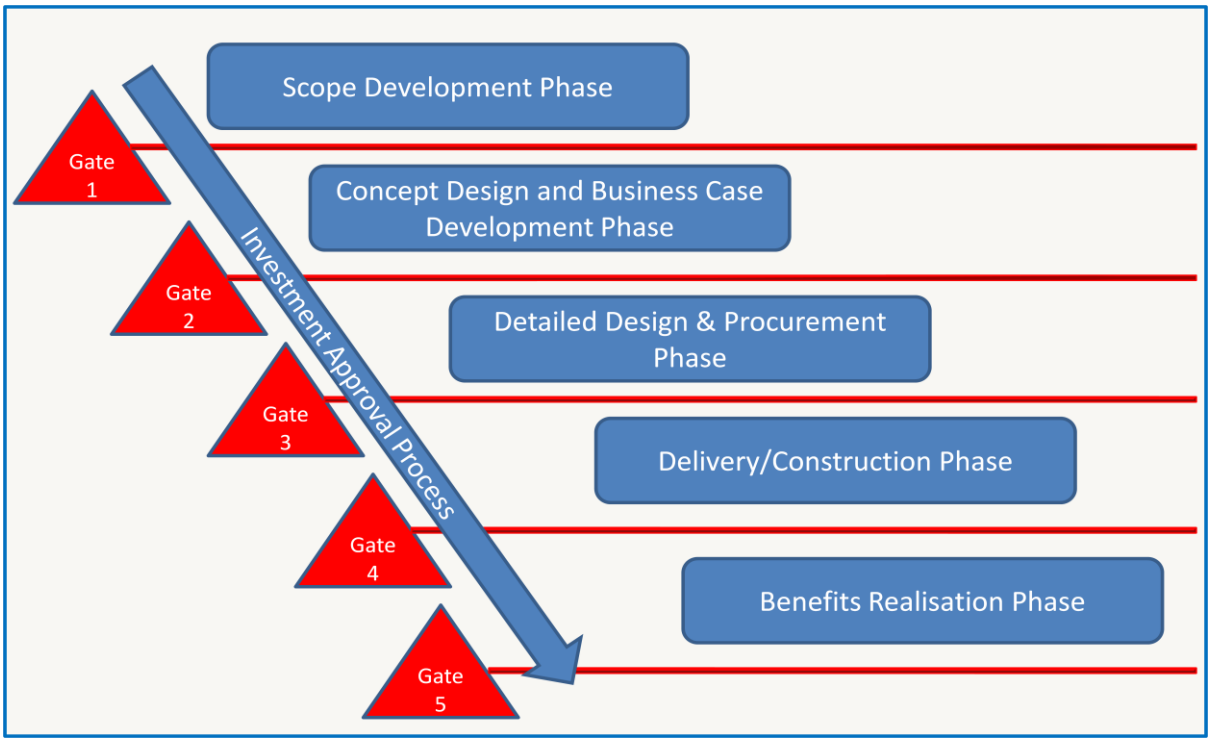
5.7 Asset Management Systems

5.7.1 Capital Investment Process in BGE (UK)

5.7.1.1 The process

The Investment Approval Committee (IAC) is charged with the governance and approval of all capital spending in accordance with a rigorous process. The approval path follows a five-gate model, as shown in Figure 30.

Figure 30 Investment Approval Process and Gates

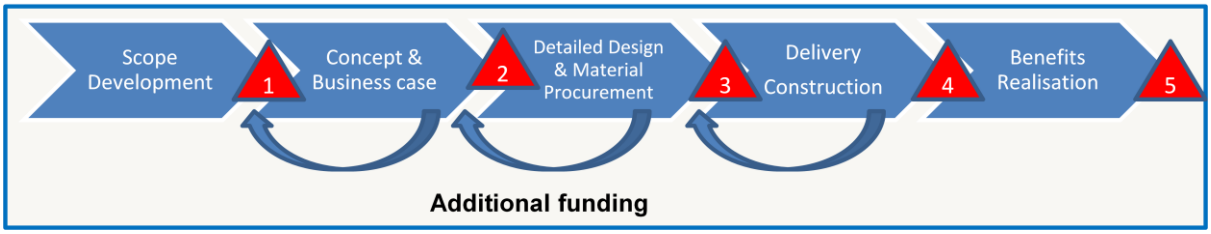


Investment approval process is divided in to five separate phases:

- Scope Development;
- Concept Design, Option Analysis and Business Case;
- Detailed Design, Materials Procurement and Preferred Bidder;
- Delivery/Construction; and
- Benefits Realisation.

The process shown in Figure 31 comprises of five separate gates, labelled 1 to 5. Each phase requires approval at the appropriate gate to enable advancement along the process. A project is completed at Gate 4 and the enduring benefits are evaluated subsequently at Gate 5. A control budget is set at each gate, sufficient to move the project through the next phase. All funding in excess of the agreed budget, because of cost overruns, scope creep or materials issues, requires further approval before advancement to the next phase, as shown by the loop back path in Figure 31.

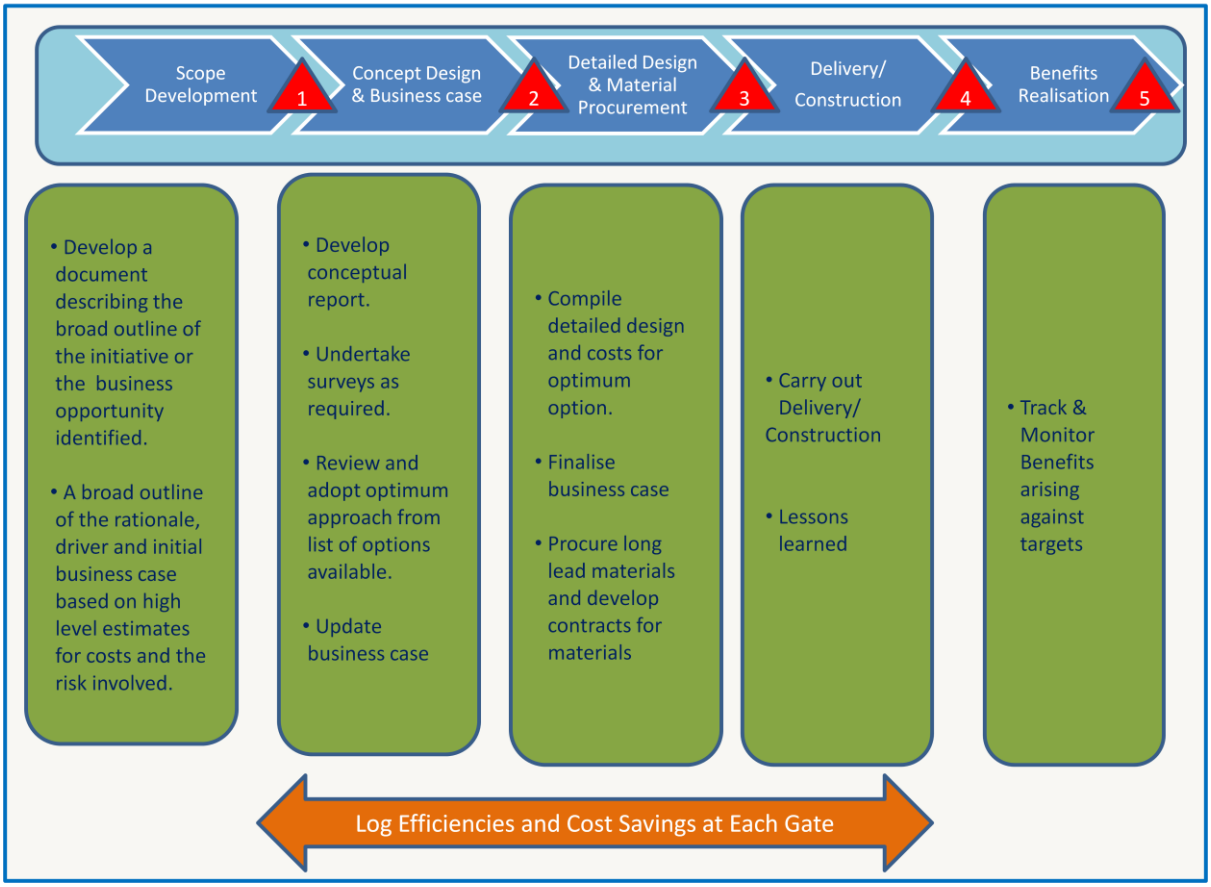
Figure 31 Investment Approval Process and Gates



5.7.1.2 Tasks and deliverables

The various tasks and deliverables required during the investment process are shown diagrammatically in Figure 32.

Figure 32 Tasks and Deliverables



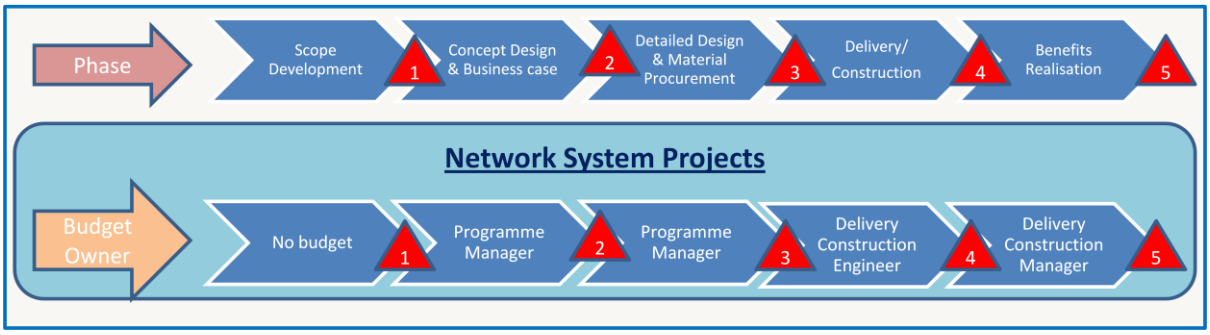
5.7.1.3 Budget ownership and responsibility

As part of the overall governance around the IAC process, a key issue is ownership and accountability for the financial aspects of the capital project. Each Programme Manager is responsible for the capital budget through the various phases in the lifecycle of a capital project and this is shown diagrammatically in Figure 33.

The Programme Manager responsibilities include:

- Understand and accept the budget and costs to date they are taking over from previous gate and budget holder
- Monitor spend on project
- Update projected cost to next date and to completion
- Ensure there is adequate budget available before entering in to commitments
- Request re approval from previous gate where projects are anticipated to exceed approved control budget
- Query and understand any cross charges to the project
- Identifying and rectifying any cost misallocations
- Communication of accruals to Finance on a monthly basis

Figure 33 Budget Ownership and Responsibilities



5.7.2 Asset Management Systems

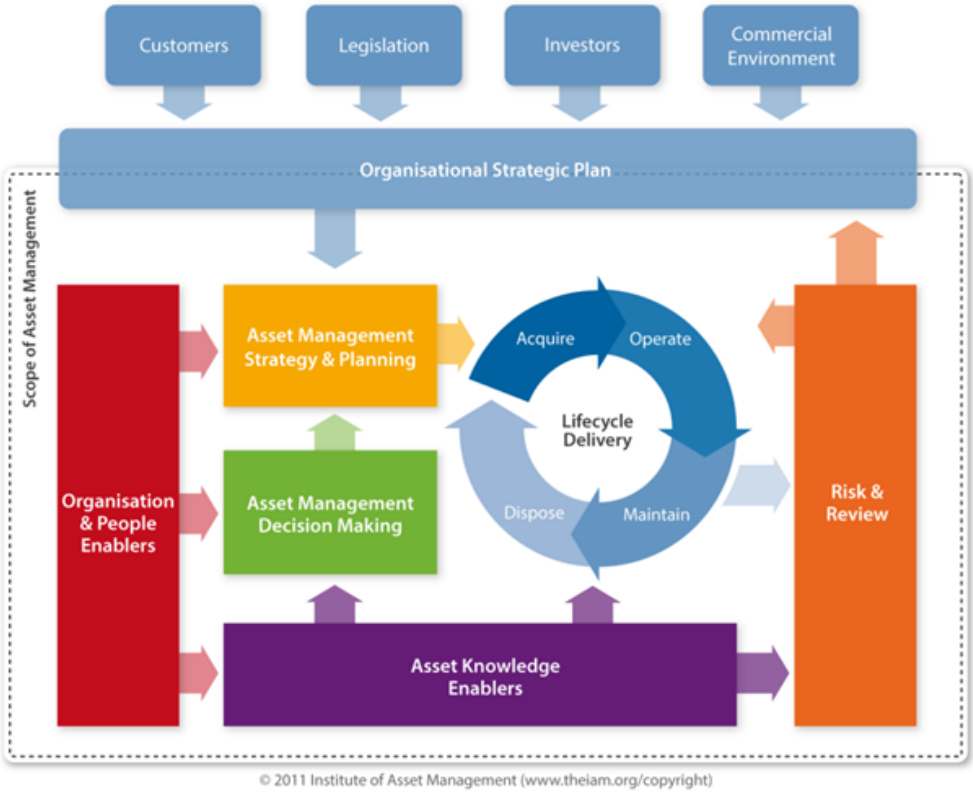
5.7.2.1 Proposed approach to implement an Asset Management System

BGE are in the process of implementing an Asset Management System in line with an industry best practice to achieve BGE's organisational strategic plan, by optimising and sustainably managing our assets; their performance, risks and cost during their entire lifecycle. We previously refer to this in section 4.4.1, regarding benefits.

The Asset Management System further enhances our capabilities in an integrated and systematic way to a recognised industry standard; PAS 55. This standard, details 28 requirements, provides a tested framework for Asset Management and an auditable link back to the business' objectives while demonstrating to stakeholders that the physical assets are being properly managed.

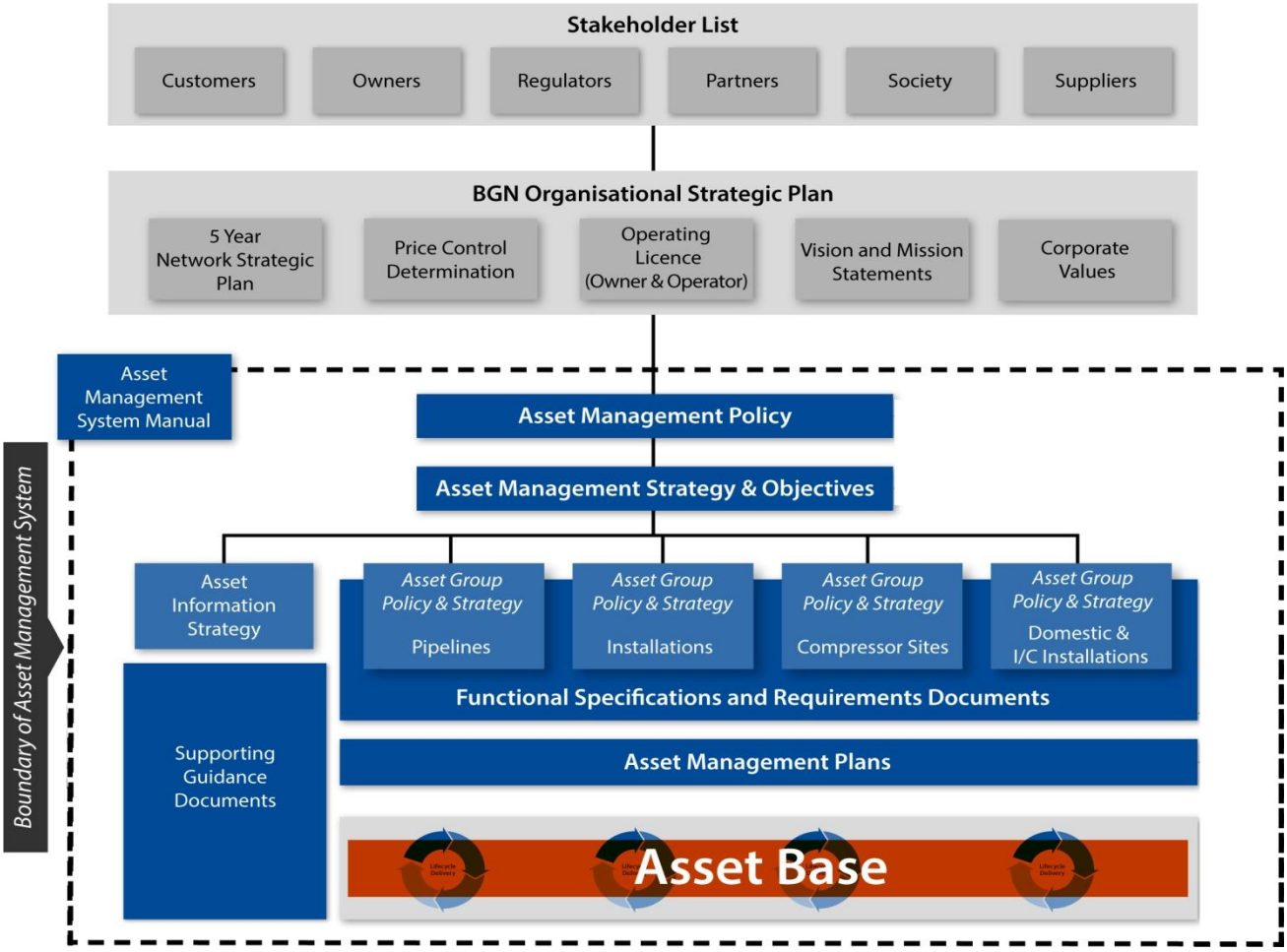
PAS 55 has been based on the familiar International Organisation for Standardization (ISO) format and will easily integrate with the existing ISO 9001 and ISO 14001 systems to which BGE is presently accredited. Key components, included within the scope, are shown in Figure 34 below.

Figure 34 Institute of Asset Management Conceptual Model for Asset Management



The key documents that form the Asset Management System are as illustrated in Figure 35 below.

Figure 35 BGE Asset Management System



The purpose of each document is detailed in Table 13 below.

Table 13 Asset Management System documentation and purpose

Document	Purpose
Asset Management Policy	Principles and mandated requirements derived from, and consistent with, the organisational strategic plan, providing a framework for the development and implementation of the asset management strategy and the setting of the asset management objectives
Asset Management Strategy	Long-term optimised approach to management of the assets, derived from, and consistent with, the organisational strategic plan and the asset management policy The documents set out: A summary of the total population of assets and locations within the scope of the Asset Group Policy and Strategy; Future trends in demand and changes in usage patterns; Plans for new asset creation, refurbishment, enhancement and decommissioning with resultant effects on routine (OPEX) activities; Any non-standard approaches that have been prescribed for specific assets; Baseline criticality ratings (scale of 1 – 5) for all locations with changes over the (5 year) planning horizon due to planned activities and/or demand profiles
Functional Specifications and Requirements	These are written at the asset class level. They are specific rule-set for the asset class which has been derived from the whole-life decision-making approaches defined in the overall Asset Management Policy and Strategy. These documents include the following elements: How risk is evaluated for these asset classes (i.e. how we apply the risk framework); Notable issues and problems from the historical record; Deterioration characteristics and failure modes; How condition is graded; How performance is measured; and A rule set for the whole-life interventions for the asset class (maintenance, inspection and renewal tasks).
Asset Management System Manual	The Asset Management System Manual forms the framework for the implementation of Asset Management within the organisation, the undertaking of associated Asset Management activities for both internal and external communication of BGE's Asset Management approach.
Asset	The Asset Information Strategy defines how BGE intends to collate, maintain,

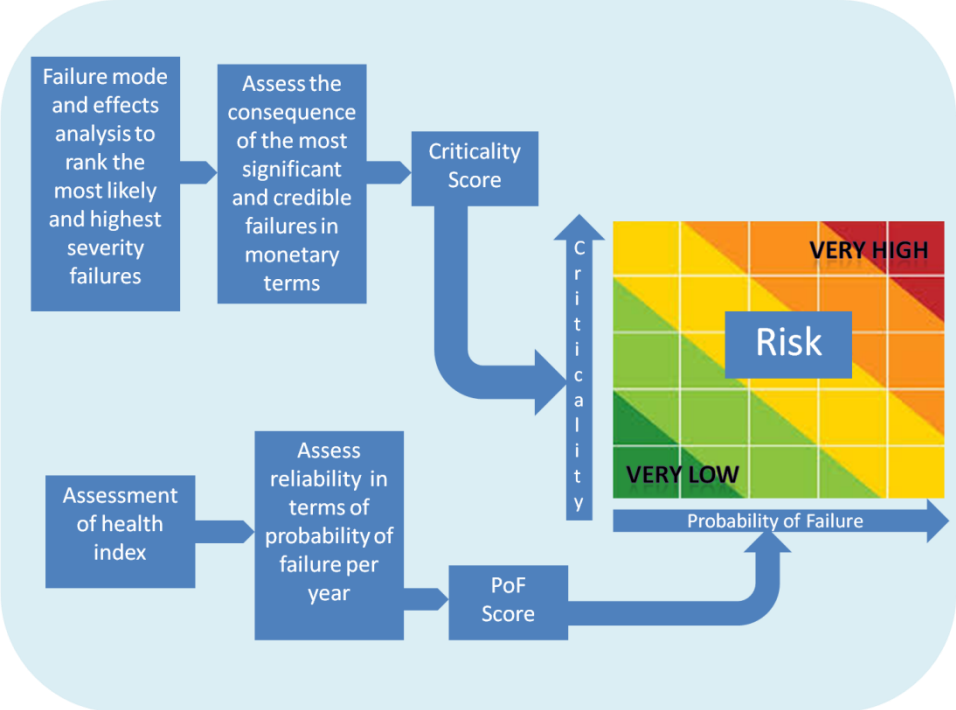
Information Strategy	utilise and dispose of asset information to support both strategic planning and lifecycle delivery activities. Additionally, it takes into account the lifecycle costs of the provision of asset information and the value the information adds to the organisation in terms of improved decision-making and supports the day-to-day delivery of Asset Management activities.

5.7.2.2 Proposals to identify and manage developing risk issues

The risk associated with a particular asset failure is evaluated in accordance with the Health, Safety, Quality and Environment (HSQE) risk evaluation model, Risk Assessment and Management. The model is a standard qualitative heat map assessment of the likelihood and consequence set against five criteria:

- Health and Safety;
- Environmental;
- Compliance;
- Customer; and
- Reputation.

Figure 36 The Asset Risk evaluation model



Additionally risks are identified through the BGE Quality Management System's internal auditing programme.

Identified risks are raised and managed through BGE's Risk Management System. The risk profile is addressed through interventions, both CAPEX and OPEX. Detailed business cases are developed for each

intervention, which are then prioritised based on risk level. Projects are managed by an Investments Approvals Committee process which is gated project approval process as follows;

- **Gate 1** – Approval to undertake Concept Design;
- **Gate 2** – Approval to Prepare Design and Cost Estimate;
- **Gate 3** – Investment and Construction Approval;
- **Gate 4** – Project Closure Approval; and
- **Gate 5** – Post Investment Review Approval.

5.7.2.3 Application of RCM (Reliability Centred Maintenance) principles to optimise activity

Reliability Centre Maintenance principles are detailed per asset class within the Functional Specification and Requirements documents.

These documents include the following elements:

- How risk is evaluated for these asset classes (i.e. how we apply the risk framework);
- Notable issues and problems from the historical record;
- Deterioration characteristics and failure modes;
- How condition is graded;
- Operating parameters and how performance is measured, and;
- A rule set for the whole-life interventions for the asset class
    - Condition Monitoring,
    - Inspection or Predictive Maintenance
    - Planned Preventive Maintenance
    - Function Testing
    - Corrective Maintenance

In total there are 15 Functional Specification and Requirements which support the delivery of the Asset Group Strategies, as illustrated in Figure 37 below.

Figure 37 Functional Specification and Requirements and Asset Group Strategies

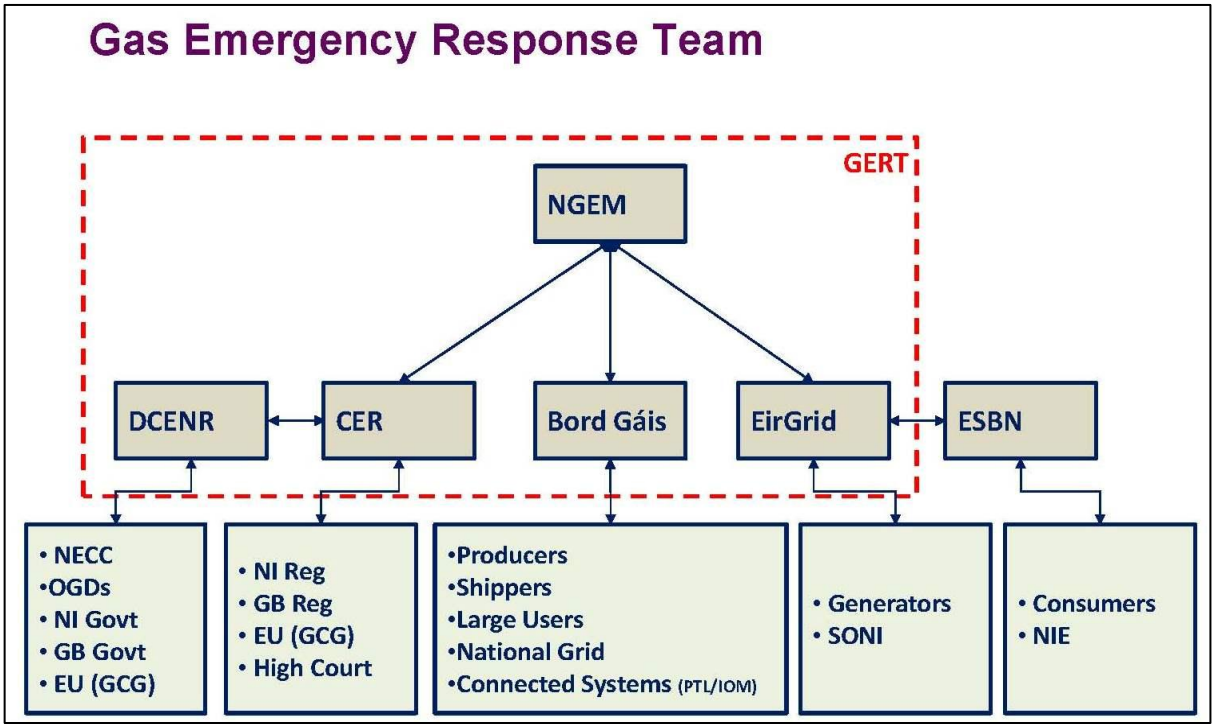
Asset Management Policy				
Asset Management Strategy and Objectives				
Asset Groups	**Compressors**	**Installations**	**Pipelines**	**Domestic and Small I/C Installations**
Functional specification and requirements				
G4,E6,G10 meter installations				Y
Turbine, Compressors and Ancillaries			Y	
Pipelines, Pipework and Associated Equipment	Y	Y	Y	
Valves and Actuators	Y	Y	Y	
Pressure Vessels	Y	Y		
Filters	Y	Y		
Cathodic Protection	Y	Y	Y	
Heating Systems	Y	Y		
Odourisation Equipment	Y	Y		
Pressure Reduction Systems	Y	Y		
Facilities Management (inc security and safety and lifting equipment)	Y	Y		
Control and Instrumentation	Y	Y	Y	
Metering (G16+)	Y	Y		
SCADA	Y	Y	Y	
Compressed Natural Gas Fast Fill	Y	Y	Y	

5.8 Emergency Response

5.8.1 Gas Emergency Response Team

BGE (UK) works closely with Regulators and Government Departments regarding the requirements of EU 994/2010. The Regulation aims at demonstrating to gas customers that all necessary measures are being taken to ensure continuous supply, particularly in the case of difficult climatic conditions and in the event of disruption. As part of the regulation BGE (UK) has a Gas Emergency Response team in place, which is lead by the Operations Manager, as the National Gas Emergency Manager (NGEM).

Figure 38 Gas Emergency Response Team



The NGEM is responsible for coordinating actions across affected parts of the Network to take action to prevent, as far as possible, a Gas Supply Emergency developing, and where it cannot be prevented, to manage the emergency in accordance with the Natural Gas Emergency Plan (NGEP).

The aim of the NGEP is to:

- Protect the safety of the general public;
- Protect property and key infrastructure; and
- Minimise disruption resulting from a gas supply emergency.

Existing emergency arrangements will be expanded to include the GTTW pipeline. Briefing exercises will be held regarding the scope of the GTTW project and incorporated to crisis management and emergency preparedness plans. BGE (UK) will cover emergency response from its offices in Co. Antrim.

We will continue to ensure stakeholders are informed regarding the development of our asset base in Northern Ireland where new projects come on stream.

Figure 39, Figure 40 and Figure 41 set out our emergency arrangements and how emergencies are classified.

GTTW will form part of the emergency response process.

Figure 39 Emergency Response Arrangements

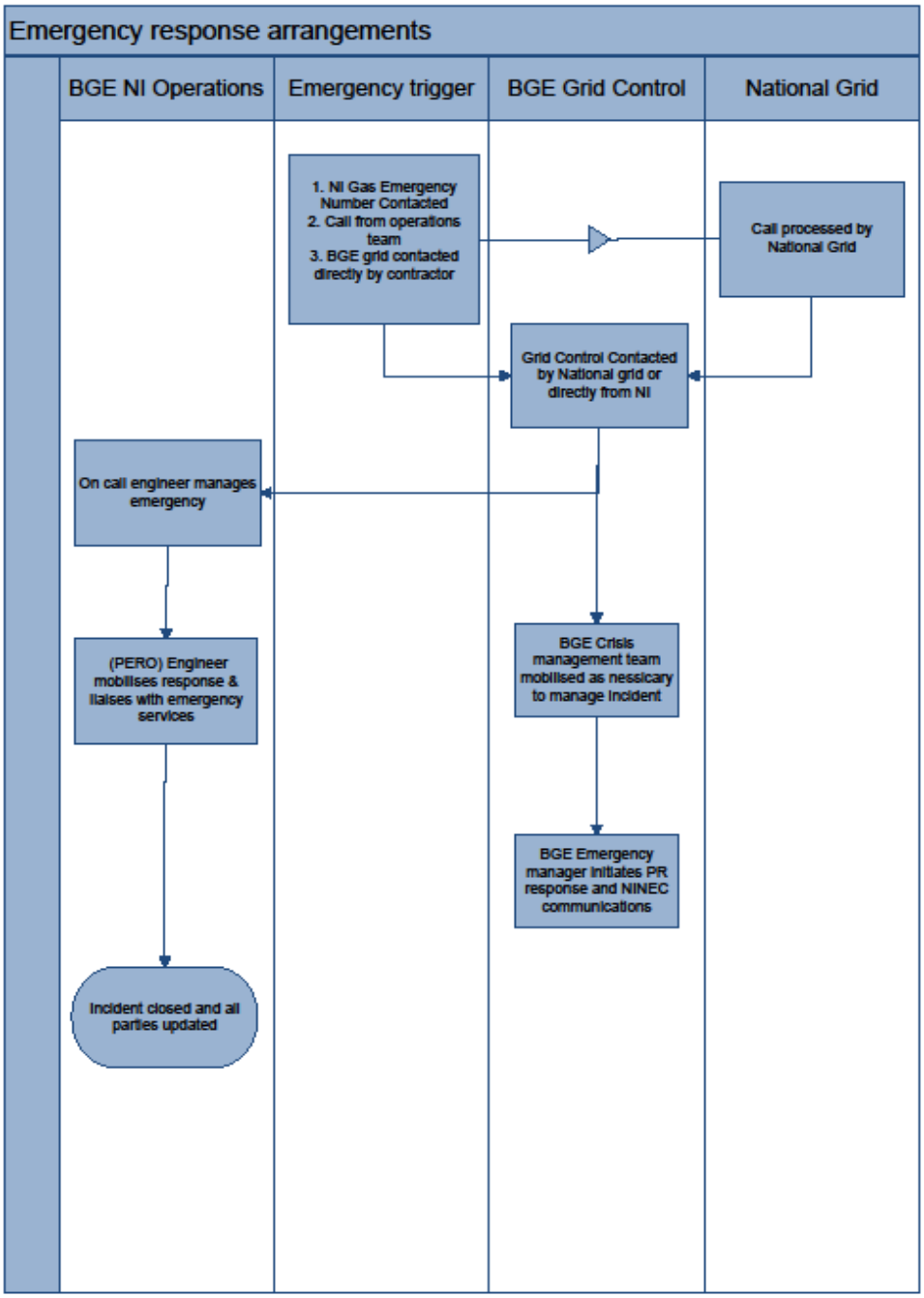
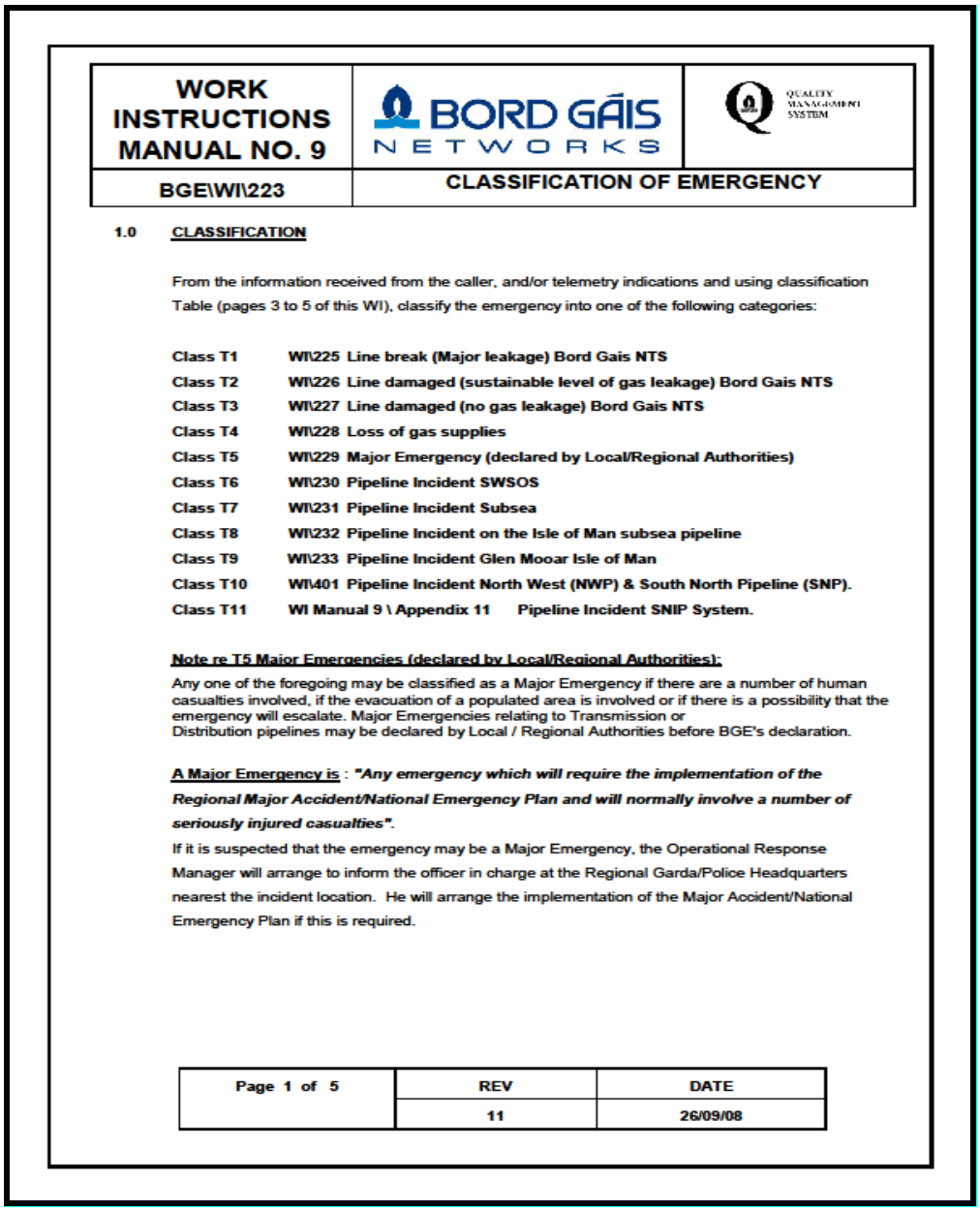


Figure 40 Classification of Emergency



WORK INSTRUCTIONS MANUAL NO. 9	BORD GÁIS NETWORKS	QUALITY MANAGEMENT SYSTEM
BGE\WI\223	CLASSIFICATION OF EMERGENCY	

1.0 CLASSIFICATION

From the information received from the caller, and/or telemetry indications and using classification Table (pages 3 to 5 of this WI), classify the emergency into one of the following categories:

Class T1	**WI\225 Line break (Major leakage) Bord Gais NTS**
Class T2	**WI\226 Line damaged (sustainable level of gas leakage) Bord Gais NTS**
Class T3	**WI\227 Line damaged (no gas leakage) Bord Gais NTS**
Class T4	**WI\228 Loss of gas supplies**
Class T5	**WI\229 Major Emergency (declared by Local/Regional Authorities)**
Class T6	**WI\230 Pipeline Incident SWSOS**
Class T7	**WI\231 Pipeline Incident Subsea**
Class T8	**WI\232 Pipeline Incident on the Isle of Man subsea pipeline**
Class T9	**WI\233 Pipeline Incident Glen Mooar Isle of Man**
Class T10	**WI\401 Pipeline Incident North West (NWP) & South North Pipeline (SNP).**
Class T11	**WI Manual 9 \ Appendix 11 Pipeline Incident SNIP System.**

Note re T5 Major Emergencies (declared by Local/Regional Authorities):

Any one of the foregoing may be classified as a Major Emergency if there are a number of human casualties involved, if the evacuation of a populated area is involved or if there is a possibility that the emergency will escalate. Major Emergencies relating to Transmission or Distribution pipelines may be declared by Local / Regional Authorities before BGE's declaration.

A Major Emergency is : ***"Any emergency which will require the implementation of the Regional Major Accident/National Emergency Plan and will normally involve a number of seriously injured casualties".***

If it is suspected that the emergency may be a Major Emergency, the Operational Response Manager will arrange to inform the officer in charge at the Regional Garda/Police Headquarters nearest the incident location. He will arrange the implementation of the Major Accident/National Emergency Plan if this is required.

Page 1 of 5	REV	DATE
	11	26/09/08

Figure 41 Dial Before You Dig Logo

5.8.2 General

Health, Safety and Environmental issues are of prime concern to BGE (UK). Pipelines and installations must be designed and constructed in a manner, which will reduce residual risks to levels, which will satisfy the Health and Safety Executive (HSENI). Additionally the design must be assimilated into its environment to the satisfaction of the various statutory bodies, consulted as part of the planning process. Of significant importance is also the need to demonstrate to landowners of both the pipeline wayleave and of AGI sites that the entire system has been designed, constructed and will be operated, maintained in a manner which is fundamentally safe and of minimal detrimental effect to the environment and their surroundings.

5.8.3 Health and Safety

The HSENI publish Statutory Instruments (SI), which set out the requirements and conditions that the owner of a gas pipeline must fulfil prior to commissioning the pipeline system. In order to achieve the requirements set out by the SI, the proposed Pipeline and Installations will be designed to the stringent requirements of internationally recognised codes and standards.

Every phase of the design, construction, operation and maintenance of the system is audited by the HSENI to ensure that Health and Safety is one of the primary drivers in all aspects of the project.

Since its foundation in 1978, the BGE Transmission Business Unit, i.e. that division of BGE responsible for high-pressure gas pipelines and installations, has an exemplary safety record and has never experienced a major pipeline release.

6 Procurement

6.1 Principles

Procurement in the Bord Gais Group is managed by the Bord Gais Shared Service Procurement Department and all tenders are issued through this department.

Bord Gais Group Procurement is governed by the EU Utilities Directive 2004/17/EC and the guidelines from this directive are incorporated into Bord Gais Procurement Policy and Procedure. These procedures outline the thresholds for various procurements for Supply of Goods and Services and Construction Works. The Bord Gais Group has extensive experience of working under the Utilities Directive for the construction of Major Gas Pipelines. Proposed policies and procedures are in place to ensure compliance with EU requirements.

Bord Gais Group's internal Authorisation Levels and Execution of Contracts policy governs the authorisation of expenditure and contracts within the group from managerial level up to board level. A project of this magnitude will require board approval for the project itself but will also require board approval for any contracts within this project with a value greater than €10 million. Processes, authority levels and financial controls are in place.

As outlined above the procurements for a project of this magnitude will be done under the guidelines of the EU Utilities Directive 2004/17/EC. Any Goods or Services that will be procured under this project with a value greater than €414,000 and Construction Works greater than €5,186,000 will be advertised in the EU Journal. Competitions advertised in the EU Journal follow a two stage process, pre-qualification process and tender process. Under the Pre-Qualification Process bidders are invited to submit a pre-qualification questionnaire to determine their suitability for the competition.

Typically the sections of the pre-qualification questionnaire are Financial, Technical and Health and Safety. The pre-qualification is assessed by an evaluation team and typically the top five bidders are brought forward to tender stage. As part of the Tender Stage Invitation to Tender Documentation is issued to the bidders that have been successful at the pre qualification stage. The Invitation to Tender Documentation would clearly outline the requirements of the competition and would include a draft of the contract for the competition. The typical scoring for tenders is 30% Technical, 30% Health Safety and Quality and 40% Commercial. These percentages can vary depending on the complexity of the competition.

Tenders are received as sealed bids and are opened in strict adherence to the guidelines of the BGE Procurement and Procedures Policy. Tenders are then issued to the evaluation team for assessment and scoring. The highest ranked tender will be awarded the contract based on the results of the evaluation. Competitions that are advertised in the EU Journal and that go through this two stage process usually can take from six months to a year to complete.

6.1.1 Contract Strategy & Framework Agreements

In order to ensure we maximise value and reduce risk we propose to utilise the Responsible Approving Supporting Consulted Informed (R.A.S.C.I) process. This process is embedded within the business and process assigns roles and responsibilities to tasks that form part of "the contract end to end process".

It is especially useful in clarifying roles and responsibilities in cross-functional and departmental projects and processes which can vary through the following 9 steps;

- Work with the business to determine the best approach to prepare a contract by completing the Contract Strategy Risk Document, this captures the contract requirements, any associated or known risks and also identifies any contract opportunities.
- Team develops the Pre Qualification Questionnaire (PQQ) using the procurement template and procurement send out to the applicants.
- Team evaluates PQQ returns (Technical, Financial and Health and Safety).
- Team develops the Invitation to Tender (ITT), using the procurement template.
- Legal finalises contract. ITT and Contract sent out to the applicants
- Team evaluate ITT returns
- Procurement award Contract
- Implement Business and IT Systems and Mobilisation
- Post Award – Contract Management

We enclose our end to end process (Appendix F) which shows each of the steps necessary to process a contract from start to finish.

As part of the 9 step approach Contract Strategy works with the business to complete the Contract Strategy Risk Document. In summary this captures the contract requirements, any associated or known risks and also identifies any contract opportunities.

We also manage risk by;

- Securing price certainty on materials by agreeing rates upfront at tender stage with the vendors(s). Rates are typically linked to Consumer Price Index (CPI) or Retail Price Index (RPI) and are adjusted upwards or downwards depending on the annualized index rate use at the anniversary date of the contract.

6.1.1.1 Framework Agreements

A framework agreement may be set up where we are likely to have repeated tender needs. A number of steps must be taken in establishing these frameworks:

- Planning the initial set-up of a framework needs to be planned well ahead.
- To set up a framework and OJEU Notice, PQQ and tendering process must first be followed, noting specific intentions for establishment of the framework.
- Contract Strategy in conjunction with Procurement, Legal and the Business conduct a Risk Analysis to determine any risks associated with setting up a framework agreement. Opportunities are identified and a strategic approach is taken to identify similar works, consultants, materials, services, construction or maintenance projects. A framework will typically run for a three year period with the option to extend for a maximum of two years.
- Once established Framework Agreements have advantages of:
    - Significantly reducing the Procurement time-line as there is no need to place an OJEU notice, conduct a PQQ or observe a Stand-still period prior to award;
    - Reducing Procurement risk and challenges; and
    - Amalgamating requirements and expertise.

BGE (UK) has the following strategic contracts in place under framework arrangements. We will utilise these contracts (Table 14) for the GTTW project, these contracts will benefit an accelerated mobilisation phase of the project from procurement to engineering.

Table 14 Strategic Framework Contracts

Strategic Contracts	
Services and Engineering	**Goods and Materials**
• Technical Surveying Framework	• Pressure Reducing Station(s) Framework
• National Inspection Contract	• Boiler Station(s) Framework
• Engineering Services	• High Frequency Induction Pipeline Framework
• Technical Specialist	• Remote Terminal Unit(s) Framework
• Land Agency NI and Scotland	• Instrumentation Framework
• Aerial Survey	• UPS Power Systems Framework
• Online Inspection Contract	• Energy Monitoring Equipment Framework
• HSQE Framework	
• Land Agency Republic of Ireland	
• Maintenance Contract Northern Ireland and Scotland	

6.2 Material Strategy

It is our intention to utilise our existing framework agreements to meet the future materials requirements of the contract where applicable. We have developed these frameworks with suppliers with strict adherence to quality control procedures, which offer advantages for GTTW as specifications are already in place. We have well established relationships with the suppliers which we have leveraged to further accelerate material delivery.

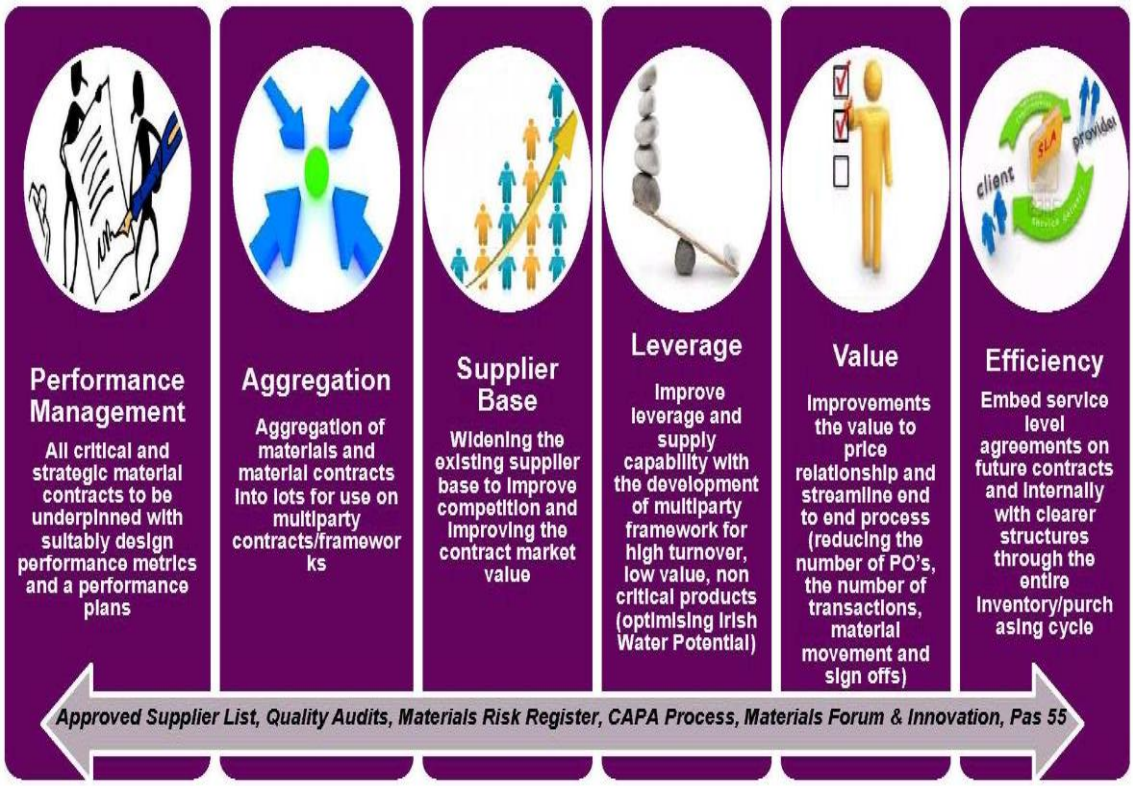
During the mobilisation period, we have the option to go directly to our key strategic material suppliers who are contracted long term to supply the current material requirements of the Networks Business. We have identified the following strategic material framework agreements which will be of benefit at mobilization stage and will facilitate a timely response time subject to an order been placed:

- Pressure Reduction Systems Framework.
- Pressure Boiler Framework
- HFI line pipe framework

The key pillars to our materials strategy are outlined in Figure 42. We achieve this by understanding the requirements, the constraints and the opportunities in the process.

The key pillars of our material strategy are assured through the use of an Approved Supplier List, frequent Quality Audits, maintaining a Materials Risk Register, Corrective Action and Prevention Process, working with our Materials and Innovation forum and utilising PAS 55.

Figure 42 Key Pillars of Material Strategy



This material strategy will be applied to the GTTW project and will follow the same process as Northwest, South North, spur line to Derryhale and more recently a 50 km steel pipeline to Co. Wexford. BGE (UK) will leverage off material frameworks in place with suppliers and will utilise this capability and the following frameworks to purchase materials for the GTTW project:

- High Frequency Induction Pipeline
- Pressure Reducing Skids (PRS)
- Package Boiler Units (PBU)
- C&I Equipment, Kiosks and Remote Telemetry Units (RTUs)

The benefits of these frameworks for the GTTW project are approximately 6 months in terms of procurement programme as the need to pre-qualify the vendors will have been completed as part of the framework establishment.

The project will also benefit from the cost efficiencies through BGE buying power. A project of this nature through normal EU procurement process would typically be 18 months from commencement to delivery of materials; therefore there is significant benefit in utilising the existing frameworks.

Utilising previous experience and based on our review of the Fingleton McAdam documents, the following materials will be procured through the frameworks;

- Linepipe (combination of heavy wall and light wall)
- Bends, Tees, Elbows
- Pressure Reduction Equipment
- Boiler Equipment
- Concrete Coated Pipe

We estimate material availability between 9 – 12 months inclusive of delivery to site. The steel pipeline material will be delivered to the port most likely Warrenpoint or Belfast and stored temporarily within the port similar to Northwest and South North pipelines. As part of the preparation for this submission BGE (UK) has completed an advantage road point survey of the route outlined within the Fingleton McAdam documents.

Following consideration of the route and associated constraints such as undulating terrain, presence of bog and prevalence of minor roads. BGE (UK) would propose to alter the approach taken on South North Pipeline, whereby a portion of the line pipe was procured in 18 metre nominal lengths, and revert to standard 12 metre nominal lengths. Utilising 12 metre lengths is beneficial for a number of reasons:

- It enables the pipe manufacturer to transport the pipe in modular pipe crates specifically designed such that they can be craned into ship holds and onto articulated lorries. This negates the need for multiple handling of individual pipes during transportation from the pipe mill to the final storage area. This approach is desirable as it reduces the risk of lost time incident during pipe handling and also reduces the potential for damage to the factory applied coating during transportation.
- Negates the need for non standard extendable trailers required to transport 18 metre pipes. 18 metre trailers require oversized turning areas at road crossings and can also be difficult to manoeuvre on minor roads.
- 12 metre pipe lengths will give greater flexibility when traversing wet area on the pipeline spread, by minimising weight.

Following route review, at this point in time, based on the programme submitted and the geographical spread of the project BGE (UK) would envisage a requirement for 3 pipe storage areas for an 18 month period.

Initial discussions were held with the Strategic Planning Division of The Department of the Environment as part of submission preparation and BGE (UK) understand that there would not a requirement to include the pipe storage areas in the overall planning submission as the locations are temporary in nature. Initial review suggests the Limavaddy to Strabane pipeline would require a single storage area while the Derryhale to Derrylin Pipeline would require 2 pipe storage areas.

In order to minimise rental costs BGE (UK) would propose that linepipe delivery would take place approximately 3 to 6 months in advance of construction with the pipe storage areas maintained until

construction completion (any remedial works to the sites would be included in the scope of the main construction contractor). In order to minimise set up and security costs for the sites BGE (UK) would in the first instance seek to identify and utilise secured sites with existing security and good access for heavy goods vehicles, similar to the Northwest and South North pipelines. The pipeline lengths, 12 metres, will be transferred to the Contractor site compound for delivery to the pipeline spread.

It is envisaged that single pressure reductions stations (PRS) and package boiler units (PBU) will be placed under the strategic framework contracts, thereby availing of ;

- Economy of scale when ordering
- Enable the designs to be standardised insofar as possible
- Ability to rationalise spare parts inventory required for ongoing maintenance

As per normal practise the PRS and PBU will be delivered directly to the AGI sites during the construction phase of the project, following successful completion of Factory Acceptance Tests, based on pre-agreed delivery windows identified in the construction contract. Based on the load information provided it is expected that there will not be a requirement to split the PRS buildings for transportation reasons (as per 50 kscmh PRS utilised in Ballmagaraghan AGI on the South North Pipeline).

The vendor's suppliers' scope will include completing a site visit to understand the site conditions during the construction phase and also to map out the optimal transportation route for the delivery of the equipment from the port to site. The survey will identify any route constraints such as overhanging foliage and cables. The vendor will identify any enabling works required in advance of delivery. Based on the current information available in relation to the Enniskillen AGI location it is probable that power steering axel trailer will be required to get the equipment given the narrow nature of the approach roads.

Given there are 6 AGIs to be constructed as part of the project BGE (UK) would propose including a milestone in the construction contract to front end completion of the AGIs.

BGE (UK) historic experience suggests that a new build AGI takes approximately 16 weeks to complete, site delivery of PRS and PBU will be programmed to happen approximately 8 weeks in advance of the milestone completion date. This will enable the contractor to complete the initial civil works while ensuring there is adequate time available to complete the remaining civil, mechanicals and testing post delivery.

Ancillary AGI items such as valves, tees and fittings will be delivered into stock in Gasworks Road Cork and issued to the construction contractor on the agreed mobilisation date.

6.3 Construction, Maintenance and Specialist services

BGE (UK) will utilise strategic contracts under its framework agreements to maximise mobilisation, engineering works, services contracts and material procurement in order to accelerate the GTTW project where possible to the benefit of the Northern Ireland consumer as outlined in section 6.1.1.

In addition we propose the following options for the construction contract for the GTTW project;

6.3.1 Construction Contract

There are two options available to BGE to procure works within Northern Ireland.

Either or both options may be used depending on the circumstances. This will be determined based on procurement law, jurisdiction, and tax compliance rules.

Option 1 If European Union Procurement Law is not applicable i.e. contracting entity is the Northern Ireland Company.

Where EU procurement Law does not apply, it is BGE's proposal to engage at Tender stage with its existing pre-approved suppliers for Construction Projects, this is a major advantage for the GTTW project, where BGE (UK) has highly experience pre-approved construction contractors.

On receipt of the applicants' Tender submissions, BGE will conduct a thorough and rigorous evaluation and award process which includes contract specific Award Criteria relevant to the project or work scope. Once the Preferred Bidder has been identified, contract and mobilisation dates agreed, construction work may commence.

Typically the lead in time is 3 months from issue of the tender documents.

During Contract formation stage, BGE incorporates all clarifications agreed during the award process to complete the final contact document. In addition, BGE uses a computerised work management system to manage each of the key steps of the contract process, namely processing of payments, applying and releasing retentions, monitoring Key Performance Indicators and rate adjustments.

BGE has a vast amount of experience in forming and implementing multiple construction contracts for large distribution and Transmission pipelines, above ground installations, underground installations, fibre optic and complex infrastructure crossings. BGE has extensive working knowledge of all contract types available within Ireland and the United Kingdom market, we will apply all our experience and knowledge to ensure we achieve the best market rates for the consumer of Northern Ireland.

Option 2 If European Union Procurement Law is applicable i.e. contracting entity is BGE (UK)

Complying with EU Procurement Law, it is BGE's proposal to issue a Pre-qualification Questionnaire through the EU Journal. An internal evaluation of applications received from the interested parties is carried out with the top six applicants proceeding to tender stage of the competition. On receipt of the applicants' tender submissions, BGE will conduct a thorough and rigorous evaluation and award process which includes contract specific award criteria relevant to the project or work scope. Once the preferred bidder has been identified and contract/mobilisation dates agreed, construction work may commence. Typically the lead in time is 6 months on issue of the tender documents.

During Contract formation stage, BGE incorporates all clarifications agreed during the award process to complete the final contact document. In addition, BGE uses a computerized work management system to manage each of the key steps of the contract process, namely processing of payments, applying and releasing retentions, monitoring Key Performance Indicators and rate adjustments.

BGE has a vast amount of experience in forming and implementing multiple construction contracts for large distribution and Transmission pipelines, above ground installations, underground installations, fibre optic and complex Infrastructure crossings. BGE have extensive working knowledge of all contract types available within Ireland and the UK market.

6.3.2 Maintenance Contracts

BGE (UK) has extensive knowledge and experience in developing and implementing maintenance contracts on high pressure gas networks. We already have contracts in place for Northern Ireland and this is a major benefit for the GTTW project, as the project will merge under existing contracts, with minor amendments.

We have a proven track record in operating in Northern Ireland and in securing contracts which deliver a safe and reliable service which is supported with qualified and competent providers.

All of our contracts are underpinned with appropriately designed key performance indicators which help to maintain service levels and promote continuous improvement through the term of the contracts.

The contract BGE (UK) has in place in Northern Ireland for maintenance works provides a long-term surveillance, maintenance and operations contract to cover the Northwest & South North Transmission Network & associated gas installations.

This contract extends out to October 2017 and includes 24 hour, year round standby emergency response services.

BGE (UK) successfully manages similar contracts with other providers in South West Scotland.

6.3.3 Specialist Services

BGE (UK) will use the framework agreements as previously discussed in section 6.1.1 for specialist services.

This provides GTTW with distinct advantages given contracts are already in place to leverage off. BGE (UK) will go directly to our framework providers for these services.

We will utilise the following framework agreements to maximise the benefit to the GTTW project to the benefit of the Northern Ireland consumer;

- Engineering Services Contract;
- Tech Specialist Engineering;
- Tech Survey Services;
- Design, Engineering and Project Management Services;

- Land Agency Services;
- Aerial Services;
- Health and Safety Services; and
- Cathodic Protection Maintenance and Monitoring.

This will allow us to mobilise as soon as the Specialist Services are agreed and in place.

7 Business Development

7.1 System Development and Operation

BGE (UK) currently supports the Utility Regulator in Northern Ireland in producing the annual Northern Ireland (NI) Gas Capacity Statement (GCS). Over the past number of years we have carried out the technical analysis for the Utility Regulator in the production of the Gas Capacity Statement for Northern Ireland. We work closely with Premier Transmission Limited (PTL) and have completed the technical analysis on their behalf also, as we jointly feed into the Utility Regulator, as a result of our experience on the Northern Ireland network over the past ten years and the network analysis capability we offer.

The GTTW project will merge seamless into the existing network analysis models and we will continue to provide our network analysis capability to PTL in our joint assessment of the Northern Ireland network, and support the Utility Regulator in this regard.

The GCS provides an assessment of the Northern Ireland's Transmission system's ability to meet forecasted future demands on the network over a ten year period, accounting for both Transmission and Distribution connected customer demands.

Currently the Utility Regulator issue a questionnaire to each of the large Transmission connected customers (power stations) and distribution (<7 barg) companies, requesting a ten year forecast for annual, peak day and summer minimum day demands. The forecasted demands provided by these stakeholders form the basis of the forecasted NI demands which are included in the NI GCS.

It is anticipated that under the new NI licensing conditions being currently introduced by the Utility Regulator, the NI TSOs will be (collectively) responsible for coordinating and producing the NI GCS, which will then be submitted to the Utility Regulator for signoff and publication. Under these new arrangements the TSOs will be responsible for engaging with the power stations and Distribution companies in order to determine future Transmission system requirements. This engagement will (at a minimum) replicate the current medium of communication, i.e. the questionnaire. In addition to this, BGE (UK) would consult with these stakeholders after the publication of the NI GCS to discuss the results and conclusions, and address any queries or concerns that the stakeholders may have.

Currently the GCS assesses the network based on a range of demand scenarios; firm load only, and firm and interruptible loads. Further demand scenarios could be developed, based on the consultations with the Distribution companies, which may need to be considered to support planned growth of downstream distribution connections.

7.2 Public Relations

Bord Gais has a track record in developing large scale, high pressure pipeline projects which is underpinned by proven credentials and a strong reputation in stakeholder management. The Bord Gais experience is that extensive prior consultation; on-going communications and quality reinstatement are key contributory factors in a seamless pipeline project development and in fostering deep, on-going

relationships with key target audiences. These key audiences include community and business interests, landowners, local authorities, politicians (both nationally and locally), government departments, statutory, environmental and regulatory authorities and national, local and trade media.

Bord Gais Eireann has an experienced Corporate Affairs team which is responsible for the development, implementation, ongoing monitoring and control of the stakeholder and communications strategy to support successful development of the GTTW high pressure pipeline project. Public Relations activities represent a key component of this stakeholder strategy.

Bord Gais engages Belfast based full-service communications company Davidson Cockcroft (DCP Strategic Communication Ltd) to complement the internal team and utilise local knowledge and established relationships to provide Media Relations, Crisis Communications and Stakeholder Management support within Northern Ireland. DCP has supported Bord Gais through the development of both the Northwest and South North Pipeline projects and has recently been re-appointed as Northern Ireland Public Relations service provider to Bord Gais following completion of a competitive tendering process.

Key communications objectives for the GTTW project include:

- Creating awareness of the benefits of the pipeline across all key target audiences;
- Managing audience expectations around the pipeline and construction programme;
- Delivering a cross party public affairs programme to facilitate receipt of approvals required and generate support of key influencers from Members of Parliament, Members of the Legislative Assembly & Council Members;
- Devising and implementing an appropriate community relations, consultation and public information programme;
- Managing Media Relations – locally and nationally within Northern Ireland; and
- Delivering on-going communications throughout the course of the pipeline development programme.

Public relations activities include employment of a media strategy to highlight benefits of the pipeline project, communicate project milestones and support delivery of the project objectives.

Key project milestones and achievements which will be highlighted to stakeholders and the public through media include announcement of the licence award to all relevant publics and liaising with appropriate bodies and individuals to maximise awareness; planning permission granted; arrival of line pipe in NI; construction commencing; ongoing management of concerns and benefits arising from construction of the pipeline; pipeline completion and commissioning.

8 Operational costs

8.1 Alignment with the business plan

BGE (UK), together with Bord Gais Networks has significant experience in the operation of high pressure gas pipelines, with approximately 2,400 km of gas Transmission pipeline – the first of which was installed in 1978.

Based on our knowledge and experience over the past 35 years, we have built up a long history of understanding the costs associated with the management and operation of gas Transmission pipelines. This has been benchmarked and adjusted over time to reflect our experience.

8.2 Activity build up

This section discusses the range of activities and the operational costs that will be incurred under the licence.

Furthermore, there is a likelihood that some of these activities will be outsourced in order to gain efficiencies – for example, maintenance costs etc. We foresee that the main areas to be governed by tendering activities may include:

- Operations and maintenance contracts – relevant contracts in this area would include such items as routine maintenance, emergency response, Dial before you Dig, reactive maintenance, planning enquiries, HSE liaison and Security Services liaison. The working presumption is that these areas would be contracted on a five year basis, with an option to extend after this point. There are a number of companies who would be competent to provide this service.
- Original Engineering Manufacturer contracts – we would expect this to typically consist of annual contracts for key equipment i.e. Station Control Systems and Boilers etc.
- Specialist Services i.e. specific contracts required for certain departments. For example Asset Integrity may require support through existing agreements managed through the Asset Integrity department – they may require the services of specific industry experts to analyse, consult and comment on particular issues or to manage future regulatory inspections where an external party is required by law.

Thus where relevant, activities will be put to tender and be outsourced to reduce operating costs. The next section discusses these operating costs in more detail.

8.2.1 Operating costs

The operating costs that will be incurred are as follows:

8.2.1.1 Maintenance charges

The pipeline will be operated and maintained to IGEM/TD/1, IGEM/TD/3, IGEM/TD/4 GEM/TD/13, Gas Safety (Management) Regulations (NI) 1997, Pipelines Safety Regulations (NI) 1997 and Pressure Systems Safety Regulations (NI) 2004 as amended or replaced with or without modification.

Maintenance is carried out on a periodic basis as prescribed in the standards and specifications. This work includes mechanical, electrical and C&I activities. Examples of these would include functional checks, boiler maintenance, calibrations, CP checks and general site maintenance. This work is carried out by the Maintenance Contractor for the area and supervised by BGN. Major programmes including pipeline pigging and heat exchanger overalls are also carried out by specialist contractors as required in the specifications.

The standards are prescriptive in relation to Surveillance, Inspection, Maintenance and non-routine procedures. For example, fortnightly aerial surveillance will be required by the standard to look out for tree felling, unauthorized house building, unauthorized excavations, and ground movement. The pipeline will be overflown by helicopter every 2 weeks and results will be recorded and retained for audit and review.

- Safety Campaign – safety campaigning is an important cost and has proven on BGE (UK) pipelines to be a very successful way to promote safety and reduce unauthorised third party activities. Other safety campaign costs will include –
    - Emergency Exercises: To ensure compliance with the Safety Case, it is planned to conduct two emergency exercises each year.
    - Pipeline Integrity: A number of Health, Safety, Quality and Environment activities and audits will be required to verify compliance e.g. Maximum Operating Pressure, and Pressurised Systems Safety Reporting. In addition, the pipeline safety regulations dictate that Operators must prepare and maintain a written scheme of examination for all pressure vessels on GTTW. Road crossing marker posts will also need to be maintained to deal with external damage and overgrowth.
    - UKOPA: This cost is an annual subscription charge for the UK Onshore Pipeline Operators Association.

- Administration and Utilities - Costs in this area relate to the supply of electricity to all sites along the pipeline powering security fencing and station systems. BGE (UK) endeavours to procure energy at the most competitive rate possible.

- Grid Control – the pipeline will be supervised and monitored on a 24/7 basis from the central control room. Grid Control has successfully managed the gas supply and demand to the current Northern Ireland pipeline network during the record winter cold weather periods experienced in 2009/2010. During this period, no interruptions in gas supplies were experienced by Northern Ireland customers and record gas flows were transported through Beattock Compressor Station. Thus we expect it will be more than capable of monitoring and supervising the GTTW pipeline also. Grid Control will also co-ordinate emergency response activities on the pipeline.

- Wayleaves - Wayleaves administration associated with land reinstatement and remedial works which arise on cross country pipeline post construction. Note that there are also Agricultural Liaison Officer and Agricultural remedial costs that are required to cover the costs of reinstating the lands on the pipeline route.

- Asset management costs - Asset management services which will support the pipeline will include:
    - Asset integrity management.
    - Determination of the optimum maintenance policies and strategies for the assets.
    - Development of Network models to analyse demand, capacity, growth issues and constraints.
    - Managing projects and contracts, and procuring materials and services required.

- Detailed design - Drawing Office support in relation to the pipeline will include:
    - Providing Transmission data to third parties.
    - Wayleaves mapping.
    - Update and review of landowner data.

- Insurance – a number of different insurance premiums will be required to be taken out for the new pipeline. BGE (UK) will ensure that fit for purpose insurance is obtained for the asset. This will include business interruption, property damage and public liability, in addition to other policies.

- Scheduling and dispatch – Scheduling and Dispatch are responsible for owning, managing and delivering on the end to end scheduling and dispatch process, ensuring that all activities are optimised to ensure efficiency in the delivering of maintenance services. The function monitors the process which operates in the Click system. It also oversees how the Maximo systems interface with Click.

- Licence fees - Costs in this activity relate to the annual Licence Fee paid by Transmission Operators in Northern Ireland as determined by the Utility Regulator.

- Rates - Costs in this activity relate to rates payable to the local authorities in Northern Ireland.

- Transportation services – these will largely be provided by the Regulation and markets team. These include:
    - Shipper Services & Large Account Management – this includes items such as key account management with NI Shippers; Liaison regarding the operation of the system; Extensive reporting to both Shippers and Regulators as per the various agreements, Licences, Codes and DPO obligations; responding to information requests from the Regulator and managing customer queries, data requests and feedback for customers.
    - Commercial Management & Analysis – this includes addressing enquiries from customers, progression and development of connection agreements and the Revenue Reporting function analyses and reports on revenues generated in Northern Ireland by GTTW.
    - Trading & Settlement - Northern Ireland GTTW Transportation billing and management of disbursements account and ensuring that the postalisation pot for this pipeline is accurately distributed.
    - Regulatory Controls – including co-ordination of the GTTW price control. Other work involves Northern Ireland GTTW management, stakeholder management, ad-hoc development and work on tariffs.
    - Tariff Team – this would include annual Northern Ireland GTTW Transmission tariff setting process and development of other applicable tariffs; reconciliations of the GTTW annual regulatory revenues; and responses to various regulatory consultations that have tariff implications for GTTW.
    - Market Arrangements – includes Managing the change control process in relation to modifications to the Transportation Network Code as requested by Industry; Modifying the Transportation Network Code to comply with the provisions of emerging European Regulations and Directives; Ensuring that any Code modifications are implemented in the Transporter's I.T. Systems; Managing the change control process in relation to Inter-operator Agreements between respective TSOs and between TSOs and DSOs. Note that this work may transition to the proposed CJV if it were to go ahead.
    - Other – coordinating with the Regulatory Authorities in Northern Ireland re GTTW on environmental, sustainability and security of supply objectives, harmonizing

market objectives, EU directive delivery objectives, technology & information objectives and delivery of monopoly regulation requirements.

- Legal - manages and co-ordinates a range of legal activities. They provide legal advice on the legal implications of the day to day transactions with third parties in addition to providing legal input into projects and initiatives. The Legal Department is responsible for the provision of a range of services to minimise legal risk.

- IT - As well as Information Technology management, information security and support activities, this category of costs covers the following:
    - Costs associated with dealing with Ordinance Survey Northern Ireland (OSNI), including obtaining appropriate maps and the use of the addresses database.
    - Costs associated with the operational support of Maximo, Click and Syclo.
    - Operation and Management of GTMS (Northern Ireland) to support transportation arrangements on the GTTW pipeline or such other system that maybe developed in order to be compliant with the European Directive.
    - Cost associated with the use of PRISMA.
    - Provision of a 24/7 on-call service to both Grid Control (in their role as Transporter) and to the Shippers on technical/system support, security/access issues and business queries.
    - Initial and refresher training for all IT systems for both Shippers and internal users.
    - Provision of C&I Leased Line for GTTW.

8.2.1.2 Other Support Costs include:

- HR – this area would include HR services such as HR generalist support, central services, compensation and benefits, performance management support, Industrial Relations services and Learning and Development. HR will provide support to the business to ensure that employees are sourced effectively and performance managed appropriately to ensure the most efficient services for the GTTW project.

- Facilities – This category refers to the fulfilment of the property and facilities needs of the business on the GTTW project through effective management of both internal staff and third party service providers in the facilities area. This cost will ensure that appropriate office locations are utilised and that costs in these area are minimised.

- Secretariat – this category of support activities includes Secretariat, Legal and Corporate Affairs. Included within this activity is provision of expert in-house legal opinion on relevant matters in relation to GTTW Northern Ireland business; and the provision of public relations, market and media facing services amongst others.

- Corporate Costs – this would include functions such as the office of the Chief Executive, Strategic Planning & Regulatory Affairs and Corporate Affairs. This is a central role that is responsible for setting and driving strategy, strategy plans and strategic change for the organisation, and other public relations services.

- Finance – the finance category covers the support of the Finance Department, Internal Audit and Procurement. An example of the various services this would cover include:
    - Regulatory reporting for GTTW
    - General ledger and other reporting functions for GTTW including month-end close, cost management, financial and statutory reporting.
    - Financial planning including budgeting, forecasting, and corporate plan relating to GTTW.
    - Transaction processing for core finance (and payroll) operations. Functions include Accounts Payable, Payroll and Expenses, and Accounts Receivable.
    - Taxation including the preparation of VAT, CIS, Corporation Tax and the relevant employee returns. Ensuring that all payments are made in a tax compliant manner.
    - Treasury and cash management, business planning, Networks strategy, and Balanced Scorecard reporting.

The above costs will ensure that all accounts prepared will be in line with the licence terms, are prepared in compliance with the relevant accounting standards and the relevant Companies Acts. In addition these costs will ensure that any expenditure will be approved appropriately in line with internal corporate governance limits and subject to challenge.

- Internal Audit, providing assurance on the effectiveness of the system of internal controls and governance framework to ensure compliance with best practices and the International Standards for the Professional Practice of Internal Auditing.
- Procurement, compliance with procurement policy and procedures, external regulations and requirements and providing subject matter expertise across the business to effectively manage procurement of goods and services in relation to Northern Ireland.
    - Ensures value for money is achieved in all external sourcing of goods and services for GTTW Northern Ireland.

8.2.2 Risks

BGE (UK) has significant experience and a proven track record in operating pipelines and set out a number of specific operational risks in the GTTW project.

- The GTTW project is going through more difficult terrain than the areas where existing networks are currently located, for example commercial fruit farms, Wetlands, lower quality farmland etc.). This means that agricultural remediation costs will be higher proportionate to the pipeline length.
- The GTTW project is more remote than existing networks. This may result in increased costs due to a loss of economies of scale, for example the proximity of different parts of the current network to each other means that aerial surveillance and 24 hour emergency response costs are lower. For GTTW however these costs will be proportionately higher. The likely impact of this risk is difficult to quantify.
- From our experience, with new pipelines, there is always a period from the end of the construction maintenance period, to a further two years to understand operational behaviour of the pipeline, regarding landowners, reinstatement or drainage issues that may take longer to arise, therefore there is a level of uncertainly during this period.

While these risks are inherent to this proposed project, BGE (UK) is cognoscente of their existence, and have taken them into consideration when preparing this tender project.

8.3 Cost management:

Within our financial systems each sector of the business is set up as a separate Oracle company with a unique identifier – the business unit number. This is an efficient way to manage and control the costs in each specific area, highlighting areas that are performing or not performing against budget and enabling the business to manage appropriately. This will also facilitate compliance with any licence conditions including the ability to generate separate regulatory accounts which are verified and audited by our external auditors.

Within BGE (UK) cost management and review is of the utmost importance and costs are appropriately managed, accurately reviewed and are in line with the budgeted expectations of the business unit and cost centre managers.

Before the beginning of each financial year the budgeting process takes place. Whilst a time consuming process, the budgeting process gets full cost centre buy in across the business units as it is the most important tool we have to manage our costs. This also includes input from the Investment Approval Committee (IAC) process which ensures that all operational maintenance costs are optimised in consultation with the asset investment process. IAC is outlined in greater detail in section 9.

Once the budget is collated and built up from first principles it is reviewed by the senior Management Team, their role is to challenge the budget and to ultimately determine a tough but achievable budget

that ties into the overall business plan of the asset and the regulatory allowance establish by the regulator. Once senior management approve the final draft of the budget this is then submitted to the Board of Directors for approval. Once approved the budget is inputted into Oracle and forms the basis of the monthly Finance cost management reviews.

On a monthly basis, finance will review each cost centres costs against budget, highlighting variances and discussing these with cost centre managers and business unit leads. On a quarterly basis Finance meet with each of the cost centre managers to discuss their performance YTD, and their planned approach to the remainder of the year. These meetings help to ensure that variances are highlighted and actioned. Finally on a quarterly basis the results are reported to the Board of the statutory entity. Thus it can be seen that costs and performance are monitored, reviewed and actioned.

Separate reporting will be prepared to categorise information into the regulatory allowances and ensure that any overruns are identified and actioned. In line with the licence actual versus allowance costs will be submitted to the Regulator.

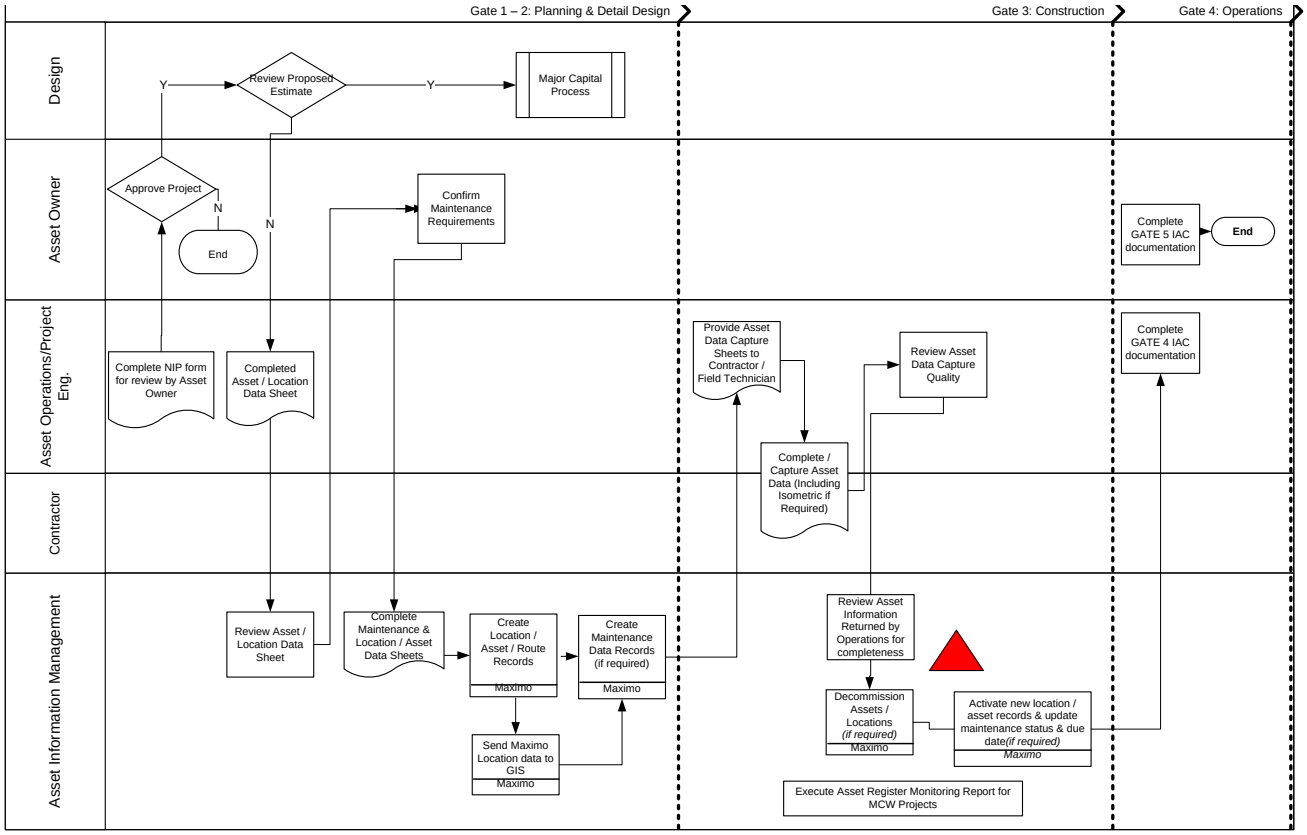
BGE (UK) manages operational costs through Oracle which is interfaced with the other relevant data gathering systems and modules including;

- Maximo
- Core
- Oracle Procurement and Oracle Accounts Payable

These in turn feed into the Oracle General Ledger which reports information in companies and cost centres.

Operational Maintenance Costs are managed through BGE (UK)'s Works management System Maximo (which is interfaced with Oracle Financials) and are driven by policy. Prior to commissioning of every individual asset, it is set up in Maximo in compliance with a formal asset register update process as illustrated in Figure 43. Part of this process is setting up the Planned Maintenance ("PM") schedule for the asset.

Figure 43 Asset Register Update Process



8.3.1 Maximo

In Maximo there are job plan templates which contain the standard instructions and standard costs for doing each individual unique activity on the asset base. A Job Plan is a detailed set of instructions for work to be performed and they generally contain:

- Tasks (procedures) to be performed including Crew Type
- Estimated Labour hours / Materials / Cost / Tools required to complete the work
- Pre-requisites that must be completed before or on completion of the work
- Scheduling parameters & constraints:

Job Plans describing reactive / planned maintenance activities always conform to asset policy –*how the asset is to be maintained, any tools or materials that must be employed during the maintenance activity & data collection requirements for storage against each work order.* Job Plans are used in concert with PM Schedules, Routes, Assets, Locations, Rounds, projects and finally work orders to capture actual work execution.

For every individual asset, there are Planned Maintenance Schedules (PMs) set up against the asset and location as illustrated above. These PM schedules set out the maintenance activities to be carried out on the asset, the information to be gathered and the frequencies that maintenance is to occur. PMs are

effectively templates for scheduled preventive maintenance work. They are used to generate PM work orders.

They generally contain:

- The Location or Asset, or possibly a Route of Locations or Assets, at which the preventative maintenance is to take place.
- One or more Job Plans specifying what preventative maintenance is required. The system copies the job plan to work orders generated from the PM. The generated work order inherits the tasks, services etc. from these job plans.
- The frequency with which the PM is to be carried out and the due date for the next time it is to be carried out.

The frequency with which a PM is to be carried out can be determined by

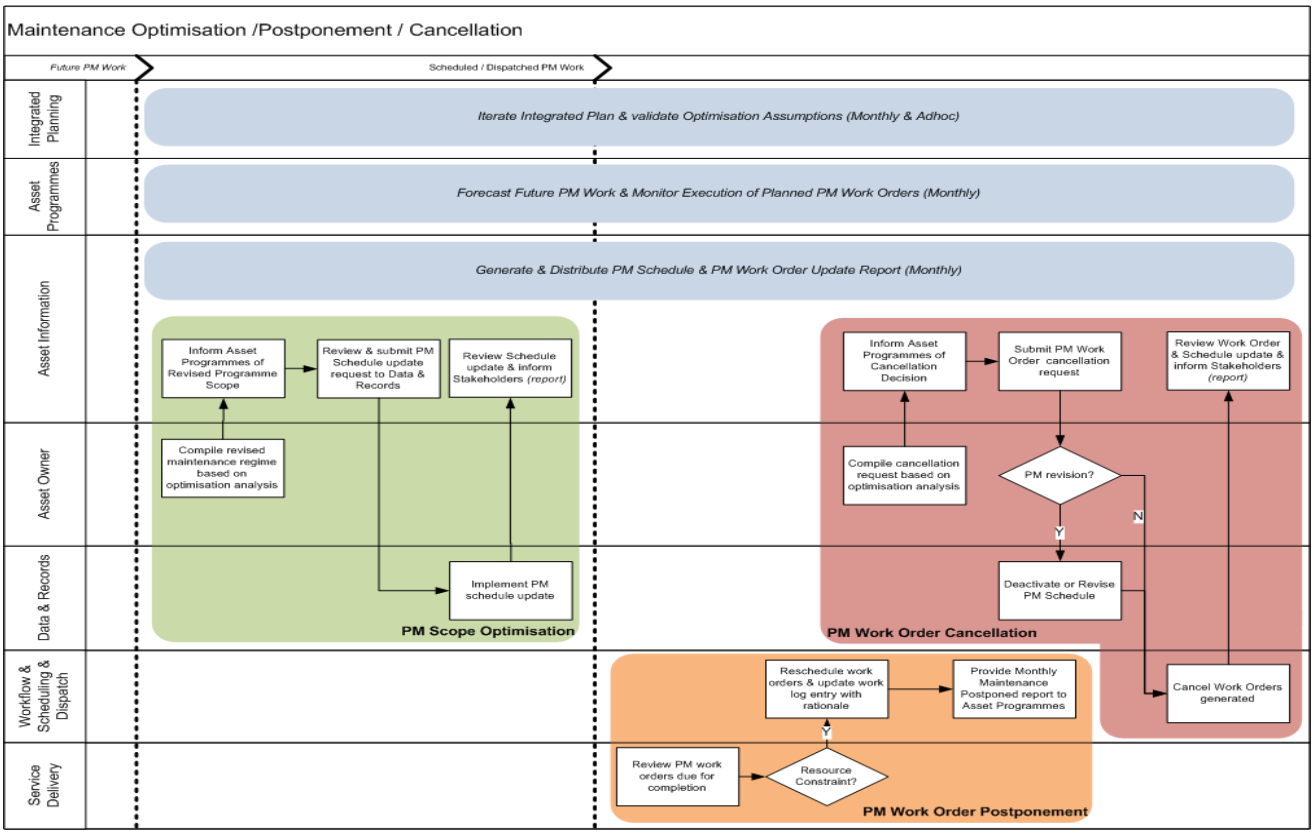
- Elapsed time since the target start date or completion date of previous work. PMs for this work are called time-based PMs.
- Metered asset usage since the target start date or completion date of previous work. PMs for this of work are called meter-based PMs.
- A combination of elapsed time and metered usage. For example, you can schedule a PM to trigger work every 6 months or every 300 hours, whichever comes first.
- You can create flexible schedules by using lead times, seasonal and extended dates, and by triggering work outside of a PM frequency cycle.

PMs are grouped into hierarchies that model the assets and create PMs for routes. Prior to the date maintenance is due; the system generates a work order (the PMs select the appropriate job plan template and sends it to work flow progression for completion).

On completion of the activity (work order), the actual time, materials and service costs are recorded against the work order through handhelds and it is routed for approval and payment. Any variations from the standard are highlighted and require separate approval.

A forecasting tool is used to forecast the workload from Maximo based on the PMs and asset base. The forecast workload can then be refined and optimised to generate efficiencies as illustrated in the Figure 44 below.

Figure 44 Maintenance Optimisation, Postponement or Cancellation



Similar to the planned maintenance described above, and follow on work or reactive work will also be done on foot of a Maximo work order and all costs, materials and asset information is logged on the work order which is linked to the individual asset

The Maximo system allows for capture of a wide range of data on individual assets which enables strategic decisions to be made to optimise performance, gain efficiencies and reduce costs

8.3.2 CorePay

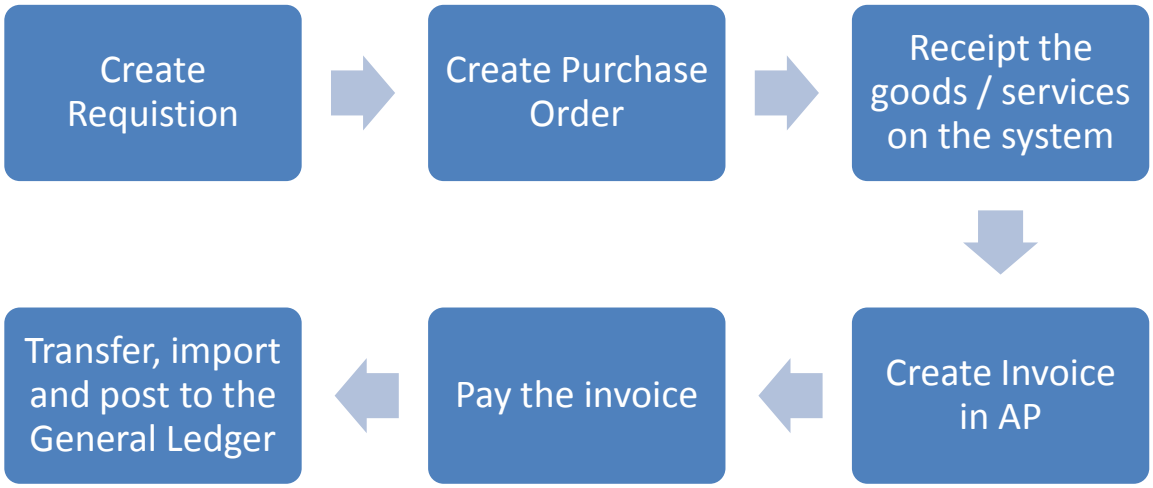
CorePay is a secure, reliable and proven payroll system that will be used to control payroll costs effectively on the GTTW project. It is equipped with a multitude of features to streamline and optimise payroll process. It has a number of benefits including

- Ensure legislative compliance both in the UK and Ireland
- Extensive payroll functionality incorporated in CorePay, that has been developed and enhanced by Core over the last 24 years
- Fully integrated with the HR system and Time & Attendance.

CorePay is integrated with Oracle financials which enables Oracle to captures the payroll costs in the relevant separate Oracle company.

In addition to raising costs on Maximio costs can also be raised using an Oracle Purchase Order on the Oracle system. The process flow is outlined below in Figure 45. The first step in the process is to raise a purchase requisition which once approved generates a purchase order.

Figure 45 Oracle Process Flow



No expenditure can be incurred until the purchase order has been approved. The purchase order is raised on Oracle and approval is managed based on hierarchies of approval within the system. Depending on the value of the spend, the default approval route is as per Table 17. Once the purchase order has been appropriately approved the expenditure can be incurred.

Table 15 Default Oracle Project Approval Route

Project Budget Value (EUR)	Approver Role
0 to 50,000	Cost Centre Manager
50,000.01 to 150,000	Senior Manager
150,000.01 to 500,000	Head of Networks Finance
	Head of Business Unit
500,000.01 to 2,500,000	Managing Director Networks
2,500,000.01 to 5,000,000	Group Finance Director
5,000,000.01 to 10,000,000	Chief Executive
>10,000,000.01	BGE Board

Once the goods or services have been received then they are receipted on the Oracle system. Then on receipt of a valid invoice a three way match is performed which matches the purchase order, receipt, and invoice details before the corresponding invoice can be paid.

8.3.3 Oracle

Oracle financials facilitates the Financial Management and Control of expenditure as outlined above. In addition it also facilitates the following:

- Drill down facility to AP Invoices and Purchase Orders;
- Cost Centre Reporting; and
- Interface to general ledger.

The Financial Management of costs is crucial to BGE and Oracle financials allows us to monitor the Opex spend effectively using cost centre reporting. A cost centre report is required each month for each cost centre so that Management has information on the actual versus budgeted costs. “Expenditure YTD” is also reported on for comparative purposes to the annual budgeted spend. Networks Finance distributes cost centre reports monthly which are generated from SAP Business Objects

All cost management practices will be applied to the GTTW project to ensure the effective management of costs.

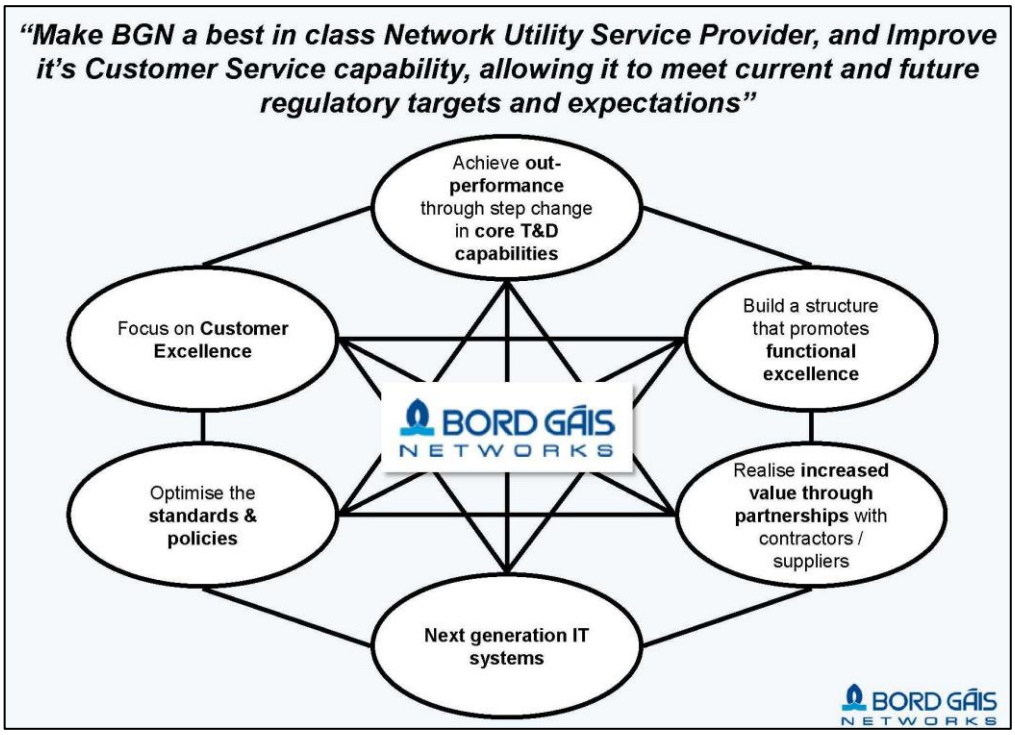
8.4 Efficiency improvement plans

8.4.1 Asset Focused Organisation

The Bord Gais Networks organisational structure and operating model changed in 2010 following the Networks Transformation Programme (NTP). The current structure can be described as ‘asset centric’. A new department was created, Asset Management which is dedicated to the development of the network, through efficiency and improvements in processes. In addition an Asset Operations department was created which merged our service delivery and workflow departments.

We set out our goal in Figure 46 below.

Figure 46 Bord Gais Networks Goal



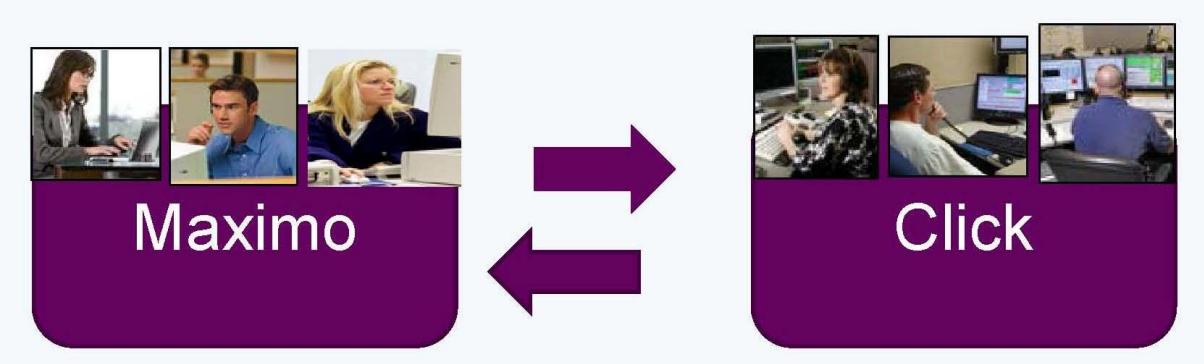
Our transformation project also embedded;

- **Supply Chain Optimisation**, thereby applying best-practice procurement processes within BGE purchasing spend with a view to adding value and reducing or avoiding costs.
- **Contract Management**, a specific supply chain initiative to radically re-configure how BGE acquires engineering services from external contractors.

Theses efficiencies will allow the Gas to West project leverage off existing BGE frameworks, which have been developed with multiple suppliers to offer choice and competitiveness. Having these frameworks in place reduce the procurement timeline by having to go through a tendering process, while also ensuring value for money in the procurement of both capital and operating expenditure.

BGE (UK) has also automated its business processes as part of the Networks Transformation Programme (NTP). BGE automated its business processes through the implementation of a range of software as presented in Figure 47 which allow real time data visibility and facilitate investment decisions based on real information.

Figure 47 Automation of Business Processes



Maximo – the work and Asset Management system where all jobs scheduled and tracked.

Click – used to assign all work to handheld devices.

Syclo – used to return real time data from the field to Maximo.

This software allows real time data to be recorded in the field, thereby allowing interpretation of asset data through decision support tools so the most optimum & informed decisions can be made to renew or replace the assets.

BGE is a member of the Gas Transmission Benchmarking Initiative (GTBI). Benchmarking has become a strategic tool for continuous improvement in highly competitive markets. It reveals the strengths and weaknesses in an organization and focuses attention on the key areas for performance improvement.

The main objective of benchmarking is to provide credible measures as well as to promote continuous improvement. Benchmarking is a process that provides a sense of direction, but even more so, it is a means to measure current performance and provides tools instrumental to enable superior performance. In general terms the business objectives of benchmarking are to contribute to the improvement of business processes; reduction of costs; increase of assets availability/uptime and reliability; measurement, monitoring, enhancement of customer, employee and society satisfaction, i.e. environment and safety.

GTBI was established to compare operating efficiencies of Gas Transmission systems across Europe. BGE were one of the founding members of the GTBI and have participated for 10 years. Membership of GTBI enables BGE to compare performance and discuss best practice in the gas Transmission business with TSOs throughout Europe.

BGE will apply all learning's to ensure the best in class assets are delivered for the Northern Ireland consumer in the GTTW project, similar to the process currently adopted on BGE (UK)'s existing pipeline assets in Northern Ireland.

8.4.2 Benchmarking

Benchmarking plays a pivotal role in both the diagnostics of how we operate and in long term planning. We continually strive to be leaders in our field, continually aspire to be leaders with other best in class organisations and other organisations aspire to follow our lead.

We are members and are actively involved in the following groups;

- European Gas Pipeline Incident Data Group (EGIG)
- United Kingdom Onshore Pipeline Operators' Association
- Gas Transmission Benchmarking Initiative (GTBI Europe)

Benchmarking has become a strategic tool for continuous improvement in highly competitive markets. It reveals the strengths and weaknesses in an organisation and focuses attention on the key areas for performance improvement.

The main objective of benchmarking is to provide credible measures as well as to promote continuous improvement. Benchmarking is a process that provides a sense of direction, but even more so, it is a means to measure current performance and provides tools instrumental to superior performance. In general terms the business objectives of benchmarking are to contribute to the following:

- improvement of business processes;
- reduction of costs;
- increase of assets availability/uptime and reliability; and
- measurement, monitoring, enhancement of customer, employee and society satisfaction, i.e. environment and safety.

The following are an example of improvements delivered through benchmarking;

- Above Ground Installations (AGIs):
    - Boiler Replacement Programme, this project is currently ongoing with the replacement of modulating boilers with modulating condensing boilers. This replaces the oldest and most inefficient boilers with modern condensing boilers that are approximately 90% efficient. This is resulting in significant fuel and CO2 savings. With new control systems the new boilers are capable of modulating their output to more carefully match the required thermal input at each installation. Armstrong International are working with BGE in this regard and adopting their design to reflect BGE design of boiler units.
    - Waterbath Replacement Programme, replacement of waterbath systems with modulating condensing boiler with modern control systems will represent a significant decrease in the fuel used to operate these installations.

- Combined Heat and Power Units (CHP), as part of the boiler and waterbath replacement project, BGE is engaged in pilot project to upgrade some boiler units with small CHP boilers. These units would replace a single boiler in the boiler houses, and operate as a base load boiler, while simultaneously producing electricity for the AGI. This has the potential to significantly reduce the electrical demand at the larger installations. Should this initiative be successful it will be rolled out to other installations.

- Marker Replacement Programme
  - Following a review of United Kingdom and European operators on pipeline marker arrangements, BGE has rolled out a programme to upgrade existing pipeline markers to bring them in line with best international practice and to further reduce the risk posed by third party damage. As part of the upgrade the "Dial Before You Dig" number will be prominently displayed.

BGE (UK) will apply all learning's from benchmarking to ensure the best in class assets are delivered for the Northern Ireland consumer in the GTTW project.

8.4.2.1 Design Optimisation

Based on our experience and knowledge of design, our understanding of the existing Northern Ireland networks we can efficiently improve the design by reducing the amount of Transmission network there by facilitating more connections from the Distribution network, while also maintaining consideration of future development in our design to facilitate future expansion of the gas network.

We purpose;

- Above Ground Installations (AGI) locations could be optimised, we have set out an alternative in Appendix E which will reduce the Transmission infrastructure and allow more customers to be connected as the Distribution feeder main increases.
- Special Engineering Crossings, through our past experience and the build out of the towns and Transmission infrastructure in Northern Ireland, optimising the AGI location can mitigate the special crossings on the Distribution feeder main mitigating cost and construction risk. We utilised this approach in the build out of previous infrastructure in Northern Ireland.
- Our past experience from steel procurement, we believe the proposed 150 mm steel pipeline could be increase with little incremental costs, thereby increase the pipeline capacity by up to 70% for these sections of pipelines.

8.4.3 Supply Chain Optimisation

BGE (UK) will leverage off existing parent company agreements with material suppliers and engineering service providers.

This is a major advantage for the GTTW project as it would reduce the procurement phase of materials by six months.

It would allow an accelerated mobilisation phase for engineering works, site investigation, which will benefit the GTTW project.

8.4.4 Environmental Efficiencies

We have developed our own in-house environmental guidance plans which assist in the development of Environmental Impact Statement (EIS) and Environmental Appraisal Reports (EAR).

We have utilised these on past projects which bring efficiencies in the preparation of the EIS and EAR for pipelines in terms of reduced programme and in our discussions with Environmental agencies, to demonstrate our capability.

We will apply this to the GTTW project and have also mentioned what we can offer to the Northern Ireland Environmental Agency as part of our recent discussions during the consultation phase of the GTTW project.

We have outlined these techniques will ensure we adhere to policy such as the envirokit, enviroplan and are currently developing enviroops, all applicable to construction and operational personnel, inclusive of contractors on behalf of BGE (UK).

This innovative approach to environmental sustainability would be applied to GTTW.

Figure 48 Enviroplan and Enviroops

The documents provide guidance to planning and assessment, operations, construction and office staff. There are easy to navigate, providing concise information and answers, with next step advice. They are developed in hardcopy and eBook version.

9 Capital expenditure costs

9.1 Alignment with the business plan

BGE (UK) together with Bord Gais Networks has significant experience in design, construction and operation of high pressure Transmission pipelines. With approximately 2,400 km of Transmission gas pipelines, with the first of these pipelines installed in 1978 the network has been expanding ever since.

We have a dedicated in house team of project estimators. Based on our extensive experience over the past thirty five years we have built up a history of project cost estimates, which have been benchmarked and adjusted to reflect actual project costs over time.

Based on these building blocks and our experience of recent pipelines, we have built up a project estimate for the GTTW project.

9.2 Capital Cost Activity build up

Our estimates are based on building blocks referred to as “Compatible Units” which is a function of Maximo our Asset Management software system.

Compatible unit estimating allows costs estimates to be built up from smaller predefined building blocks, in our case, costs of AGIs, pipelines, materials, design, project management, labour and other costs. These smaller compatible units, as estimates progress become replaced with actual base costs throughout procurement of contracts and materials. This essentially provides our estimators with a library of cost schedules to build up estimates for example, steel pipelines with varying diameter to above ground installations. The CU process also incorporates version management function and tracks changes made to estimates, as the estimate progress through the approval system where actual tender costs are entered into the estimate. The CU process identifies how costs are derived and it can be seen where the largest cost drivers in the CU estimate are built up.

All CUs created as part of a project are individually available within the CU library, allowing estimators to add individual CUs as necessary to project estimates.

For the GTTW project our estimators have built an estimate based on the high pressure Transmission design as set out by Fingleton McAdam (FMA) in the “Potential Extension of Natural Gas and Related Services in Northern Ireland” Feasibility Study Report March 2010 under the Utility Regulator competition, for construction of circa 169 km of high pressure Transmission pipeline.

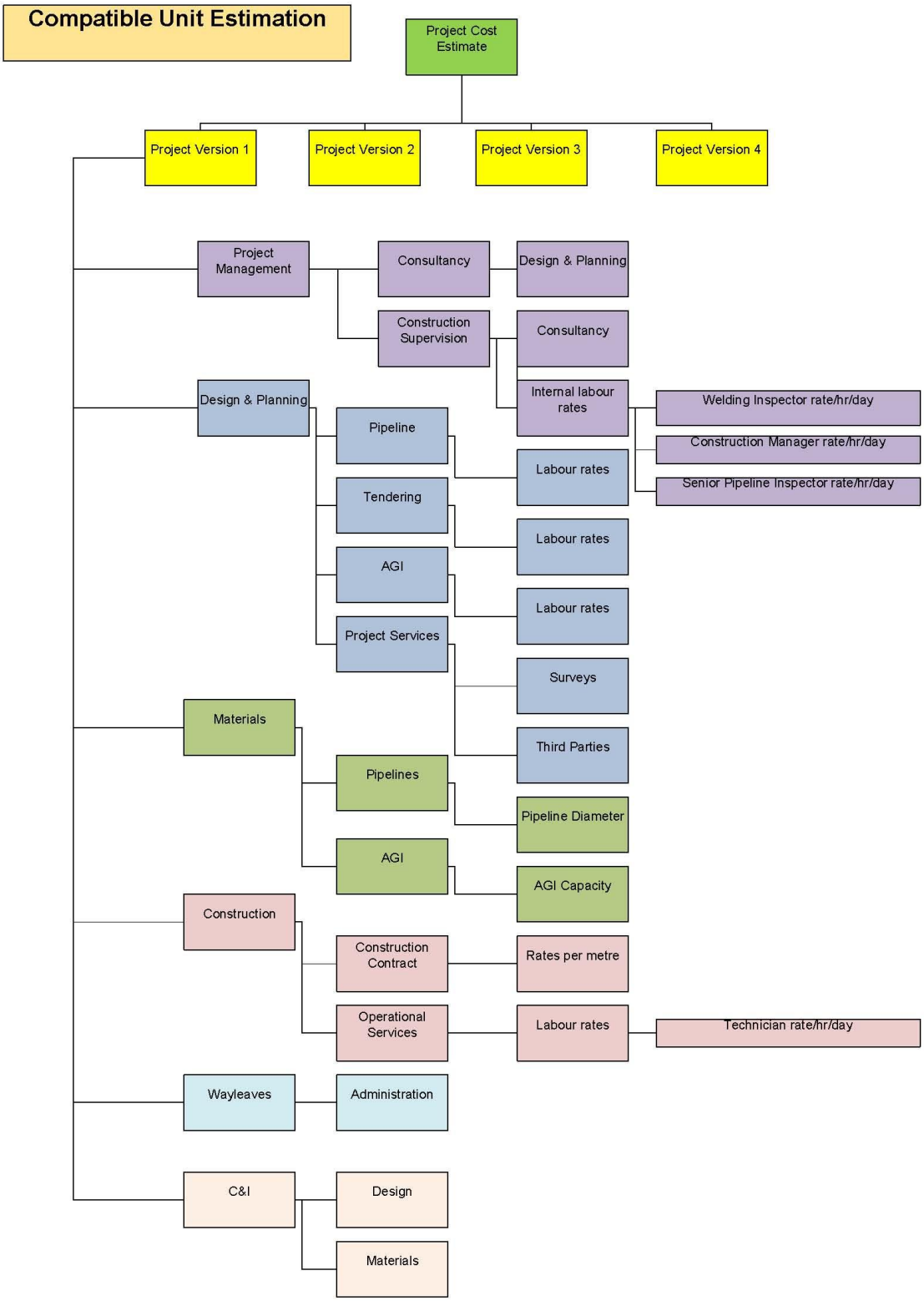
We have built the estimate from the bottom up using compatible unit approach to estimating. The estimate reflects best cost estimate subject to market verification through the tender procurement process for the construction contract and incorporates rates for materials based on the BGE frameworks with material suppliers. Having material frameworks in place offer an advantage regarding the procurement process, in terms of timing to procure materials and also reflect BGE buying power.

In addition, over the past eighteen months, we have constructed a combination of Transmission pipeline sizes ranging from 200 mm to 450 mm in diameter, with combined lengths of circa 60 km which also reflect pipeline activities in the compatible units estimate library.

- Construction of 46 km 400 mm steel pipeline to 400 MW Power Station, Co. Wexford in 2013
- Diversion of 0.5 km 450 mm steel pipeline in Northern Ireland for A8 Motorway in 2013
- Construction of 10 km 300 mm steel pipeline, Dublin City Refurbishment in 2013.

Figure 49 below shows how compatible unit estimate process.

Figure 49 Compatible Unit Estimation Process



We have adopted the compatible unit estimate approach to build up the activities for the GTTW project based on our pipeline construction experience.

The estimate provides an indicative capital cost for the high pressure pipeline section of the GTTW competition based on FMA March 2010 design. While we note, materials, construction, site investigation, wayleaves, SCADA and control and instrumentation are a pass through our estimate reflects “bottom up approach” based on our CU methodology for the purpose of the competition.

The estimate will be phased over the design and construction period, three years based on Fingleton McAdam Study.

Table 16 provides overview of activities with breakdown in the respective areas, which is essentially the capital cost expenditure. The cost of mobilisation, which relates to putting conveyance licence in place, agreements with other TSOs, GTMS etc. will run in parallel with initial design and planning phase. BGE (UK) has existing assets, operational systems, IT systems, licences, codes etc. in place in Northern Ireland, we seen GTTW project merging on to existing systems with relatively light modifications to reflect the new project.

Table 16 High Pressure Transmission Pipeline Capital Cost Estimate

Activity	Description	£ Capital Cost	£ Capital Cost
Project Management	Engineering Services	7,500,000	
	Project Management	1,338,829	8,838,829
	Mobilisation	300,000	300,000
Design and Planning	Drawing Office Pipeline	76,363	
	Drawing Office AGI	56,280	
	Pipeline Engineering	76,860	
	AGI Engineering	130,851	
	Project Services	2,690,783	
	Construction Tendering	71,900	3,103,037
Material Procurement	Line Pipe and Bends	11,364,726	
	AGI Materials	4,165,108	
	Material Storage	635,000	
	Material Inspection	275,000	16,439,834
Construction	Construction Contract	47,604,832	
	Operational Services	1,153,796	
	Construction Management	441,700	
	Archaeology	1,729,750	50,930,078
Wayleaves	Wayleaves	14,261,208	
	Land Acquisition	1,815,504	16,076,712
Control and Instrumentation	C&I Materials	950,031	
	C&I Construction	300,000	
	C&I Design	42,000	1,292,031
Total Cumulative Budget			£96,980,521

9.3 Cost management

9.3.1 Cost Management Overview

BGE manages project costs through Oracle Project Costing ("OPC") which is interfaced with the other relevant data gathering systems and modules including;

- Maximo;
- Wayleaves;
- Oracle Time and Labour Reporting;
- Accounts Payable; and
- Inventory.

OPC is in turn interfacing with Oracle General Ledger and Oracle Fixed assets.

While budgetary responsibilities are clearly identified at each phase of the investment life cycle, monthly financial cost reports are prepared for each project and distributed. These monthly reporting from Oracle on costs including;

- Original Budget;
- Control Budget;
- Projected Final Cost;
- Inception to date Actual Cost;
- Expenditure Year to Date;
- Expenditure Month to Date;
- Committed Amount; and
- Accruals.

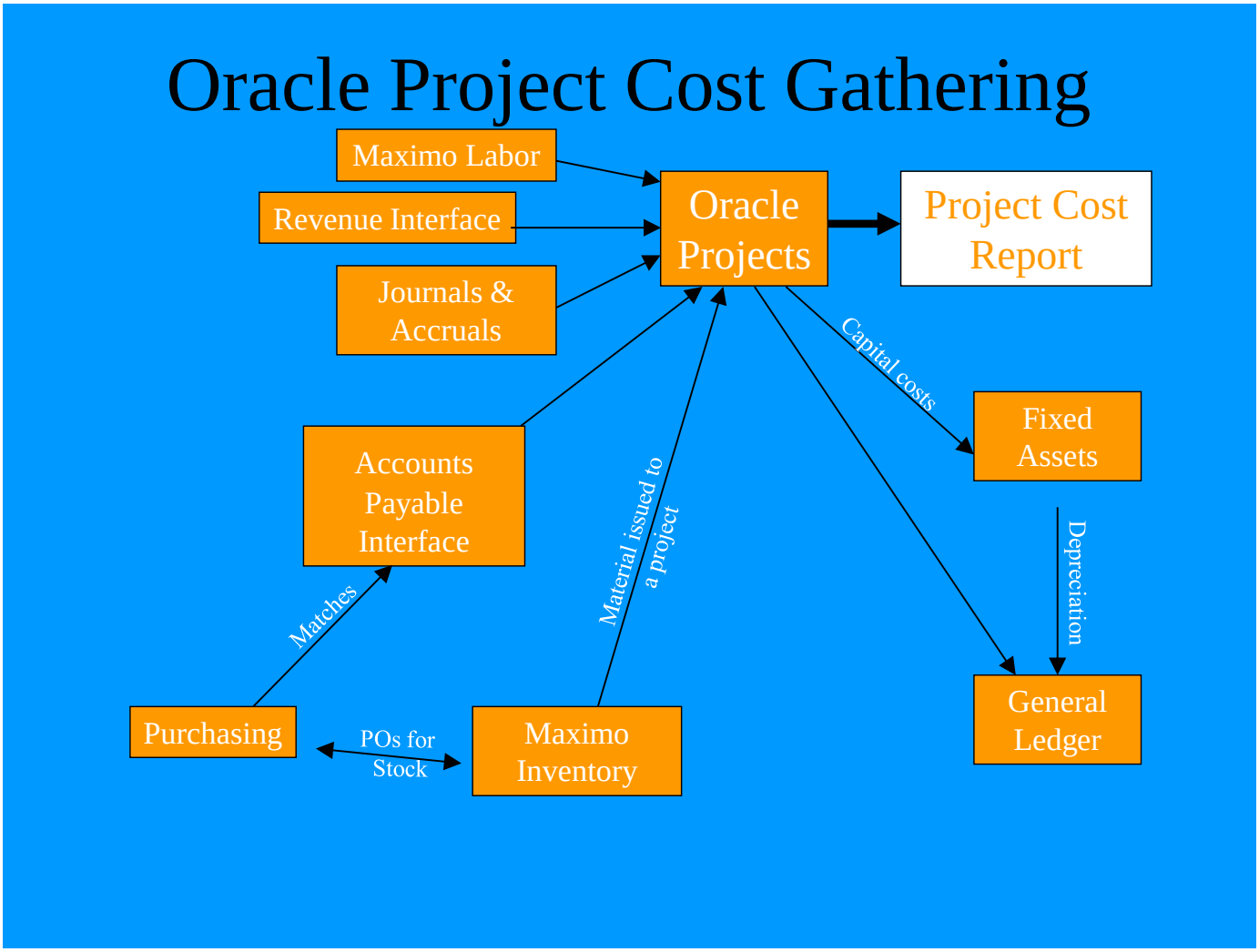
The programme plan for each individual project sets out the communication plan which will include the review forum for monitoring costs.

The Investment Approval Committee (IAC) reviews the overall portfolio of investments on a monthly basis.

9.3.2 Transmission Projects Process

Figure 50 shows Oracle Project Costing and the interfaces which facilitate the cost gathering process.

Figure 50 Oracle Project Costing



Oracle Project Costing facilitates the Financial Management and Control of Construction Projects with reference to the following:

- Budget Approval;
- Expenditure Control;
- Drill down facility to AP Invoices and Purchase Orders;
- Labour Cost Calculations;
- Cost Reporting; and
- Interface to GL/Fixed Assets.

The Financial Management of Projects is crucial to BGE and Oracle Project Costing allows us to monitor the Networks Capital Spend effectively.

9.3.2.1 Expenditure Control

No expenditure can be incurred on a Project until an approved Budget exists. Once a Budget has been prepared and approved by the Investment Approval Committee as outlined above, it is submitted to Oracle for electronic approval which in turn validates the Project and allows expenditure to be charged. Depending on the value of the Budget, the default approval route for a Project Budget on Oracle Project Costing is as per Table 17.

Table 17 Default Oracle Project Approval Route

Project Budget Value (EUR)	Approver Role
0 to 50,000	Investment Analyst
	Projects Lead-Capital Investments
	Asset Programme Manager
	Operations Finance and Capital Lead
50,000.01 to 150,000	Asset Investment Manager
	Financial Planning and Reporting Manager
150,000.01 to 500,000	Head of Networks Finance
	Head of Business Unit
500,000.01 to 2,500,000	Managing Director Networks
2,500,000.01 to 5,000,000	Group Finance Director
5,000,000.01 to 10,000,000	Chief Executive
>10,000,000.01	BGE Board

Once the Budget is approved, the Project is open to costs such as those listed below.

Purchase Orders

- All Contracts and or purchase orders raised against Projects appear as commitments in Oracle Project Costing; and
- Project costs associated those POs are interfaced to OPC via Accounts Payable.

Inventory, materials that are used on a Project are charged to the Project in one of two ways:

- Matching POs, where materials are ordered specifically for a Project and the PO has the Project cost code; and
- Maximo Inventory Interface, where materials are issued from stock to a Project. Most materials are charged to a Project in this way.

Finance Charges

- BGE Accounting Policy is to capitalize the interest on borrowings used to finance Capital Expenditure; and
- Oracle Project Costing has an automated process of charging interest to Projects.

Construction Accruals

- BGE Accounting Policy is to accrue expenditure on Construction Contracts up to a "Value of Work Done" based on values received from the Construction Manager and/or Un-invoiced Receipts at month end. This accrual is designed to give a fair reflection of the Project value during construction.
- In Oracle Project Costing, the generation of Construction Accruals is automated

Labour

- Maximo Labour and Oracle Time and Labour (OTL) are the time recording systems used for charging internal staff and contractors to Projects. Both systems are fully integrated with Oracle Project Costing. Timesheets are input by employees weekly on line by putting in the relevant Project and Task number details on a weekly basis.
- Rates for staff are supplied by the Financial Reporting Manager. The process of entering labour debits the Project and credits the parts and labour.

9.3.2.2 Import of Costs

Integrations

- Maximo Inventory – Stock issues to Projects are interfaced daily
- Maximo Labour is interfaced daily
- Accounts Payable Supplier Invoices interfaced daily
- Oracle Time and Labour (OTL) daily

9.3.2.3 Cost Reporting

- A cost report is required for each Project so that Management has information on Budget, Cost, Commitment and Projected Final Cost for each Project.
- “Expenditure YTD” is also reported on for comparative purposes to the annual budgeted spend.
- Networks Finance distributes monthly Project Cost Reports which are generated from SAP Business Objects
- Managers also utilize the onscreen views in Oracle to extract and review the detailed costs of their specific Projects

All cost management practices will be applied to the GTTW project ensuring full viability of costs.

10 Finance costs

10.1 WACC (work book submission)

In this section we set out the WACC we are bidding for the GTTW project and explain the underlying parameter estimates we use. In particular, we address the following two points as requested by the UR:

1. Explanation of build-up of the WACC, and
2. Explanation of assumptions used and their appropriateness.

Explanation of build-up of the WACC

In Table 18 we show the build-up of our WACC estimate for the GTTW. This is based on an assessment of the WACC for a mature gas network over the 40 year project lifetime (under a revenue cap regime) plus an adjustment to reflect the additional construction risk associated with building a new network.

Our bid is 6.19% (pre-tax, real). It is important to note that this rate is estimated as a blended rate of return that must be allowed throughout the project life time. This rate would not be sufficient to recover the construction risks if a lower rate was applied in price controls after the initial determination.

Table 18 Build up of WACC estimate

Cost of debt (real)	**3%**
Risk-free rate (RFR)	1.38%
Equity Risk Premium (ERP)	5.5%
Total equity market return (TMR)	6.88%
Asset beta*	0.578
Equity beta	2.01
Cost of equity (post-tax, real)	**12.44%**
Gearing	75.0%
Tax rate	21%
WACC (pre-tax, real)	**6.19%**

*Note: we assume a debt beta of 0.1 in the re-levering calculations.

Explanation of assumptions used and their appropriateness

We now explain the basis of the parameter estimates used in Table 18.

Cost of debt

To assess the appropriate level of the cost of debt, we use two strands of evidence. For the lower bound, we adopt Ofgem's iBoxx index mechanism using the Corporate Non-financial broad A and BBB with 10+ year indices, accounting for inflation using Band of England's break-even inflation rates for 10-year gilt. A ten-year trailing average is then applied in order to avoid short-term market fluctuation in the estimation of the long-term cost of debt. We also took account of relevant transaction costs (issuance and carrying costs) consistent with general UK regulatory precedents.[5]

For the upper bound, we use the current BGE NI's allowed cost of debt from its latest determination by the UR in 2012, at 3.2% which was composed of a risk free rate (RFR) of 2% and a debt premium of 1.2%. Recent regulatory determinations on the RFR by UK regulators have come down since then (see below). However, the spot gilt yield has been low for the past five years, and is showing signs of increase according to various sources such as the OBR forecast and BoE yield curves. It also likely that yields on the cost of utility corporate bonds will rise over the next few years. Therefore we consider it appropriate to set 3.2% as the upper bound of our range for the long-term cost of debt.

TMR, RFR and ERP

We looked at total market return (TMR), which is the sum of RFR and ERP taking into account the following factors:

- The long-term TMR on equity based on an international history of equity market returns (1900-2012) and quoted by Ofgem is between 6.5% and 7.5%[6]. This is the return that investors expect and require.
- Although we consider the CC's final determination for NIE estimates a TMR of 6.5% (see Table 20), which in our view is too low, we recognise this regulatory precedent
- There is theoretical and empirical evidence that an inverse relationship exists between RFR and the ERP and therefore the TMR on equity is relatively stable. The current low RFR may have been offset by a higher ERP. We therefore consider that a TMR estimate of 7.25% used in RIIO-T1 and RIIO-GD1 to be appropriate as the upper bound (see Table 20).

[5] UK regulators typically allow for 20-30 bps for transaction costs while estimating the cost of debt. For example, Ofwat in its PR09 allowed 20 bps and Competition Commission's determinations on NIE (2014) and Ofgem in DPCR5 (2010) allowed 30 bps.

[6] See page 6 of Ofgem (2013), *Consultation on our methodology for assessing the equity market return for the purpose of setting RIIO price controls*

To reflect recent regulatory precedent and market data we assume a risk-free rate (RFR) of 1.25% to 1.50% (see Table 20). Given our estimates on the TMR and the RFR, our estimate for the ERP is within the range of 5.25% to 5.75%.

Asset and debt beta

As a new build project the GTTW network entails much greater CAPEX than mature gas networks. The nature of the GTTW project is also likely to raise the construction risk around this CAPEX. As noted in our response to NIAUR's consultation on the Risk Adjustment Factor, the GTTW network passes through more difficult terrain (orchards, wetlands, lower quality farmland) and is more remote than the existing gas networks which mean construction entails more risk[7]. It would not be efficient or possible to transfer all this construction risk to contractors through fixed price contracts. Therefore the combination of a greater volume of CAPEX (relative to the asset base) and greater risk around this spend means a substantial construction risk premium is warranted.

The project is also stand-alone and therefore subject to specific risks around the tender and the subsequent regulatory regime.

We capture the effect of these risks on the lifetime WACC by applying an asset beta which is higher than that of a mature network. To estimate the impact of the additional risk for the GTTW project compared to mature networks we looked at estimates of asset betas for firms facing substantial project and construction risk, see Table 19.

[7] See BGE(NI) to the UR consultation (2014) *Gas Network Extensions in Northern Ireland: Approach to Comparing High Pressure License Applications*

Table 19 Asset betas for firms facing significant construction risk

Firm type	Notes
Traditional energy	Sample: Centrica, E.ON, RWE, SSE, Statoil
Renewable energy generators	Sample: Nordex, Gamesa, Repower, Vestas,Iberdrola Renovable,Terna
Heathrow Terminal 5	This is based on the equity beta (1.3) proposed by the CCA in 2002 to reflect construction risk of T5.
Construction	Based on US data

Sources: Grant Thornton; CCA; NYU/Stern

We considered an appropriate asset beta for the GTTW project. We choose a lower bound in the middle of the traditional energy range, since they face more price / volume risk but have lower capex relative to the existing asset base. We base our upper bound on renewable energy developers (lower bound) on the basis that these firms face greater risk than the GTTW pipeline (e.g. performance, price and regulatory risk as well as high capex to existing assets).

As a cross-check on this asset beta we looked at the construction risk premium for PFI projects. Using published data on equity and debt costs for PFI projects pre- and post-construction implies a risk premium for building and operating a PFI asset versus a fully constructed asset. This premium is incorporated into an overall asset beta of 0.58, which sits in the middle of the range we have adopted.

In calculating the equity betas associated with these asset betas we use a debt beta of 0.1, in line with recent regulatory precedent in NI and GB.

Gearing

We assume a gearing rate of 75%. This is in line with a study done by Grant Thornton for Ofgem, where the five-year average (2006-11) actual gearing of a group of electricity transmission operators in the UK averaged at 77%.[8]

The overall WACC is relatively insensitive to the level of gearing because the equity beta rises as the gearing rises.

[8] Grant Thornton, Interest during Construction for TR2A offshore transmission assets, a report for Ofgem E-serve, March 2011.

Tax rate

To convert the post-tax cost of equity into a pre-tax rate we assume a tax rate of 21%. This is the current main rate of corporation tax in the UK, see Table 20.

Table 20 Recent WACC determinations

	Ofgem RIIO-T1 (2012)	**Ofgem RIIO-GD1 (2012)**	**Ofwat guidance (2014)**	**CC NIE final determination (2014)**
Cost of debt	**2.92%**	**2.92%**	**2.75%**	**3.1%**
Gearing	62.5%	65%	62.5%	45%
Cost of equity	**6.8%**	**6.7%**	**5.65%**	**3.4%-5.0%**
Risk-free rate (RFR)	2.0%	2.0%	1.25%	1.0%-1.5%
Equity Risk Premium (ERP)	5.25%	5.25%	5.5%	4.0%-5.0%
Total Market Return (TMR)	7.25%	7.25%	6.75%	6.5%*
Asset beta	0.4	0.42	-	0.35-0.40
Gearing	62.5%	65%	62.5%	45%
Pre-tax WACC (real)	**4.9%**	**5.1%**	**4.4%**	**4.8%**

*Note: The CC adopted the top end of its range on the TMR in its Final Determination.

Appendix A: Key Personnel

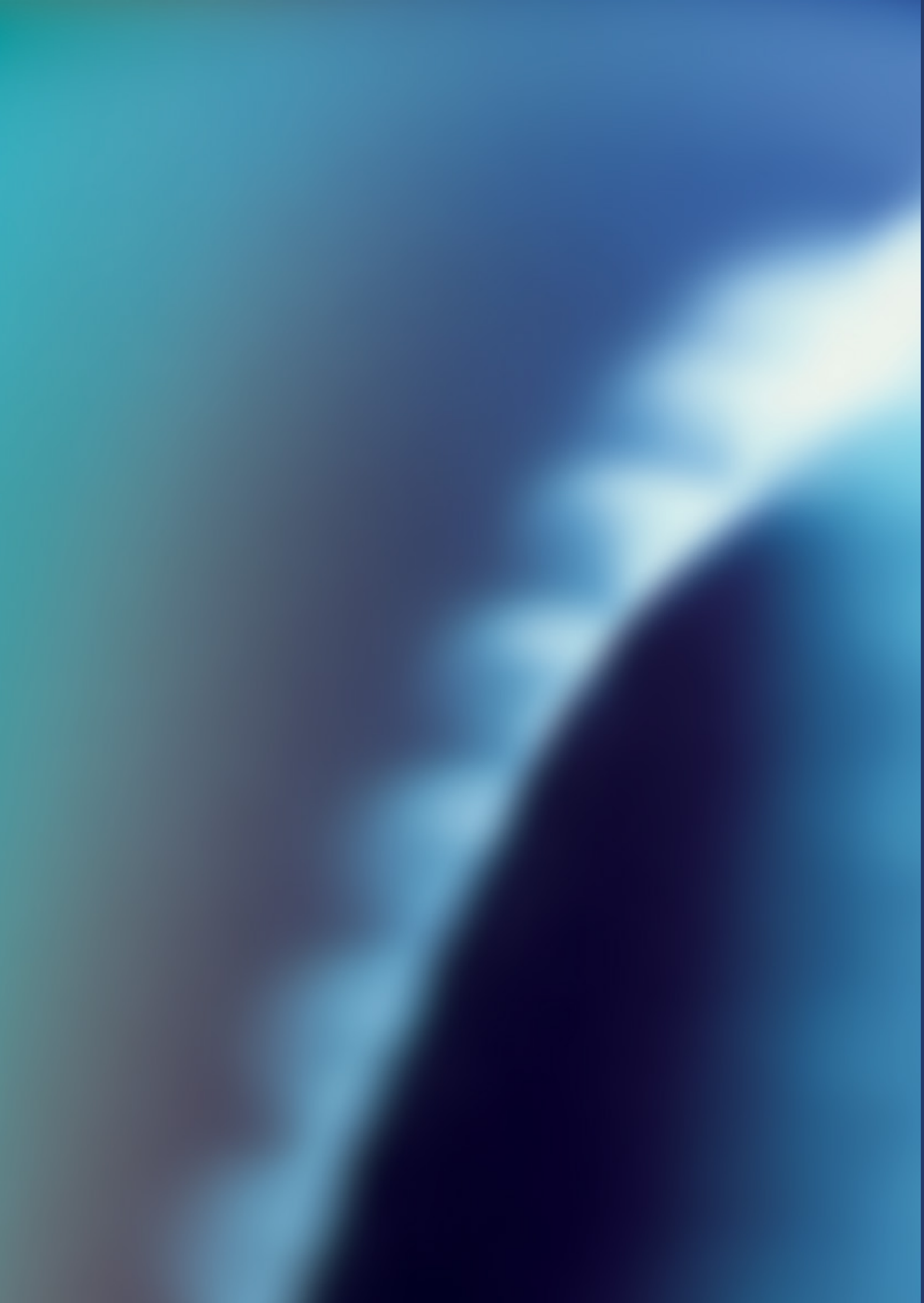
Appendix B: Programme of Activities

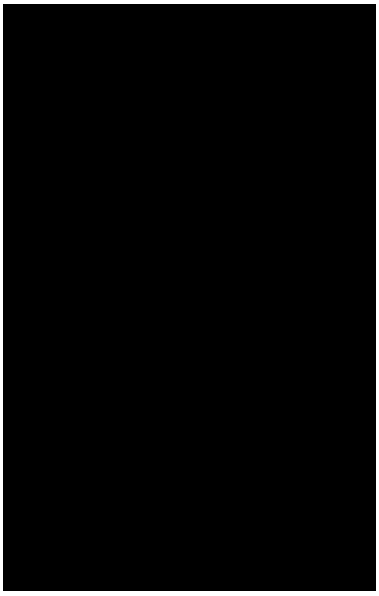
Appendix C: Landowner Sample Brochure and Landowner Handbook

Appendix D: Display boards sample

Appendix E: Alternative Design

Appendix F: Contract end to end process





Profession
Civil Engineer

Joined Bord Gáis Éireann
1997
Years of Experience
30
Nationality
Irish
Qualification
BE, CEng, F.Eng.
Professional Associations
Fellow of the Institute of Engineers of Ireland

Current Position
Managing Director - Major Projects

Fellow of the Institute of Engineers of Ireland, I hold an Executive position on the BGÉ Management Team, a role which I have held since 2008.

I have over 30 years experience working mainly in infrastructure development. I have extensive experience in project management, planning and permitting, stakeholder management, design, tendering, procurement, construction management and contract administration.

I have over 30 years experience delivering major infrastructure projects in the energy sector and general Civil Engineering sector.
I am currently the Chairman of BGÉ (UK) Ltd. I have previously acted as interim CEO for the BGÉ Group on two separate occasions, for a period in total of 8 months. I have also acted as Programme Director for the establishment of Irish Water for the past 24 months, which has seen the establishment of a new Water Utility under the umbrella of the BGÉ Group.

Managing Director - Major Projects.
I recently assumed the role of Managing Director for the Major Projects function within the Bord Gáis Éireann Group, with responsibility currently for a portfolio of projects in excess of €1bn Euro.

Managing Director - Bord Gáis Networks 2008 - 2013
I was Managing Director for Bord Gáis Networks for the period, during which the Networks business went through a major transformation programme, into becoming a High Performing Utility, with leading asset management capability and world class customer service.

Head of Networks Construction 2005 - 2008
I was responsible for most of the development of the gas infrastructure during that period 2005 - 2008, including both the North-West and South-North Pipelines. The role also included the accelerated renewals project in Republic of Ireland, which saw the elimination of all cast iron from the Distribution Grid.

[redacted]

Current Position
Managing Director – Bord Gais Networks

Joined BGÉ
2008

Years of Experience
23

Nationality
Irish

Qualifications

BE, Electrical Engineering, Masters in Business Administration.

Professional Associations

Chartered Member of the Institute of Engineers of Ireland

Profession
Electrical Engineer

A seasoned professional, I am currently the Managing Director of Bord Gais Networks. This is an Executive position on the BGÉ Management Team, a role which I have held since 2012. I have over 20 years experience working mainly in infrastructure development. I have extensive experience in the energy sector. Prior to joining Bord Gais Eireann I worked in Electricity Supply Board (ESB) for 17 years and held a number of senior management positions within its Networks Business**.** I am an Electrical Engineer by qualification but have held many senior management positions with the energy sector over the last 15 years.

I have over 20 years experience delivering major infrastructure projects in the energy sector. I hold significant management experience in senior roles both in my current and previous roles.

Managing Director – Bord Gais Networks.

I am currently the Managing Director of Bord Gais Networks with responsibility for management of the Bord Gais Eireann Gas Network. Bord Gais Networks has a network of over 13,000 of pipelines, an Asset Base of €3 billion and annual revenue of €450m. We employ a staff of over 500 directly and mange outsourced contracts for other activites.

Head of Asset Management - Bord Gáis Networks 2010 – 2012.

I held the position of Head of Asset Management from 2010 to 2012. This was at the inception of Asset Management with Bord Gais Networks and involved setting up and providing a vision for delivery. The role involved management of the Asset Strategy, Asset Programmes, Network Planning, Asset Investment and Design functions. Asset Management plan and deliver programmes of in excess of €150m on an annual basis.

Business Development Manager 2008 – 2010.

I joined Bord Gais Energy in 2008 and held the position of Business Development Manager within the Strategic Investments division before moving to the role of General Manager, South Western Services post the BGE acquisition of renewables company in late 2009.

[redacted]

[redacted]

Profession
Mechanical Engineer
Current Position
Head of Asset Management, Bord Gáis Networks

[redacted] is a seasoned engineering professional working in Bord Gáis Networks in their Cork Office.

[redacted] has over 14 years experience working mainly in the Energy Sector, delivering various scale projects, with extensive experience in project management, planning and permitting, stakeholder management, design, tendering, procurement, construction management and contract administration.

[redacted] currently leads the Asset Management function within Bord Gáis Networks with responsibility for strategic planning, optimal investment strategy, contracting strategy and capital/maintenance programme delivery.

Joined Bord Gáis Networks
2000
Years of Experience
14
Nationality
Irish
Qualifications
BE (Hons), MechEng , MIEI, Dip. PM.

[redacted] has over 14 years experience in the gas industry, in gas Transmission and Distribution, with expertise in design, Project Management, construction, contracting arrangements and general management.

East Cork Pipeline Project, Co. Cork - 2008

[redacted] was the Project Manager with responsibility for the planning, pipeline routing, stakeholder management, statutory consents, constructing tendering and contract award for this 20km, 18 inch diameter high pressure transmission steel pipeline to provide gas to new Power Stations at Aghada and Whitegate. He also managed the onsite construction activities.

South North Pipeline - 2006

[redacted] was the Design Engineer with responsibility for the conceptual and detailed deign along with material specification and procurement for this 156 km, 18 inch diameter high pressure transmission steel pipeline.

Contracting Strategy Development for Bord Gáis Networks

[redacted] set up a Contracting function within Bord Gáis Networks to deliver strategic value to a portfolio of outsourced contracts. This included review of the entire contract suite and restructuring to deliver more value which improving outputs. Some of the main contracts delivered include the Network Services and Works Contract (€50m per year) to deliver construction and maintenance services and a National Inspection Contract to deliver pipeline inspection services.

[redacted]

Current Position
Head of Networks Finance

[redacted] is a Chartered Accountant and the Head of Networks Finance for Bord Gais Networks. Over the last 8 years [redacted] has worked in a number of financial and commercial roles across the BGE Group. She is currently responsible for ensuring the effective financial management of the Networks Organisation a division of BGE with an asset base of almost €3bn and an annual revenue stream of in excess of €450m.

Profession

Accountant

Joined BGE

2006

Years of Experience
12

Nationality
Irish

Qualification

BA (Hons), HDip (BFIS), MBS (MIMAS)
Professional Associations

Member of the Institute of Chartered Accountants in Ireland

[redacted] has over 8 year experience working in a regulated financial utility environment. She has managed regulatory finance functions from financial planning and effective cost management across regulatory contracts to Insurance.

Head of Finance Networks

[redacted] is responsible for ensuring the effective financial management of the Networks Organisation, she provides the financial expertise, services and information to support the business in achieving the required business outcomes; this includes cost management, financial reporting, business planning, corporate planning, Insurance, operational and strategic tax, data security, commercial demand forecasting and tariff management.

Financial Planning & Reporting Manager - Bord Gáis Networks 2008 - 2013

[redacted] was responsible for leading the corporate financial planning, decision making and budgeting process for Networks. She managed the financial reporting activities across the division and developed an effective compliance framework reflecting appropriate accounting standards following the transition to IFRS. She drove the implementation of IFRS at the Networks Division.

[redacted]

Profession
Engineer

Current Position
Head of Asset Operations

[redacted] has 33 years experience in all aspects of the Energy Utility Sector, having worked in ESB for 27 years, and in Bord Gais for the past 5 years

Joined Bord Gáis Networks
2010

Years of Experience
33

Nationality
Irish

Qualification
BE (Elec.) Hons, UCC
MSc. (Mgmt.), TCD

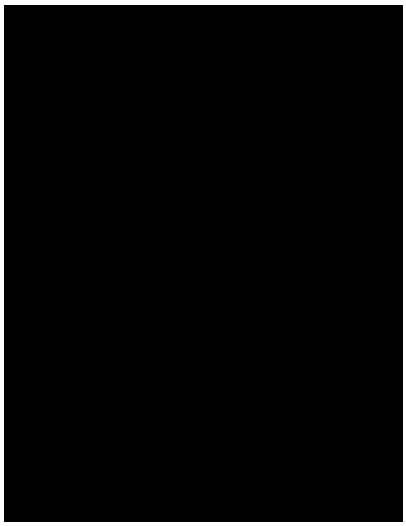
Professional Associations
Chartered Member of the Institute of Engineers of Ireland

[redacted] **has 33 years experience in all aspects of the Energy Utility Sector, having worked in ESB for 27 years, and in Bord Gais for the past 5 years**

Operations, Bord Gáis Networks
[redacted] is currently Head of Operations in Bord Gáis Networks with responsibility for delivery of all construction maintenance and repair activities – Network Operation – Customer Response activities- Emergency Response Activities nationally.

Asset Development, Bord Gáis Energy
In this role [redacted] was responsible for Delivery of a pipeline of projects (Renewable (wind) 500mw's and conventional (300mw's) including initial feasibility analysis, design, planning, construction, commission and full commercial operation.

ESB Experience
[redacted] has extensive experience of all aspects of electricity utility activities having held Senior Executive positions in Networks and Power Generation Business Units. Liam has lead teams in all aspects of the business from design, construction, maintenance, repair and operations



Joined Bord Gáis Networks
2004
Years of Experience
10
Nationality
Irish
Qualifications
B.B.S., Bachelor of Business Studies (Accounting & Economics), Postgraduate Diploma in Computing, Diploma in Environmental Science and Social Policy

Current Position
Head of Regulation and Corporate Services

[redacted] has over 10 years experience delivering multi- disciplinary projects in the energy sector from inception, through to construction.

[redacted] is Head of Regulation and Corporate Services at Bord Gáis Networks and responsible for market and regulatory affairs, legal and corporate affairs for the gas network business in Ireland, Northern Ireland, UK and Europe. In his ten years with Bord Gáis, Padraic has held a range of regulatory and market facing roles.

[redacted] previously worked in the dairy and management consultancy industries in Ireland, UK, Australia and New Zealand.

A Business graduate from University Limerick, [redacted] has more recently completed further studies in Environmental Science in University College Cork.

BGN Project 3 Programme Manager

- Delivered due diligence of all BGN assets and operations in GB,NI and IOM
- Stakeholder management – worked with key stakeholders to allow them understand BGN proposal and get buy in
- Negotiation of key legal frameworks
- Brought together different legal, financial, accounting, tax, operations, regulatory expertise (internal and external) to develop a robust proposal on how best to deliver 3rd Directive compliance

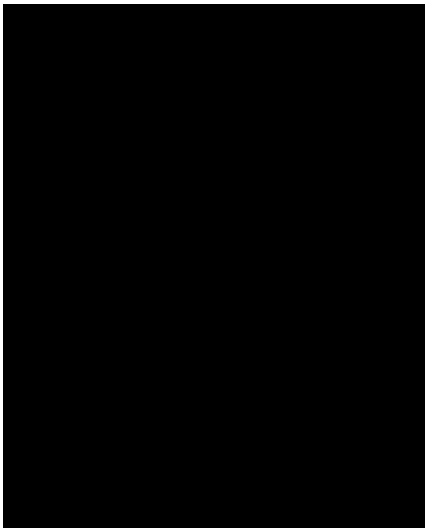
Regulatory Affairs Manager

- Managed and negotiated all key Regulatory contracts and Licences
- Fostered good working relationships with key stakeholders such as Regulators, Shareholder and Energy Industry in ROI, NI and GB since taking over the role

Shipper Market Services Manager

- Managed and negotiated all key Shipper/Supplier Contracts
- Assisted in Market Development of Gas Industry

Previous Roles in Bord Gáis; Shipper Operations Manager, Trading and Settlements Manager & Business Analyst/GPRO Analyst.



Joined Bord Gáis Networks
1996
Years of Experience
18
Nationality
Irish
Qualifications
CEng, MIEI
Professional Associations
Chartered Member of Engineers Ireland

Profession
Chartered Civil Engineer

Current Position
Engineering Design Manager

has over 18 years experience in the gas industry, in Transmission and Distribution, with expertise in design, material specification and procurement and managing multi-disciplinary design teams.

is a Chartered Engineer with over 18 years experience working in the Gas Utility Sector primarily in the design area. has extensive experience of leading and managing multi-disciplinary design projects incorporating process design, material specification/tendering and procurement, Risk Management - HAZID, HAZOP & HAZCON, planning and management of external consultant resources.

currently leads the Engineering Design Team within the Asset Management function, covering all aspects of transmission and distribution design.

Kernan to Derryhale, Northern Ireland

was the Senior Design Engineer leading the design team with overall responsibility for the specification and procurement of linepipe, installation design and all associated material procurement on this 12km, 10 inch high pressure, steel transmission pipeline project, incorporating an 15kscmh , 85 to 4 barg pressure regulating installation .

Gas to Great Island, Kilkenny/Wexford

was the Senior Design Engineer leading the design team with overall responsibility for the specification and procurement of linepipe, installation design and all associated material procurement on this 45km, 16 inch high pressure, steel transmission pipeline project, incorporating an 83kscmh , 50 barg filtering and metering installation .

Gas to Glanbia, Waterford

is the Engineering Design Manager with the overall responsibility for the specification and procurement of linepipe, installation design and associated material procurement on this 10km, 10 inch diameter , high pressure, steel transmission pipeline incorporating a 10kscmh, 85 to 19 barg pressure regulating installation.

[redacted]

Profession
HSQE Professional

Current Position
Environmental Manager

[redacted] is currently Environmental Manager for Bord Gáis Networks (BGN).

[redacted] has over 15 years experience working as a HSQE professional mainly in the Pharmaceutical and Energy sector.

She is currently Honorary Vice President of the Occupational Hygiene Society of Ireland.

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Joined Bord Gáis Networks
2009

Nationality
Irish

Qualifications
BSc (Hons)
PG Diploma Environmental Protection,
PG Diploma Occupational Hygiene,
Certificate Occupational Safety and Health,
Diploma Occupational Health and Safety

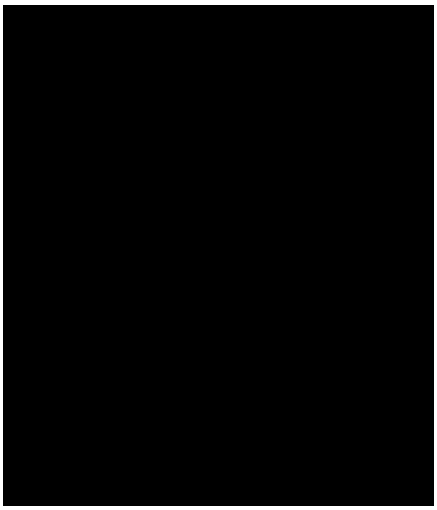
Professional Associations
Honorary Vice President of the Occupational Hygiene Society of Ireland.
Licentiate Fellow of the British Occupational Hygiene Society (LFOH).
Affiliate Member of the Institute of Environmental Management and Assessment (IEMA)

[redacted] is responsible for managing the BGN EMS to 1S014001, driving continuous improvement of the EMS, leading the Environmental Team and providing environmental management support to all business units across BGN.

Bord Gáis Networks – Safety Systems Engineer (2009 – 2012)
[redacted] in her role as Safety Systems Engineer, provided safety management support to BGN, performing risk assessments, audits, occupational hygiene support, accident/incident investigations, awareness training etc. She also worked closely with HR to develop to Occupational Health Program for BGN.

Chris Mee Safety Engineering and Nifast - Senior EHS Consultant (2004 – 2009)
[redacted] in her role as Senior EHS consultant provided EHS support to clients, performing EHS gap analyses, risk assessments, audits, etc. She also provided specialist support, carrying out occupational hygiene and environmental monitoring services to clients, measuring and assessing chemical agents, biological agents, noise, vibration and radiation etc

Bristol Myers Squibb - Environmental Chemist (1999 – 2004)
[redacted] in her role as Environmental Chemist was responsible for managing the site Environmental Air Emissions Monitoring Program, ensuring adherence with the site IPPC licence (Upper-tier Seveso II site). Anne also was responsible for managing the site Occupational Hygiene Program, conducting pharmaceutical dust, volatile organic compounds, noise and radiation assessments. She also supported the EMS ensuring maintenance and continuous improvement of the site EMS.



Joined Bord Gáis Networks
2007
Years of Experience
18 in Energy & Utilities Sector
Nationality
Irish
Qualifications
BE (Hons), Mechanical Engineering, MIEI
Professional Associations
Member of Institute of Engineers of Ireland

Profession
Mechanical Engineer
Current Position
Head of Safety, Quality & Environment

[redacted] is the Head of Safety, Quality & Environment in Bord Gáis Networks based in their Dublin Office. Bobby has 18 years experience working in the Energy and Utility Sector. Prior to joining Bord Gáis, [redacted] worked with Fingleton & White and has significant expertise in the consultancy sector, specialising in the delivery of high pressure gas infrastructure and has worked on numerous gas pipelines.

[redacted] currently heads the responsibility for Safety, Quality and Environmental, managing a significant team to ensure industry best practice in this sector, embedding BGN core value of Safety, Quality & Sustainability in contractors working on behalf of BGN.

[redacted] has over 17 years experience in Energy and Utilities Industry, with responsibility for capital delivery of gas transmission and distribution projects, with expertise in construction management, risk management, cost management and consultancy expertise.

Bord Gáis Networks Construction Manager

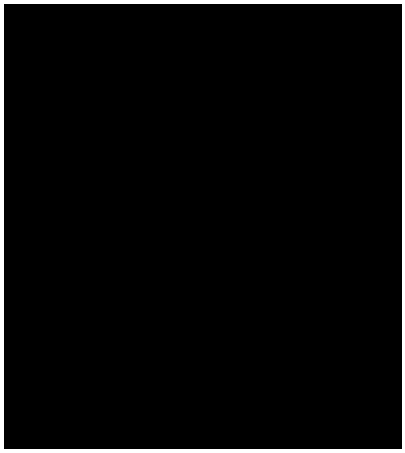
[redacted] was responsible for the delivery of the capital construction works for Transmission and Distribution. This involved management of a significant team in order to deliver reinforcement, new connections, and mains extensions as well as upgrade works.

North East Storage Project, Northern Ireland

[redacted] was Project Manager for the feasibility to investigate the development of a gas storage facility in Co. Antrim. This involved 3D seismic studies, stakeholder management (landowners, statutory consultees), management of local consultants and contractors.

South North & North West Pipelines, Northern Ireland

[redacted] was the Project Engineer overseeing the design and construction, which involved, routing, wayleaves, environmental assessment, planning applications, tender preparation, site supervision and commercial management of the construction contract for circa 260 km of 18 inch diameter high pressure steel pipelines.



Profession
Regulatory Manager

Current Position
Regulatory and European

[redacted] is Regulatory and European Affairs Manager in Bord Gáis Networks.

[redacted] has over 15 years experience working mainly in the Energy and Financial Services sectors and has extensive experience in Regulation Management, Licence Compliance, Risk Management, Demand Forecasting and Revenue Reporting, Business Planning, Commercial Lending, and Corporate Credit Assessment.

[redacted] completed a Masters Degree in Business Studies in Dublin Business School, having previously completed a BA in University College Cork.

Joined BGE
2008

Years of Experience
15

Nationality
Irish

Qualification

BA (Economics and Sociology, UCC)

Masters in Business Studies (Dublin Business School)

Publications

GE Capital Woodchester: A Study in Effective Compliance (Master's Thesis, Dublin Business School 2002)

Manager – Bord Gáis Networks

[redacted] is European Affairs and Regulation Manager in Bord Gáis Networks and is responsible for developing the company's strategic presence and interactions with key European industry, Legislative and Regulatory Stakeholders, whilst ensuring that all Bord Gáis Networks activities and processes adhere to regulatory and licensing requirements

Revenue Reporting and Demand Forecasting Senior Analyst - Bord Gáis Networks

[redacted] was previously responsible for Revenue Reporting and Demand Forecasting where anticipated market gas requirements are forecast and potential revenues are predicted across multiple scenarios and assumptions.

Regulatory Affairs Analyst - Gaslink

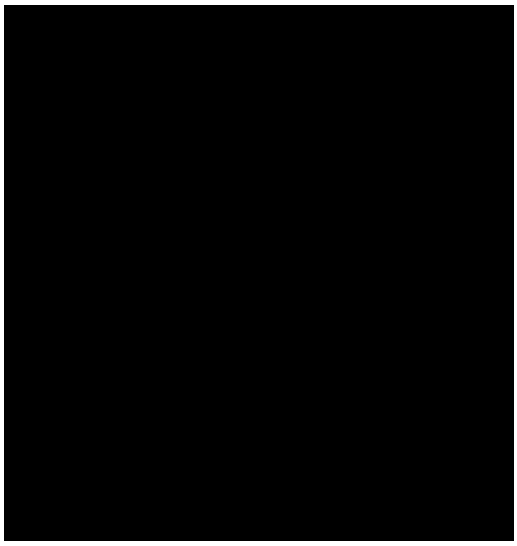
[redacted] was previously Regulatory Affairs Analyst in Gaslink with responsibility for Licence Compliance, Annual Performance Reporting, Risk Management, Board Reporting, Business and Strategic Planning

Senior Corporate Credit Analyst – HP Financial Services

Brian was previously a Senior Corporate Credit Analyst with [redacted] Financial Services responsible for Large Corporate Customer Credit Lines, Portfolio Management and Reporting.

Risk Manager – GE Capital Woodchester

[redacted] was previously a Risk Manager with GE Capital Woodchester responsible for a number of portfolios within its Commercial Finance and Leasing Division to ensure credit requests managed, credit lines reviewed and portfolio performance monitored and reported on to Senior Management.



Joined Bord Gáis Networks
2008
Years of Experience
18
Nationality
Irish
Qualifications
BE (Hons) Civil & Environmental Engineering, MIEI
Professional Associations
Member of Institute of Engineers of Ireland

Profession
Civil Engineer
Current Position
Contracts Strategy Manager

[redacted] is a Civil Engineer working in Bord Gáis Networks in their Cork Office. Cathal has over 18 years experience working in the contracting and commercial sector and for the past 6 years working with Bord Gais Networks in the Energy Sector. [redacted] has been responsible for delivering and project managing large scale construction and engineering projects and in the past, has negotiated contracts on a number of large scale development projects. [redacted] previous background is in the Civil Engineering & Construction industry and currently leads the Contracts Department in Bord Gais Networks.

[redacted] **has over 18 years extensive experience in the Civil Engineering & Contracting Industry with expertise in leading teams and delivery large capital projects across the Civil and Utility Sector.**

Contracts Strategy Manager – Contracts Department

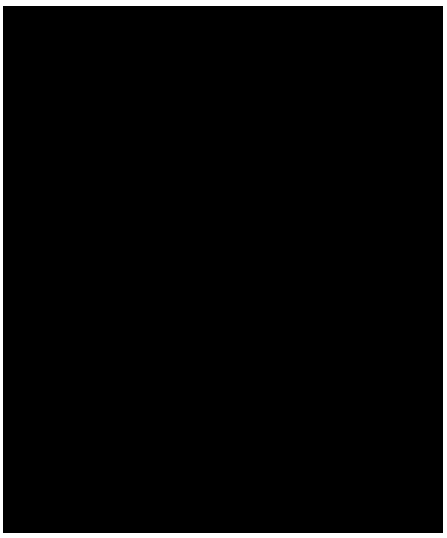
[redacted] is responsible for contract development, contract negotiation and defining contract strategy and policy for all works, service and supply contracts and is currently developing consultancy and materials frameworks for Bord Gais Networks and renewing current period and operation contracts with some of our key critical and strategic providers.

Southern Regional Manager - Construction Department

[redacted] was the Regional Construction Manager with overall responsibility for the construction planning and delivery, project management and stakeholder management for build out of the distribution network in the Southern Region including Kinsale Town, Tipperary Town & Macroom Feedermain Projects.

Operations Distribution Manager – Operations Department

[redacted] had overall responsibility for managing and executing day to day operation works across the Southern Region focusing on new connections, gas renewal projects and large industrial/commercial gas connections.



Joined Bord Gáis Networks
1997
Years of Experience
17
Nationality
Irish
Qualifications
BE (Hons), CEng, MIEI, MIGEM, Dip. PM
Professional Associations
Chartered Member of Institute of Engineers of Ireland
Chartered Member of Institute of Gas Engineers & Managers, UK

Profession
Chartered Civil Engineer
Current Position
Network Planning Manager

[redacted] is a Chartered Engineer working in Bord Gáis Networks in their Cork Office.

[redacted] has over 17 years experience working mainly in the Energy Sector delivering various scale projects, with extensive experience in project management, planning and permitting, stakeholder management, design, tendering, procurement, construction management and contract administration.

[redacted] currently leads the strategic planning and network analysis function within Asset Management, delivering Network Development and Capacity Statements, working closely with Regulatory Authorities and Government Departments.

[redacted] has over 17 years experience in the gas industry, in gas Transmission and Distribution, with expertise in design, project management, construction, operations and commissioning.

Gas to 400 MW Power Station, Co. Wexford

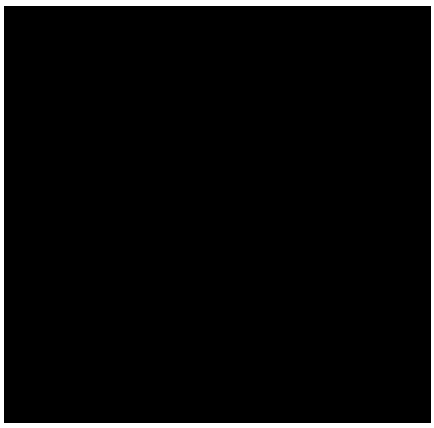
[redacted] was the Capital Programme Manager with responsibility for the planning, pipeline routing, stakeholder management, statutory consents, constructing tendering, contract award for this 46 km, 16 inch diameter high pressure transmission steel pipeline.

Dublin City Refurbishment Pipeline (Santry to East Wall)

[redacted] was the Capital Programme Manager with responsibility for the planning, pipeline routing, stakeholder management, statutory consents, constructing tendering, contract award for this 10 km, 12 inch diameter high pressure transmission steel pipeline.

Distribution Gas Network Extension Projects

[redacted] was the Distribution Design Engineer with responsibility for the design, network analysis, pipeline routing, stakeholder management, statutory consents, constructing tendering, contract award for significant connect of towns in extending the gas Distribution polyethylene network.



Structural Engineer

Current Position

Capital Programme Manager

[redacted] has over 12 years experience working mainly in the Energy Sector delivering various scale projects, with extensive experience in project management, planning and permitting, stakeholder management, tendering, procurement, construction management and contract administration.

The current Bord Gais Networks Capital Programme Portfolio contains a diverse range of projects across five asset classes. [redacted] currently leads the Capital Programmes function within Asset Management with responsibility for project progress / risk/ budget management, statutory and internal approval progression and construction contract development.

Joined Bord Gáis Networks

2004

Years of Experience

12

Nationality

Irish

Qualifications

BE (Hons), MIEI,

Professional Associations

Member of Institute of Engineers of Ireland

[redacted] has 10 years experience in the gas industry, in gas Transmission and Distribution, with expertise in routing, project management, construction and commissioning.

Curraleigh West to Midleton Pipeline in Co. Cork

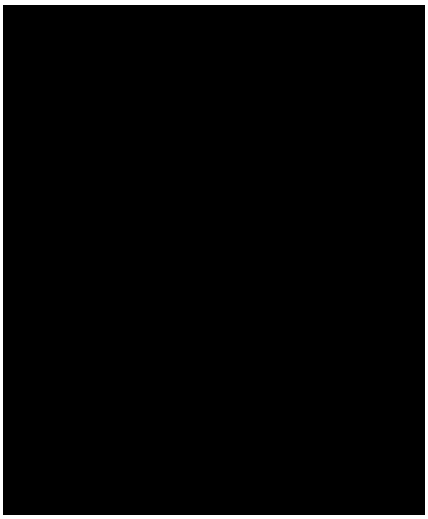
[redacted] was the Project Engineer with responsibility for the planning, pipeline routing, stakeholder management, statutory consents, constructing tendering, contract award and co-ordination of the construction supervision team for this 45 km, 24 inch diameter transmission pipeline.

Kernan to Derryhale Pipeline

[redacted] was the Project Engineer with responsibility for the pipeline routing, stakeholder management, construction contract scoping and tendering for this 12 km, 10 inch diameter transmission steel pipeline.

South North Pipeline

[redacted] was a Construction Engineer with responsibility for supervising the construction of 6 AGIs on this 156 km, 24 inch diameter transmission pipeline. Duties included liaising with BGE(NI) design team with regard to materials and site queries, verifying the contractors account submission and co-ordinating the third party utility connections such as power, telecom, and distribution gas.



Joined Bord Gáis Networks
2008
Years of Experience
25
Nationality
Irish
Qualifications
BSc (Hons) IEng, MIGEM, HDip
Professional Associations
Member of Institution of Gas Engineers and Managers

Profession
Environmental Engineer
Current Position
Interconnector Operations Manager

[redacted] has a range of operational and project experience and is currently responsible for the operation and maintenance of all BGE UK and BGE NI Assets, including Beattock and Brighouse Bay Compressor Stations, Onshore Scotland Pipeline Systems, BGE NI South North and Northwest Pipelines and is responsible for the both IC1 and IC2 Subsea pipelines that connect UK to Ireland.

[redacted] held the role of Grid Control Engineer and Safety Systems Engineer within BGN with responsibility for HAZCONs, HAZOPs, Grid Control operations and has an excellent knowledge of the technical and commercial operations of the Transmission Network.

Stakeholder engagement is cental to [redacted] current role involving HSE UK, Scottish Environmental Protection Agency and HSE NI.

[redacted] has over 25 years experience in the Oil and Gas Industry, working for ConocoPhillips for 19 years in a variety of Operations and Major Project roles and working in Transmission for Bord Gáis Networks for the last 6 years. [redacted] has a detailed working knowledge of the Northern Ireland Transmission System and is familiar with all major stakeholders in the NI gas industry

BGE NI A8 Bifurcated Stopple and Bypass Project 2013

[redacted] was the Operations Manager for this project and was involved in all project stages from conceptual design, detailed design, construction and commissioning.

Whitegate 450 MW CCGT Project 2010

[redacted] was the Safety Systems Engineer responsible for the€440 million Project, delivered on program and within budget with over 1,000,000 hours with out a lost time accident.

Kernan – Derryhale Spurline Project 2010

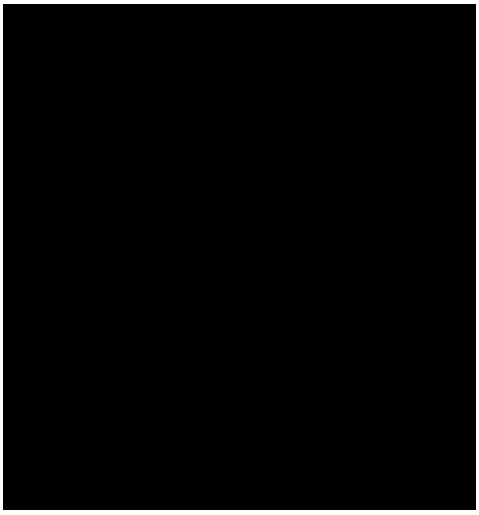
[redacted] was the Operations Manager for this project and successfully commissioned the 14.4 km 250mm NB pipeline.

Curraleigh West to Midleton Project 2009

[redacted] was the Safety Engineer responsible for this project and was involved in Design Stage Risk Assessment, construction and commissioning.

ConocoPhillips HDS Clean Diesel Project 2004

[redacted] was the HSE lead for this $100 million dollar project that was delivered on program with zero accidents or injuries and maintaining live plant operations throughout.



Profession
Mechanical Engineer

Joined BGN
2004

Years of Experience
15

Nationality
Irish

Qualification

BEng(Hons), CEng MIEI

Professional Associations

Chartered Member of the Institute of Engineers of Ireland

Current Position
Process Safety Manager

[redacted] is a Chartered Engineer with over 15 years experience working mainly in the Energy Sector in the areas of design, structural analysis, project management and asset integrity management.

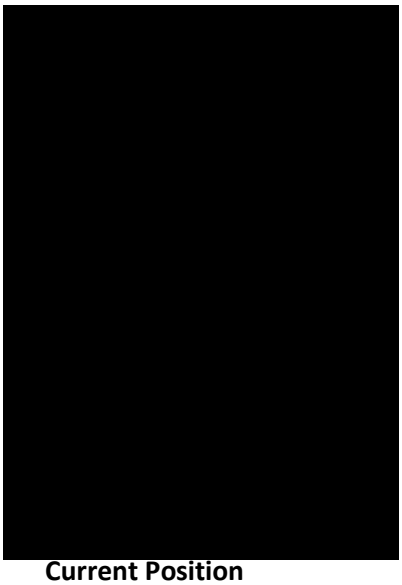
[redacted] has 10 years experience with BGN and previous to this worked with MCS International on offshore oil and gas design, verification and integrity management projects.

[redacted] has an honours degree in Mechanical Engineering from University of Limerick and has been a Chartered Engineer with Engineers Ireland since 2003.

[redacted] leads the Process Safety team with the HSQE department and works closely with the business and regulatory authorities to ensure that legislative and license requirements in relation to gas safety are fully met. The role covers both Transmission and Distribution assets across the Republic of Ireland, Northern Ireland and Scotland.

Key responsibilities include;

- Ensure adequate measures, systems, procedures and policies in place to minimise the risk of incidents and/or protect people from the effects of major accidents and ensure that risk is maintained to a level that is deemed as low as reasonably practical
- Manage the interaction with the Gas Safety Regulatory Authorities including Safety Cases
- Manage the Risk Management Framework and Business Continuity Framework
- Ensure and validate that BGN have appropriate Emergency Preparedness measures in place and maintain the Crisis Management plan and test regularly
- Develop, review and report on a range of process safety performance indicators to BGN management and Regulatory Authorities
- Represent HSQE, BGN and NSAI at appropriate internal, national and international technical working groups and committees
- Investigate asset related near misses and incidents and ensure appropriate preventative and improvement measures are put in place to prevent their occurrence



Current Position

Construction Manager

[redacted] is a Mechanical Engineer and the Construction Manager for Major Projects in Bord Gáis Networks.

[redacted] has over 30 years experience working in the Gas Industry and has been involved in projects including the conversion of the Old Towns Gas network to Natural Gas, design and construction of large Distribution network expansion programmes and Cast Iron Replacement Works. Currently, she is the Construction Manager for Major Projects in the Asset Operations area of Bord Gáis Networks.

Besides her professional degree, [redacted] has completed several other courses including On-Shore Pipeline Engineering, IMI Senior Leadership Development Programme, Contract Law and IOSH Managing Safely for Construction Managers.

Profession
Mechanical Engineer
Years of Experience
30
Nationality
Irish
Qualification
Mechanical Engineering Degree (Bsc Eng) - First Class Honours
Current Position
Construction Manager for Major Projects – Asset Operations

[redacted] has over 30 years experience working in the Gas Industry. Key responsibilities are summarised below.

Construction Manager Major Projects 2010 to date

- Construction management of Transmission (TX) cross-country and urban pipelines, TX AGI Capital and Operational upgrades and feeder mains to New Towns including Gas to Great Island TX Pipeline (46km of 16" NB and budget of €40 million) and East Wall to Coolock TX Pipeline (8km of 12"NB and budget of €13 million). Both projects delivered on time and within budget. Other recent projects include TX diversion works for the A8 Roads Contract in Larne and major upgrade works in the BGN Compressor Stations in Scotland.

Renewals Manager 2001 to 2010

- End-to-end management of the Cast Iron Replacement programme including risk management, design, tendering, construction and cost control. The Replacement Programme was accelerated in 2006 a target of 1,200km of cast iron to be eliminated with a budget of €183 million. The programme was delivered on time and within budget

Development Manager – Pre 2001

- Routing, design, costing, stakeholder management, economic evaluation, tender preparation and award of Distribution projects such as Feeder Mains to New Towns, Industrial/Commercial users, Non-gas Estates.

[redacted]

Profession
Wayleave & Site Acquisitions
Current Position
Wayleave Manager

[redacted] is the Wayleave Manager working in Bord Gáis Networks in their Cork Office. Tom has over 29 years experience working mainly in the Pipeline Networks Sector delivering various scale projects, with extensive experience in project management, planning, stakeholder management, tendering, procurement and contract administration. [redacted] currently leads the Wayleave Acquisitions Department within Asset Management, interfaces and maintains an excellent working relationship with a wide spectrum of stakeholders such as Landowners, Farming Organisations in NI and ROI, Government and Statutory Bodies and Landowner Professional Advisors

Joined Bord Gáis Networks
1985

Years of Experience
29

Nationality
Irish

Qualifications
Diploma in Agriculture

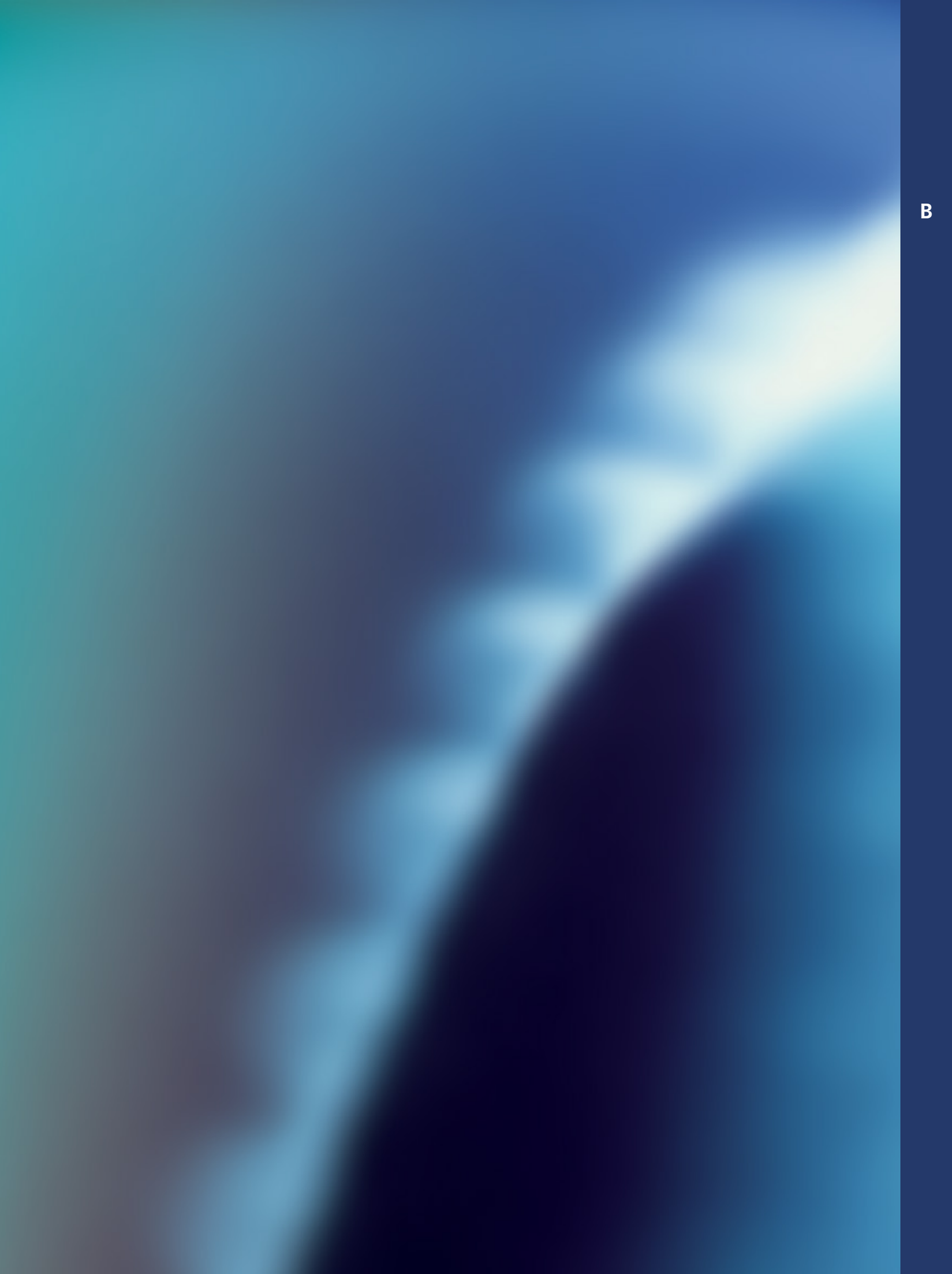
[redacted] has over 29 years experience in the gas industry, responsible for the management of the Wayleaves and Land Acquisition. Responsible for the acquisition of rights to land to enable project delivery.

[redacted] has been involved in the negotiation process and the successful acquisition of sites and wayleaves in over 100 Transmission Infrastructure Projects including the following 6 in Northern Ireland:

- South –North Pipeline
- North-West Pipeline
- Kernan to Derryhale
- Aghadowey to Ballymoney
- Dunaird to Ballymena

[redacted] also has vast experience in acquiring domestic / commercial wayleave & site acquisitions within the distribution network.

[redacted] currently manages over 7,000 landowners through which BGE / BGE (UK) enjoys a wayleave over their lands.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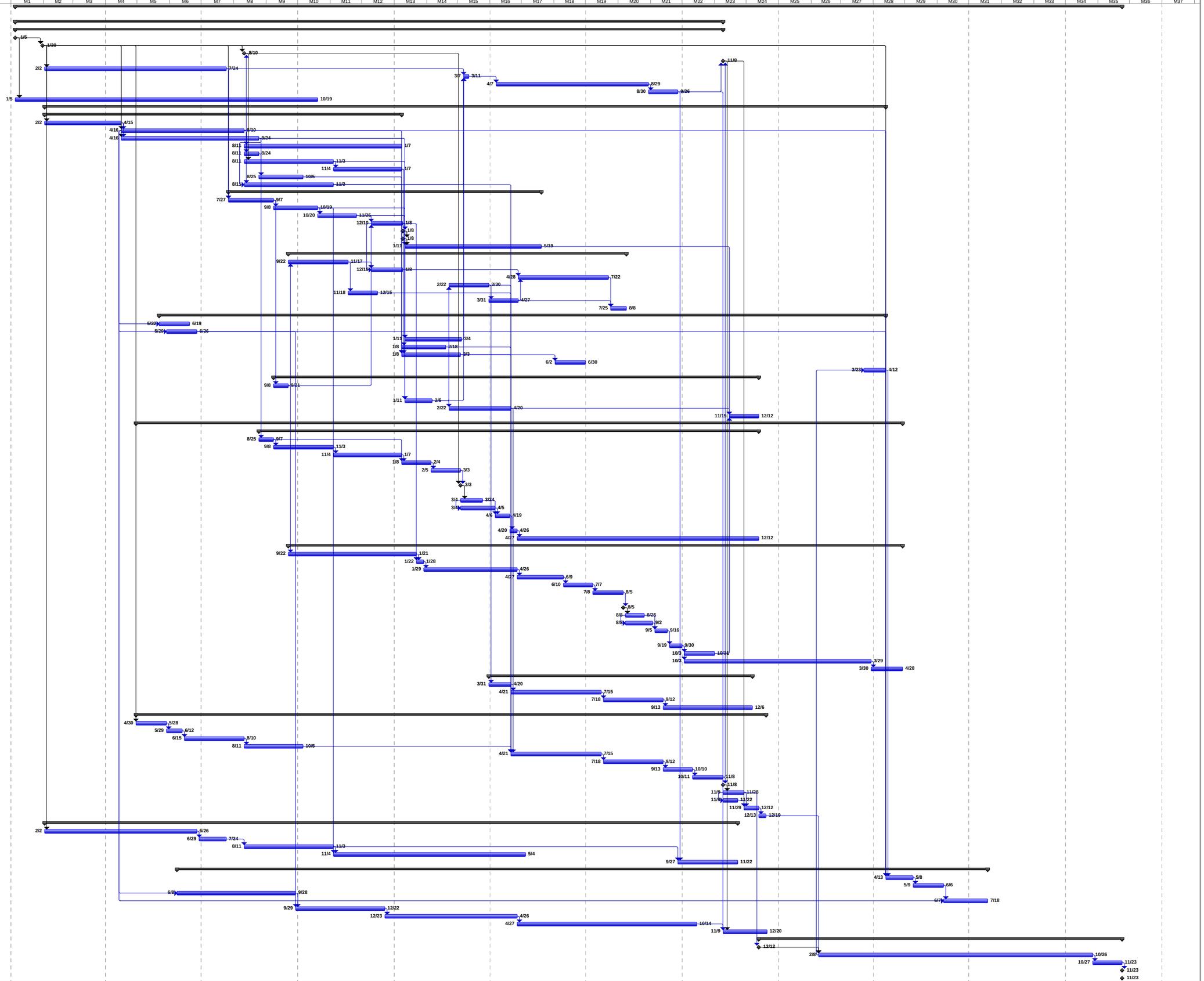
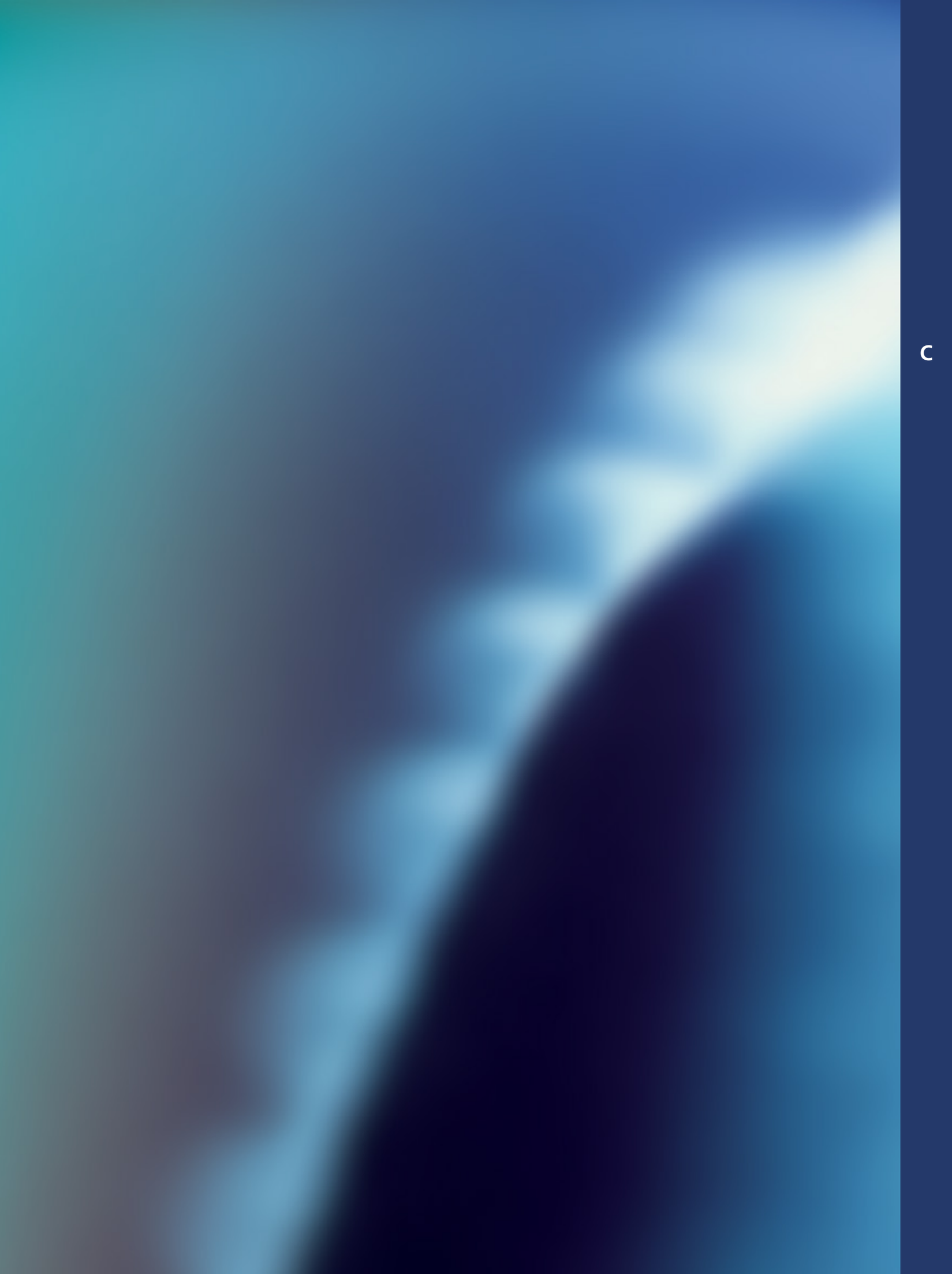
Gas To The West Northern Ireland (3 Year Programme)

ID	Task Name	% Complete	Duration
1	**Gas To The West Northern Ireland**	**0%**	**720 days**
2	**Project Management**	**0%**	**461 days**
3	**Project Management**	**0%**	**461 days**
4	NIAUR Project Approval	0%	0 days
5	IAC Gate 1	0%	0 days
6	IAC Gate 2	0%	0 days
7	IAC Gate 3	0%	0 days
8	Planning Pre-Consultation	0%	120 days
9	Planning Submission	0%	5 days
10	Planning Consideration	0%	100 days
11	Planning Approval	0%	20 days
12	Markets and Regulations- TSO Agreements	0%	200 days
13	**Design**	**0%**	**545 days**
14	**Pipeline Design**	**0%**	**230 days**
15	Aerial Survey	0%	50 days
16	Preliminary Route Report	0%	80 days
17	Environmental Impact Assessment	0%	90 days
18	Route Refinement	0%	100 days
19	Material Quantification Report	0%	10 days
20	Site Investigations & Trial Holes	0%	60 days
21	Site Investigation/Report	0%	40 days
22	Detailed Route Report	0%	30 days
23	Environmental Impact Study	0%	60 days
24	**AGI Engineering**	**0%**	**201 days**
25	Preliminary Design Report	0%	30 days
26	Topographic Survey	0%	30 days
27	AGI Civil & Mech Layout	0%	26 days
28	AGI Design Review	0%	15 days
29	AGI Ops Review	0%	0 days
30	AGI Pre-Tender Review	0%	0 days
31	AGI Detail Design with Envirokit	0%	90 days
32	**C&I Design**	**0%**	**216 days**
33	C&I Preliminary Design	0%	40 days
34	C&I Design Review	0%	15 days
35	C&I Detail Design	0%	60 days
36	Cons:C&I Tender Drawings	0%	25 days
37	Cons:C&I Technical Scope of Works	0%	20 days
38	C&I Material Specification	0%	20 days
39	C&I Construction Drawings	0%	10 days
40	**Drawing Office Pipeline**	**0%**	**470 days**
41	Routing/ Planning Drawings	0%	20 days
42	Wayleave Drawings	0%	20 days
43	Planning Drawings	0%	40 days
44	Site Investigations Drawings	0%	30 days
45	Pipeline Tender Drawings	0%	40 days
46	Pipeline Construction Drawings	0%	20 days
47	Land Take Maps	0%	15 days
48	**Drawing Office - AGI**	**0%**	**315 days**
49	PFD/ELD/Preliminary Mech + Civil Layout	0%	10 days
50	AGI Planning Drawings	0%	20 days
51	AGI Tender Drawings & MTOs	0%	40 days
52	AGI Construction Drawings and MTOs	0%	20 days
53	**Procurement**	**0%**	**495 days**
54	**Pipeline Materials**	**0%**	**325 days**
55	Confirm Pipe and Bend Quantities	0%	10 days
56	Pipe and Bends: Issue/Tender Period	0%	40 days
57	Pipe and Bends: Technical Evaluation	0%	40 days
58	Pipe and Bends: Commercial BAFO	0%	20 days
59	Pipe and Bends: Commercial Evaluation & Final Scoring	0%	20 days
60	Pipe and Bends: Issue of Notifications ot Award	0%	0 days
61	Pipe and Bends: Standstill Period	0%	14 days
62	Pipe and Bends: PD3 Approval	0%	20 days
63	Pipe and Bends: Maximo Contract Set Up and Approval	0%	10 days
64	Pipe and Bends: Contract Issued	0%	5 days
65	Pipe and Bends Delivery	0%	160 days
66	**AGI Materials**	**0%**	**395 days**
67	PRS/PBU Technical Specification	0%	80 days
68	PRS/PBU Issue Tender	0%	5 days
69	PRS/PBU Tender Period	0%	60 days
70	PRS/PBU Evaluation & Recommendation	0%	30 days
71	PRS/PBU: Commercial BAFO	0%	20 days
72	PRS/PBU: Commercial Evaluation & Final Scoring	0%	20 days
73	PRS/PBU: Issue of Notifications ot Award	0%	0 days
74	PRS/PBU: Standstill Period	0%	14 days
75	PRS/PBU: PD3 Approval	0%	20 days
76	PRS/PBU: Maximo Contract Set Up and Approval	0%	10 days
77	PRS/PBU: Contract Issued	0%	10 days
78	PRS/PBU Final Vendor Drawings	0%	20 days
79	PRS/PBU Manufacture	0%	120 days
80	PRS/PBU: Delivery	0%	20 days
81	**C&I Materials**	**0%**	**175 days**
82	C&I Material Enquiry Issue	0%	15 days
83	C&I Material Evaluation	0%	60 days
84	C&I Material Order	0%	40 days
85	C&I Material Delivery	0%	60 days
86	**Construction Tendering**	**0%**	**410 days**
87	Cons: Prepare PQQ	0%	20 days
88	Cons OJEU Pin Notice	0%	10 days
89	Cons: PQQ Issue/Return	0%	40 days
90	Cons: PQQ Assessment	0%	40 days
91	Cons: Issue/Tender Period	0%	60 days
92	Cons: Technical Evaluation	0%	40 days
93	Cons: Commercial BAFO	0%	20 days
94	Cons: Commercial Evaluation & Final Scori	0%	20 days
95	Cons: Issue of Notifications ot Award	0%	0 days
96	Cons: Standstill Period	0%	14 days
97	Cons: PD3 Approval	0%	10 days
98	Cons: Maximo Contract Set Up and Approv	0%	10 days
99	Cons: Contract Issued	0%	5 days
100	**Land Acquisition**	**0%**	**451 days**
101	Landowner Database Review	0%	100 days
102	Engage Land Valuers	0%	20 days
103	Develop Acquisition Packages	0%	60 days
104	Purchase Options (Subject to Planning)	0%	120 days
105	Finalise Land Acquisition	0%	40 days
106	**Wayleaves**	**0%**	**525 days**
107	Engage Land Valuers	0%	15 days
108	Complete Initial Route Review	0%	20 days
109	Develop Landowner Database	0%	80 days
110	Complete Final Route Review	0%	30 days
111	Wayleave Packages	0%	60 days
112	Wayleave Returns	0%	80 days
113	Wayleave Confirmation	0%	120 days
114	Landowner Notice Of Entry	0%	30 days
115	**Construction**	**0%**	**235 days**
116	Construction Kick Off Meeting	0%	0 days
117	Tx Network Construction	0%	180 days
118	Pipeline Commissioning	0%	20 days
119	**Gas Available (For DSO)**	**0%**	**0 days**
120	DSO Connections	0%	0 days



ID	Task Name	% Complete	Duration
1	**Gas To The West Northern Ireland**	**0%**	**979 days**
2	**Project Management**	**0%**	**590 days**
3	**Project Management**	**0%**	**590 days**
4	NIAUR Project Approval	0%	0 days
5	IAC Gate 1	0%	0 days
6	IAC Gate 2	0%	0 days
7	IAC Gate 3	0%	0 days
8	Planning Pre-Consultation	0%	160 days
9	Planning Submission	0%	5 days
10	Planning Consideration	0%	100 days
11	Planning Approval	0%	20 days
12	Markets and Regulations- TSO Agreements	0%	200 days
13	**Design**	**0%**	**794 days**
14	**Pipeline Design**	**0%**	**300 days**
15	Aerial Survey	0%	50 days
16	Preliminary Route Report	0%	80 days
17	Environmental Impact Assessment	0%	140 days
18	Route Refinement	0%	120 days
19	Material Quantification Report	0%	10 days
20	Site Investigations & Trial Holes	0%	100 days
21	Site Investigation/Report	0%	40 days
22	Detailed Route Report	0%	40 days
23	Environmental Impact Study	0%	60 days
24	**AGI Engineering**	**0%**	**330 days**
25	Preliminary Design Report	0%	30 days
26	Topographic Survey	0%	30 days
27	AGI Civil & Mech Layout	0%	35 days
28	AGI Design Review	0%	15 days
29	AGI Ops Review	0%	0 days
30	AGI Pre-Tender Review	0%	0 days
31	AGI Detail Design with Envirokit	0%	100 days
32	**C&I Design**	**0%**	**235 days**
33	C&I Preliminary Design	0%	40 days
34	C&I Design Review	0%	15 days
35	C&I Detail Design	0%	60 days
36	Cons:C&I Tender Drawings	0%	25 days
37	Cons:C&I Technical Scope of Works	0%	20 days
38	C&I Material Specification	0%	20 days
39	C&I Construction Drawings	0%	10 days
40	**Drawing Office Pipeline**	**0%**	**719 days**
41	Routing/ Planning Drawings	0%	30 days
42	Wayleave Drawings	0%	60 days
43	Planning Drawings	0%	40 days
44	Site Investigations Drawings	0%	30 days
45	Pipeline Tender Drawings	0%	60 days
46	Pipeline Construction Drawings	0%	40 days
47	Land Take Maps	0%	25 days
48	**Drawing Office - AGI**	**0%**	**330 days**
49	PFD/ELD/Preliminary Mech + Civil Layout	0%	10 days
50	AGI Planning Drawings	0%	30 days
51	AGI Tender Drawings & MTOs	0%	40 days
52	AGI Construction Drawings and MTOs	0%	20 days
53	**Procurement**	**0%**	**529 days**
54	**Pipeline Materials**	**0%**	**345 days**
55	Confirm Pipe and Bend Quantities	0%	10 days
56	Pipe and Bends: Issue/Tender Period	0%	40 days
57	Pipe and Bends: Technical Evaluation	0%	60 days
58	Pipe and Bends: Commercial BAFO	0%	20 days
59	Pipe and Bends: Commercial Evaluation & Final Scoring	0%	20 days
60	Pipe and Bends: Issue of Notifications ot Award	0%	0 days
61	Pipe and Bends: Standstill Period	0%	14 days
62	Pipe and Bends: PD3 Approval	0%	20 days
63	Pipe and Bends: Maximo Contract Set Up and Approval	0%	10 days
64	Pipe and Bends: Contract Issued	0%	5 days
65	Pipe and Bends Delivery	0%	160 days
66	**AGI Materials**	**0%**	**405 days**
67	PRS/PBU Technical Specification	0%	80 days
68	PRS/PBU Issue Tender	0%	5 days
69	PRS/PBU Tender Period	0%	60 days
70	PRS/PBU Evaluation & Recommendation	0%	40 days
71	PRS/PBU: Commercial BAFO	0%	20 days
72	PRS/PBU: Commercial Evaluation & Final Scoring	0%	20 days
73	PRS/PBU: Issue of Notifications ot Award	0%	0 days
74	PRS/PBU: Standstill Period	0%	14 days
75	PRS/PBU: PD3 Approval	0%	20 days
76	PRS/PBU: Maximo Contract Set Up and Approval	0%	10 days
77	PRS/PBU: Contract Issued	0%	10 days
78	PRS/PBU Final Vendor Drawings	0%	20 days
79	PRS/PBU Manufacture	0%	120 days
80	PRS/PBU: Delivery	0%	20 days
81	**C&I Materials**	**0%**	**175 days**
82	C&I Material Enquiry Issue	0%	15 days
83	C&I Material Evaluation	0%	60 days
84	C&I Material Order	0%	40 days
85	C&I Material Delivery	0%	60 days
86	**Construction Tendering**	**0%**	**329 days**
87	Cons: Prepare PQQ	0%	40 days
88	Cons OJEU Pin Notice	0%	10 days
89	Cons: PQQ Issue/Return	0%	40 days
90	Cons: PQQ Assessment	0%	40 days
91	Cons: Issue/Tender Period	0%	60 days
92	Cons: Technical Evaluation	0%	60 days
93	Cons: Commercial BAFO	0%	20 days
94	Cons: Commercial Evaluation & Final Scorii	0%	30 days
95	Cons: Issue of Notifications ot Award	0%	0 days
96	Cons: Standstill Period	0%	14 days
97	Cons: PD3 Approval	0%	10 days
98	Cons: Maximo Contract Set Up and Approv	0%	10 days
99	Cons: Contract Issued	0%	5 days
100	**Land Acquisition**	**0%**	**390 days**
101	Landowner Database Review	0%	100 days
102	Engage Land Valuers	0%	20 days
103	Develop Acquisition Packages	0%	60 days
104	Purchase Options (Subject to Planning)	0%	120 days
105	Finalise Land Acquisition	0%	80 days
106	**Wayleaves**	**0%**	**519 days**
107	Engage Land Valuers	0%	15 days
108	Complete Initial Route Review	0%	20 days
109	Develop Landowner Database	0%	80 days
110	Complete Final Route Review	0%	30 days
111	Wayleave Packages	0%	60 days
112	Wayleave Returns	0%	100 days
113	Wayleave Confirmation	0%	120 days
114	Landowner Notice Of Entry	0%	30 days
115	**Construction**	**0%**	**365 days**
116	Construction Kick Off Meeting	0%	0 days
117	AGI Construction	0%	80 days
118	Tx Pipeline Construction	0%	200 days
119	Pipeline Commissioning	0%	20 days
120	**Gas Available (For DSO)**	**0%**	**0 days**
121	DSO Connections	0%	0 days



Pipeline Statistics

Pipeline Length:	44.5 km
Pipeline Diameter:	400mm (16 inch)
Construction Timeline:	Construction to commence in March 2012 Planned completion in October 2012
Pipeline Material:	400mm (16 inch) Steel to EN10208-2
Pipeline Design Pressure:	85 bar G
Numbers Employed:	Approximately 150 during peak construction season
Number of Wayleaves Along Route	140 approximately
Number of Crossings*	52 in Total: 3 national roads or motorway 34 minor roads 3 rail 12 rivers and water courses
Land Reinstatement:	Scheduled for 2012/2013 (this can be dependent on weather conditions)
Organisations Consulted Include:	Kilkenny County Council Wexford County Council Environmental Protection Agency Farming Organisations Waterford and New Ross Ports National Parks & Wildlife Service Heritage Council Inland Fisheries Ireland

** Based on the preferred route corridor*

Further Information

There is a dedicated phone line and e-mail address for queries or comments about the proposed construction works. If the query cannot be answered straight away, then a member of the project team will get back to you as quickly as possible.

Bord Gáis Networks is committed to ensuring all works will be undertaken in a safe and environmentally responsible manner, in co-operation with the local community. Our Community Liaison Team are there to respond to any concerns of the local community.

Phone: **1850 200 694** (9am – 5pm)

Email: greatislandccgt@bge.ie

Post: Community Liaison Officer, Gas to Great Island Project,
Bord Gáis Networks, Gasworks Road, Cork

Website: **www.bordgais.ie/networks/greatisland**

BORD GÁIS NETWORKS

Doc 25724/12010

Gas to **Great Island Power Station**

Project Information

BORD GÁIS NETWORKS

Introduction

The Transmission System Operator, Gaslink, on behalf of Endesa Ireland Ltd., has requested Bord Gáis Networks to design for a new gas supply to the proposed Combined Cycle Gas Turbine (CCGT) Electricity Generating Plant at Great Island, County Wexford. This pipeline will comprise of a 44.5 kilometre spur line from the Cork Dublin Pipeline on the existing gas transmission network in County Kilkenny to a new Above Ground Installation (AGI) at Great Island Power Station in County Wexford with an intermediate AGI located centrally along the route.

The aim of this brochure is to provide our stakeholders with an overview of the project, the expected timeframe, the environment and the construction/reinstatement methodologies.

The Pipeline Routes

The starting point of the proposed natural gas pipeline will be at an existing Bord Gáis Networks facility at Baunlusk approximately 6km south of Kilkenny City. This facility, known as an Above Ground Installation (AGI), is where the pipeline is brought to ground to facilitate operation and maintenance.

Three route corridor options have been identified and assessed. **Figure 1** illustrates the route corridor options considered. Route Corridor B is currently the preferred option and an initial route has been established within the corridor.

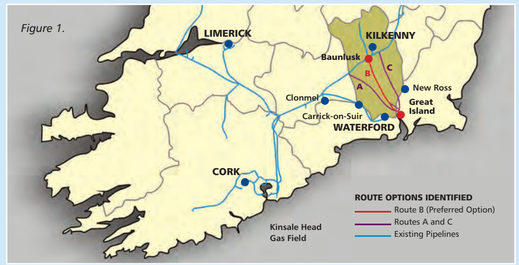
This route will be subject to further investigations and indepth Environmental Appraisal. The preferred route begins at Baunlusk AGI and travels southeast, primarily through agricultural land. It crosses the River Barrow Estuary and then runs southeast to the Great Island Power Station.

Of the three routes considered Route Option B minimises risk to the environment during the construction phase and also represents the lowest risk option in terms of safety during pipeline construction.

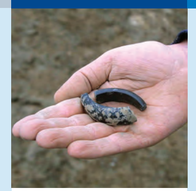
The pipeline will be constructed using 400mm diameter high-grade steel pipe, buried to a minimum depth of 1.2m below ground level.

The main impact of the proposed pipeline will be during the construction phase; however this will be relatively short term. The only above ground development will occur at the three AGI sites. These will be landscaped to blend in with the surrounding environment.

Figure 1.



Consultation and Construction



Community and Environment

Public Consultation

Prior to finalising the routes of any pipeline, Bord Gáis Networks undertakes a public consultation programme with any stakeholders potentially affected by a pipeline project. In this case, stakeholders include individual landowners, agricultural groups, statutory bodies, environmental organisations, heritage groups and others.

Developing and maintaining good relationships are necessary to the success of any Bord Gáis Networks project. Our aim is to be open and transparent in all our communications with the local communities located along the route of a pipeline. We act in a responsible manner and engage with those who may be impacted at each stage of the process so that concerns can be incorporated into our strategy, wherever possible.

Bord Gáis Networks is committed to ensuring all works will be undertaken in a safe and environmentally responsible manner, in co-operation with the local community. We have a dedicated Community Liaison Team who will be able to respond to any concerns of the local community.

Environmental Protection

As with all Bord Gáis Networks pipeline projects, a detailed Environmental Impact Assessment of the construction and maintenance of the pipeline will be carried out by consultants to assess potential impacts of the Great Island project. Any resulting mitigation measures will be implemented as required and every effort will be made to avoid any areas that are of particular environmental interest.

Bord Gáis Networks is fully committed to environmental conservation and the protection of Irish heritage. An environmental engineer will be employed to oversee activities during the construction of the pipeline.

Archaeology

Bord Gáis Networks employs a team of archaeologists as part of all pipeline construction projects. A licensed archaeologist will monitor all topsoil stripping and potential areas of archaeological interest.

Construction Activities

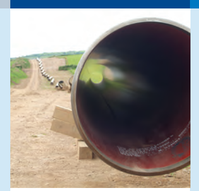
The construction programme for the Gas to Great Island pipeline project is planned to commence in March 2012 and is scheduled for completion in October 2012. It should be noted that at certain locations along the route of the pipeline, the construction programme will be dictated by the need to minimise the environmental impact.

Pipeline construction activities will be carried out by a suitably qualified contractor appointed by Bord Gáis Networks.The latest and least intrusive engineering methods will be used and the pipelines will be built, operated and maintained to the highest national and international safety standards.

In general, the pipeline will be constructed using a 'spread' technique. Prior to the commencement of construction, a surveyor will set out the centreline of the pipeline and stock-proof fencing will be erected on either side of the 36 metre working width.

The removal of hedges, walls and fences at field boundaries will be kept to a minimum and flume pipes will be inserted in drains/ditches to avoid disrupting the water flow. An archaeologist will supervise topsoil stripping, which will be carried out using tracked machines and bulldozers.

Construction and Reinstatement



The linepipe required for the pipeline will be stored at intervals along the route before being strung out along the spread. In order to minimise the amount of excavation required, the pipes will be bent or formed to suit the ground profile. The pipe sections will then be clamped together and welded. Once each weld has been radiographed and meets the specified standards, it will be coated with a polyethylene sleeve. The pipe sections are then lowered into the pre-excavated trench. The trench is then backfilled to subsoil level reusing the excavated material with compaction taking place at set intervals. Before bringing the pipeline into service, the pipe and components are subjected to rigorous testing in the field. Each stage of the construction process is overseen by qualified inspectors to ensure compliance with the engineering plans, codes, permit conditions, landowner agreements, and regulatory requirements. We would also like to emphasise that safety is our priority at all stages of pipeline construction.

The construction process typically involves the following:

Pre-Construction	Construction	Post-Construction
- Environmental Impact Statement (EIS) - On-Farm Site Investigations - Liaising with Landowners - Wayleave Acquisitions - Identification of all stakeholders on the project - Communications in the form of meetings, brochures, public information meetings - Statutory Approvals	- Fencing Off the Working Width - Top-Soil Stripping - Pipe Preparation - Trenching and Backfilling - Road and River Crossings	- Drainage and Reinstatement - Pipeline Safety - Continued Liaison with Landowners and the Community

Reinstatement

Post construction, Bord Gáis Networks will retain a 14 metre wide permanent wayleave along the route of the pipeline. This will be monitored by regular helicopter fly-overs and occasional foot patrols.

All ditch crossings will have a protective slab placed over the pipe. Following completion of the main pipe laying activities, all drains are fully replaced and reinstated. The working width is also fully reinstated, this includes picking stones, levelling the topsoil, spreading, tilling and sowing the topsoil. Once reinstatement is completed there should be little or no evidence to show that the pipeline passed through.

Working with You

The Landowner's Handbook

Your Guide to Natural Gas Pipelines

BGE (Northern Ireland)

Landowner Information

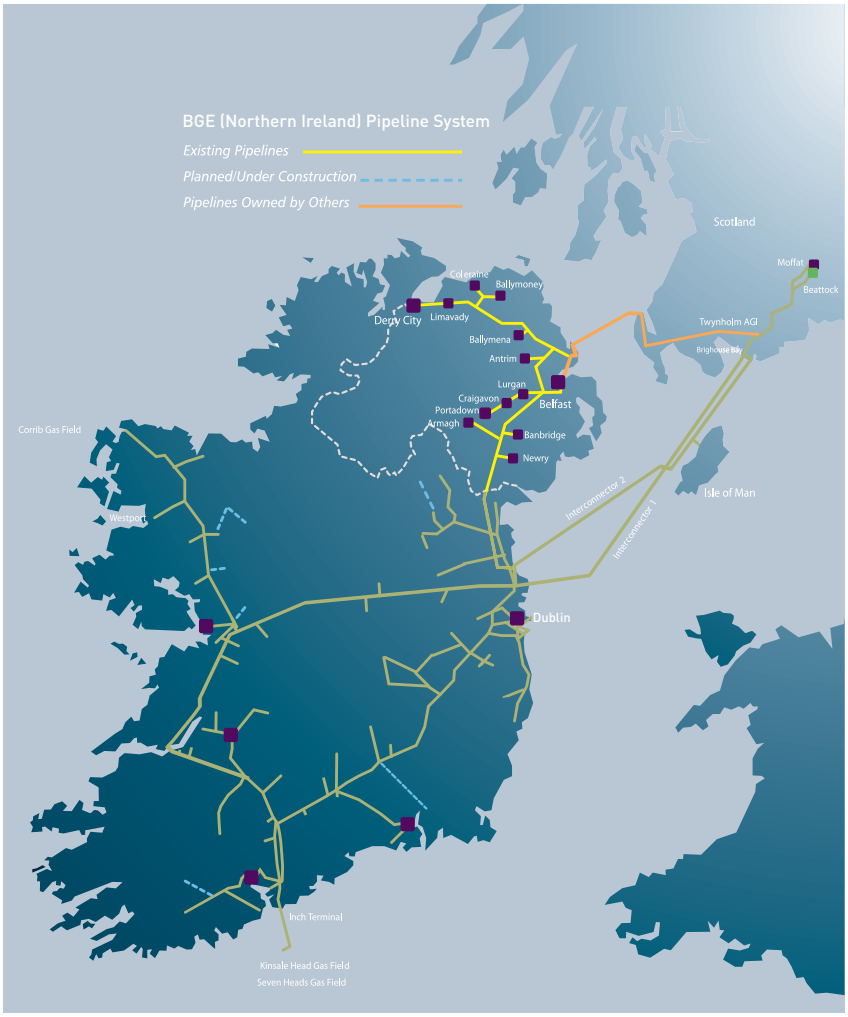
About **BGE (Northern Ireland)**

BGE (Northern Ireland) owns and operates two natural gas pipelines in Northern Ireland. This makes natural gas accessible to many towns throughout Northern Ireland, outside the greater Belfast area, and contributes to the creation of an all-island energy market, connecting the grids, North and South. The natural gas network consists of over 13,403km of gas pipelines, including two sub-sea interconnectors with Scotland, through which Ireland receives over 93% of its gas supplies. BGE (Northern Ireland) develops the natural gas network to the highest international safety standards in line with Health Service Executive (HSE) NI Policy.

Our company values are Empathy, Honesty & Integrity, Safety, Proactive and Performing. Safety is our main priority and we operate in compliance with the highest Irish and International quality and safety standards, providing a safe and dependable service to all our customers and stakeholders. We monitor the natural gas network 24 hours a day, 365 days a year, through Supervisory Control and Data Acquisition systems, including Geographic Information Systems. We also manage a 24 hour emergency response service.

BGE (Northern Ireland) operates a **Dial Before You Dig** service, handling numerous enquiries every year. We are committed to the further development and maintenance of the necessary systems and processes, in order to promote continuous safety improvement and performance. Maintenance and upgrade works to the network may include installing, inspecting, maintaining and upgrading gas pipelines and ancillary equipment above and below ground.

For over thirty years, we have been planning, constructing and maintaining gas pipelines. Honest and transparent engagement and communication with all our stakeholders are critical to the success of our business and in building our reputation and credibility. In line with our values, we have developed positive relationships with landowners, who play an important role in enabling us to provide Ireland's natural gas infrastructure.



Planning Pipeline Routes

Transmission pipelines mostly traverse agricultural lands. Landowners are one of our key stakeholders and early engagement is an essential part of the route selection process.

When the need for new gas transmission infrastructure arises, we undertake detailed routing studies and environmental assessment. We are committed to the preservation of the built and natural heritage on pipeline routes. We also engage with the relevant statutory bodies and interested stakeholders to identify a preferred route, which will minimise environmental impacts. Some of the key considerations we need to determine during the pipeline planning process are:

- Proximity and location of towns and villages
- Future development proposals for the area(s)
- Visual impact (locations of Above Ground Installation sites, (AGIs)
- Unfavourable ground such as rock, bog, etc
- Sites of environmental importance
- Areas of archaeological interest
- Mining, quarrying and landfill sites

We endeavour to act in a responsible and proactive manner on all projects and engage with those who might be impacted, by the pipeline construction and operation, at each stage of the process. We understand the impact our activities have on our stakeholders and communities and seek to manage these impacts responsibly.

Surveys

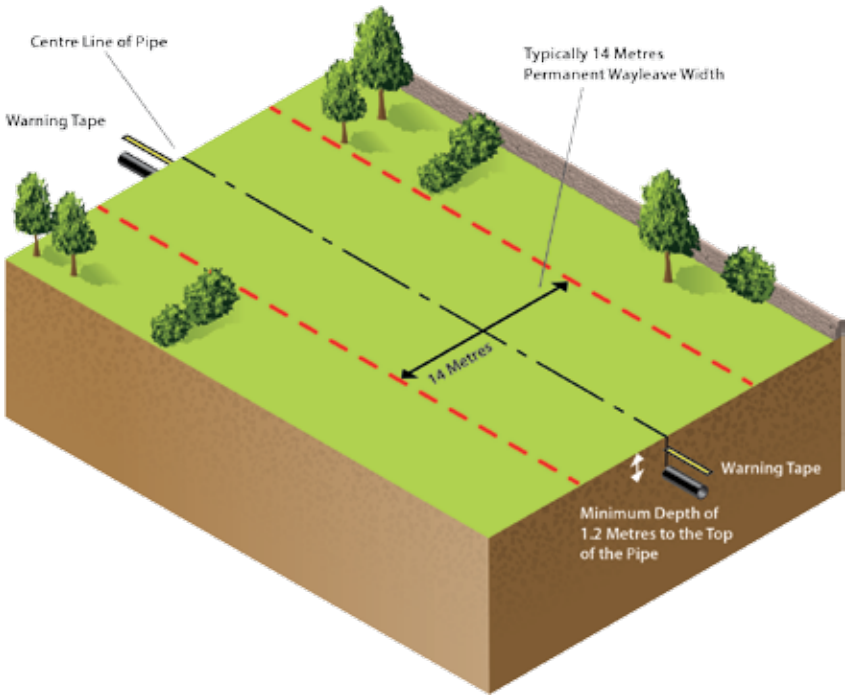
During the routing of a proposed pipeline, the route is topographically surveyed to inform the detailed design. Throughout the planning stages, a variety of surveys, such as bore holes and trial pits, are carried out with prior consent from you or the occupier. Compensation is paid accordingly and we aim to carry out the works with the minimum of disruption and the least possible damage. In the event that damage does occur, as a result of these works, additional compensation will be agreed with you.

Wayleaves, Landowner and **Occupier Agreements**

When constructing a new transmission pipeline, BGE (Northern Ireland) enters into negotiations with the appropriate farming organisations and landowners' representatives. The aim is to agree the pipeline construction method as outlined in the Agricultural Code of Practice and the compensation terms, which will be offered to you, in return for consenting to a wayleave through your lands. Following successful negotiations, we issue a Letter of Offer, consisting of a Consent Form, Wayleave Map showing the proposed pipeline route, Code of Practice, Landowner Tenant Form and Grant of Deed of Easement.

On completion of the pipeline, you will be required to sign a Grant of Deed of Easement, which includes an as-laid map showing the actual position of the pipeline. We will typically retain a 14 metre wide permanent wayleave.

A wayleave is a right enjoyed over the lands of another. In the case of BGE (UK) Ltd., the right being acquired from a landowner is the right to lay a gas pipeline, ducts, cables and any other materials connected with or facilitating the exercise or performance by BGE (UK) Ltd. of any of its functions or powers.



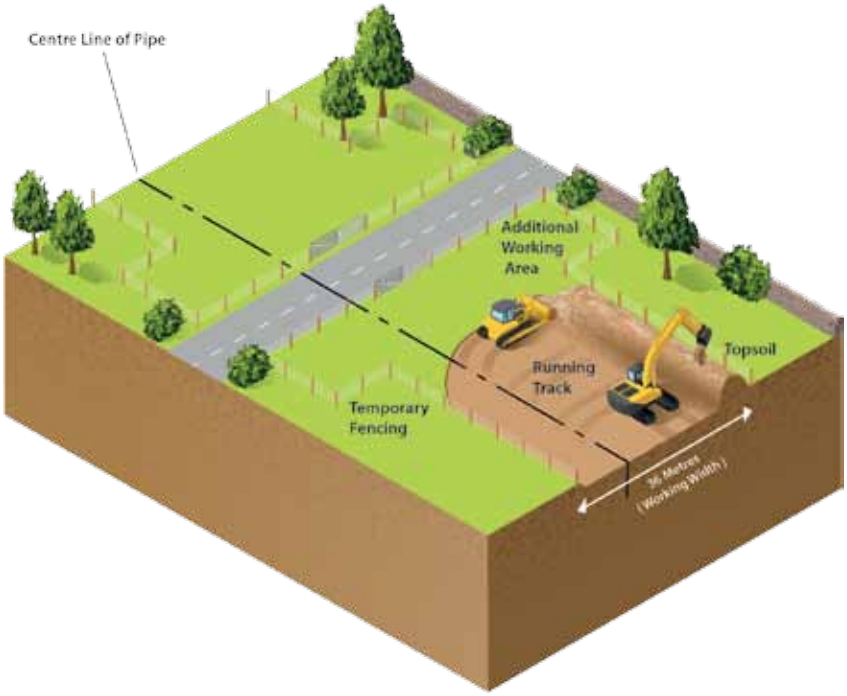
Compensation is paid per linear metre, at a rate agreed with Farming Organisation(s). We also pay advance compensation for Crop Loss and Disturbance. This is payable on the issue of Notice of Entry, which marks the beginning of the construction phase of a project.

Landowners or occupiers, on whose land our equipment is installed, are our key stakeholders. As a grantor, you also have rights under these agreements and we are bound by these. We have a statutory obligation to develop and maintain a safe and efficient pipeline system for the transportation of gas.

We always seek to acquire a right to install our infrastructure on your land through negotiation and by voluntary agreements. Where a voluntary settlement cannot be reached within project time scales, we apply to the Department of Environment, Trade and Investment (DETI) for Necessary Wayleaves. Once a wayleave is acquired, either by Deed or by Necessary Wayleave, it is registered as a burden on the title of the land and affects all successors in title.

The Construction Process Explained

Our Land Agency Contractor, through an Agricultural Liaison Officer (ALO) will complete a "pre-entry" agreement with each landowner, prior to construction commencing. The agreement records the condition of the lands, the type of fencing required, access to the remaining lands outside the working spread, water requirements, etc. The advance compensation for crop loss and disturbance is paid prior to entry to the land.



1. Preparation of the Working Width

The route is surveyed to ensure the pipeline is laid as detailed in the design mapping. Fences are erected at both sides of the working area and field boundaries are cleared to allow access for site vehicles. The type of fencing, is dependent on the particular farming enterprise and our ALO will agree this with you. It is typically put in place a week or two before construction and removed following reinstatement of the land. Many landowners request the option to retain the temporary fencing after construction. This can be agreed, provided you take ownership of the fencing and remove same.

The working area is typically 36 metres, however there can be situations where additional areas are required, such as at road, river or rail crossings and to accommodate more complex construction processes. Where necessary, the working area will incorporate access gates for livestock and boundary gates at road crossings. Water supplies, where affected by the fenced-off area, will be provided outside the spread.

Preparation of the working width.

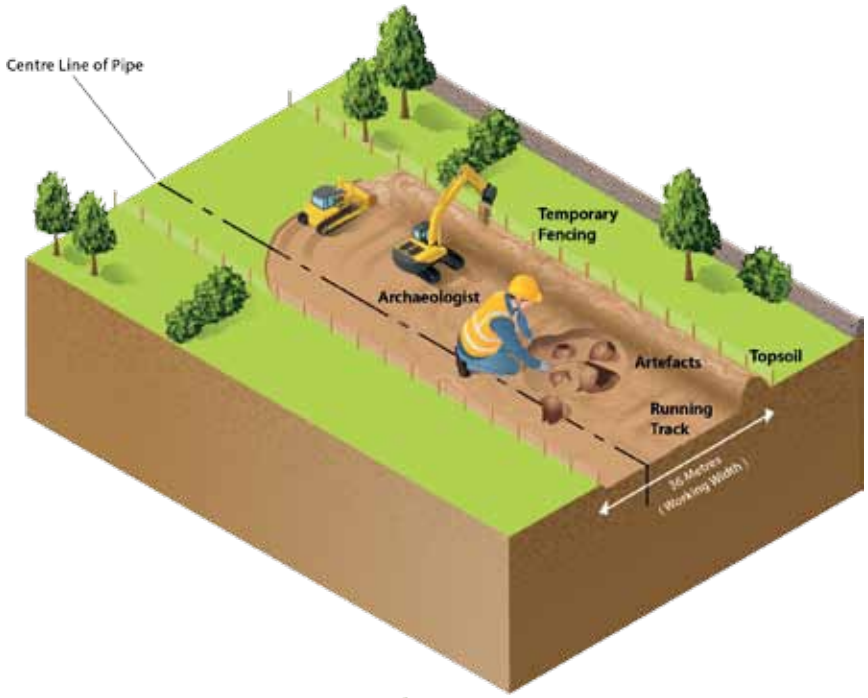
2. Topsoil Stripping

Topsoil is stripped and stockpiled at one side of the working area. The remaining subsoil surface forms the running track for all pipeline construction traffic. Care is taken to ensure that subsoil, excavated at a later stage, does not contaminate the topsoil stockpile.

The Construction Process Explained *continued*

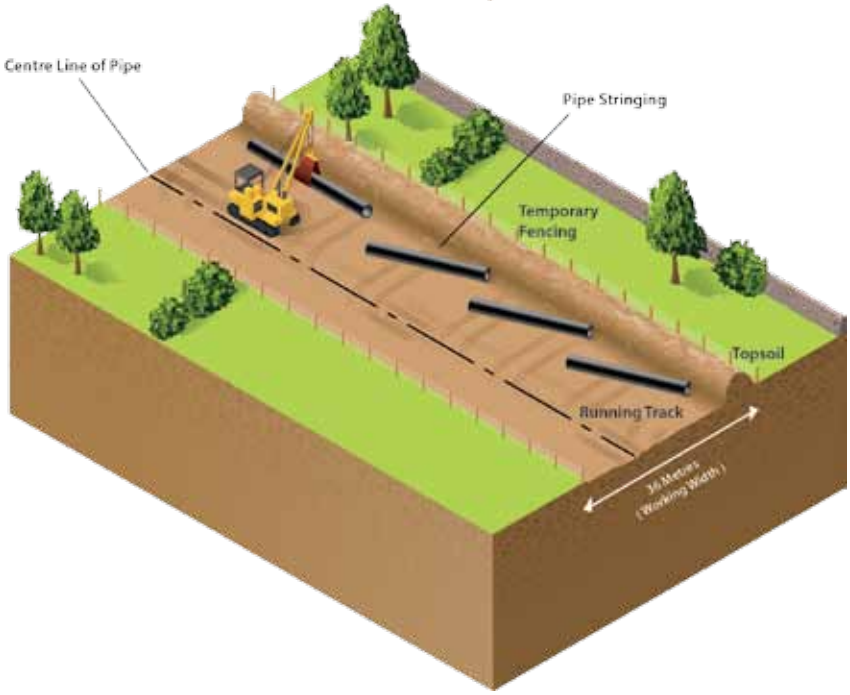
3. Archaeology

The topsoil stripping is monitored by archaeologists. In the case of an archaeological find, detailed examination, recording of data and possible protective measures will be put in place, prior to works continuing in that area. Major finds will be documented and recorded.



4. Pipe Stringing

Individual pipe lengths, with a factory-applied coating, are laid along the route on wooden supports at their approximate final position. The pipe ends are then prepared for the welding process.



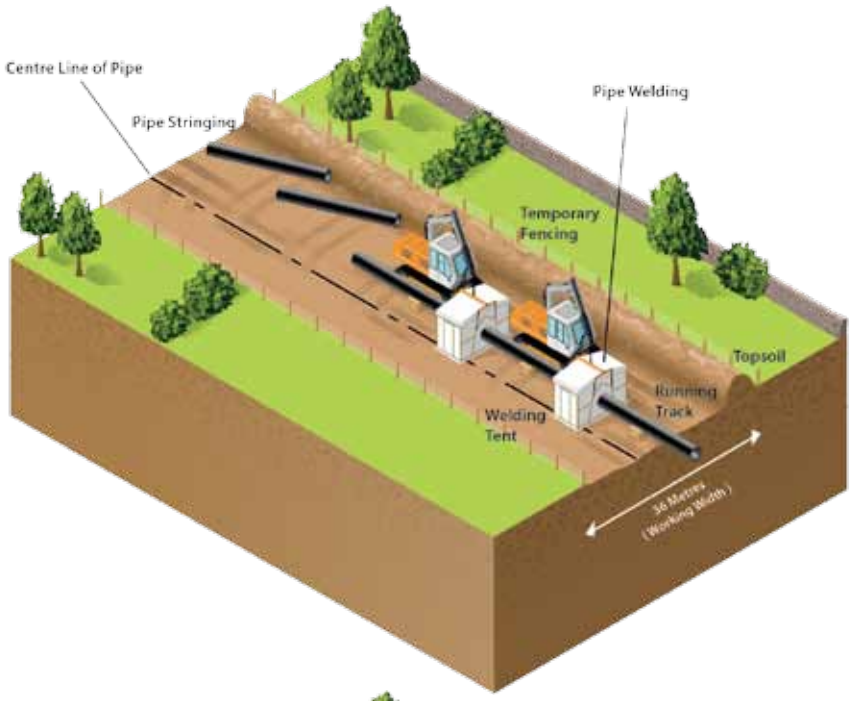
5. Pipe Bending

A pipe bending engineer surveys and assesses the pipeline route. A pipe bending crew, with specialised machinery, will then bend the required pipe lengths in situ. This allows for changes in direction or topography.

Pipe bending.

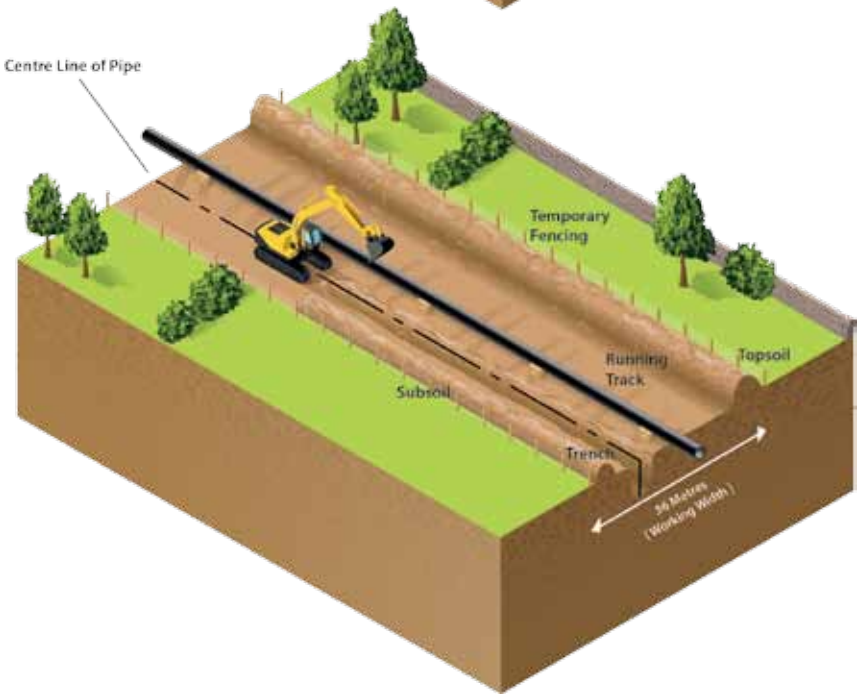
Pipe stringing.

Archaeology.



6. Pipe Welding

Pipe lengths are welded by qualified welders, radiographically tested and coated with a similar wrap to the factory-applied coating. Each weld is examined and tested to ensure the required standard is achieved. Following completion of the welding process, the welded length of pipeline is placed on wooden supports to await trenching and ditching operations.



7. Trenching

Trenching is normally carried out using tracked excavators. Excavated material is stored on one side of the trench and topsoil is stored on the opposite side. This helps to avoid topsoil contamination.

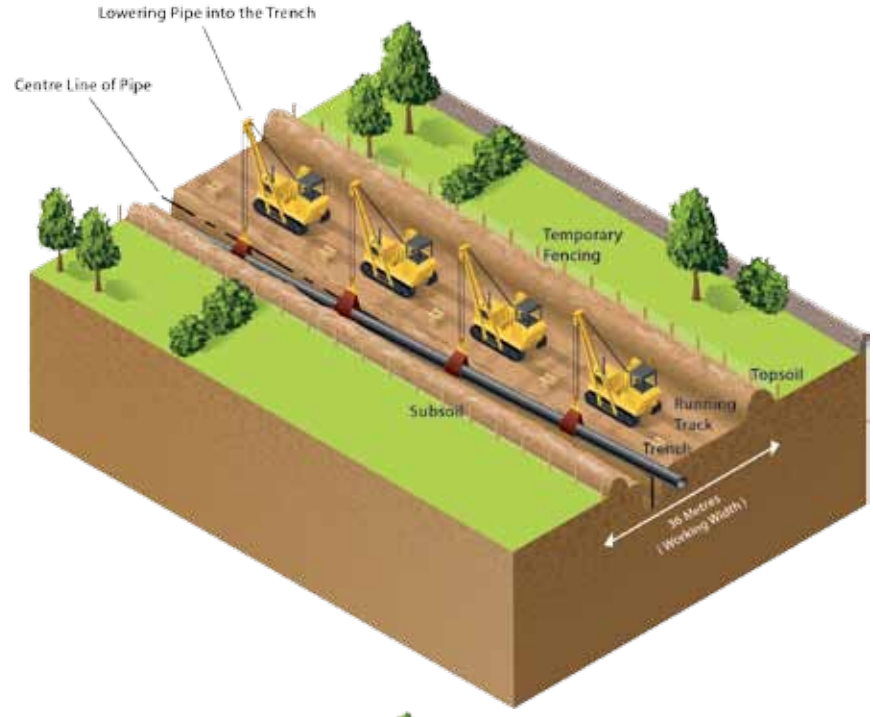
The trench is excavated to a sufficient depth to allow a minimum cover of 1.2m over the top of the pipe or extra cover when required at certain locations. To ensure safe and stable bedding for the pipeline, the trench floor will be examined, in-filled and levelled with sand or gravel, where necessary.

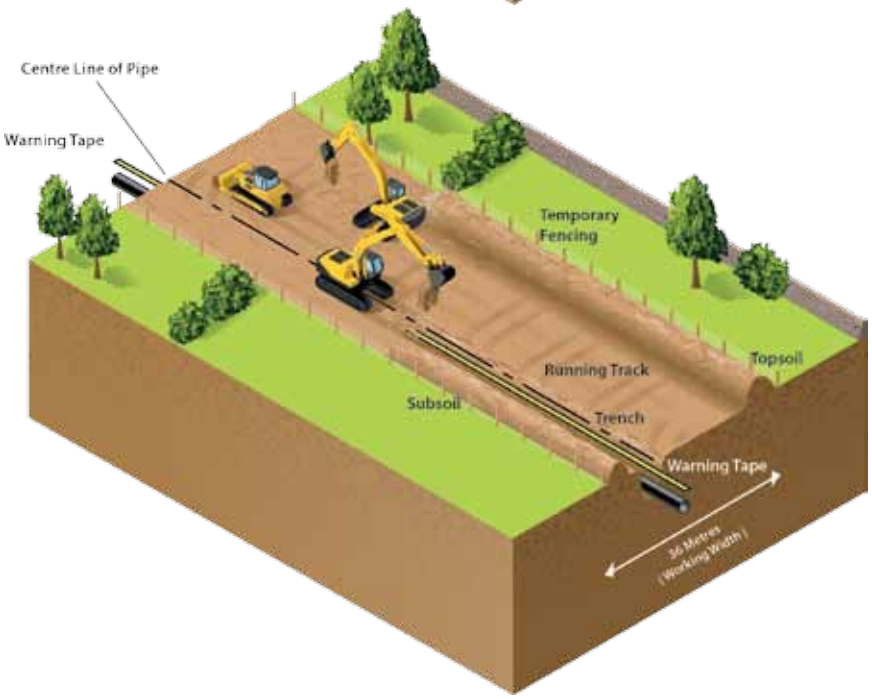
Pipe welding.

Trenching.

8. Pipe Ditching and Backfilling

The welded pipe lengths are lowered into the trench using side boom tractors or excavators. The excavated material is backfilled in layers and compacted to ensure consolidation, similar to that of the adjacent subsoil. Large rocks are removed from the fill material. Where necessary, field drains are installed or reinstated across the pipe trench. As a safety provision, warning tape is positioned within the backfill material.





Pipe ditching.

Pipe ditching.

Backfilling.

9. Reinstatement

Following completion of the pipeline, pre-identified land drains are reinstated. The working width is also fully reinstated by way of topsoil spreading, levelling, tilling and sowing of grass seed.

Other reinstatement activities include subsoil ripping/grading, topsoil reinstatement, removal of spread fences and replacement of field boundaries. Marker posts are placed at various field boundaries to facilitate our monitoring of the pipeline by both regular walkover and flight surveys.

Reinstatement of the land may not necessarily be completed in the same season as the pipeline construction; some activities such as reseeding and replanting are seasonal and may require suitable weather conditions.

Before reinstatement.

After reinstatement.

10. Testing and Commissioning

Following completion of the pipeline, a specialised contractor will carry out a water pressure test on the pipeline. Upon satisfactory completion of the tests, the pipeline is emptied and dried. The clean, dry pipeline will typically be commissioned by purging air from the pipeline using nitrogen and then natural gas is introduced. The pressure is gradually increased to full operating pressure.

Testing and commissioning.

Testing and commissioning.

Post Construction, Operations and **Maintenance**

Once reinstatement is completed, there should be little or no evidence to show that the pipeline has passed through your land. We will retain a standard 14 metre wide permanent wayleave which will be monitored by our regular helicopter patrol surveys and occasional foot patrols.

Aerial marker posts are used to indicate the presence of a natural gas pipeline. These posts are installed over ground at ditches, road crossings and land boundaries, to increase awareness of the pipeline and to assist our helicopter patrol surveys.

Aerial marker posts.

Working on Your **Land**

In order to continue to develop, operate and maintain a safe and efficient gas network, it may be necessary to enter onto your land from time to time, to construct, replace, inspect, maintain, repair or remove infrastructure.

These activities are unlikely to cause undue disruption, however, should remedial work be required, the land will be fully reinstated. These inspections and activities will be arranged with you, prior to entry onto the land. Before any construction work commences, we will prepare a Land Condition report of the condition of any affected land for agreement with you or the occupier of the land.

When carrying out any of these activities, we will ensure:

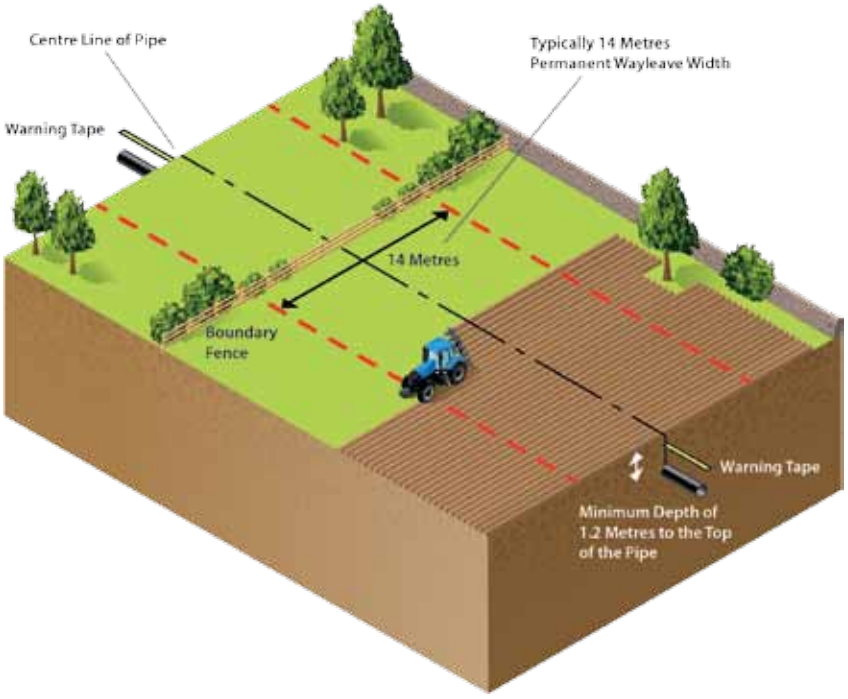
- Wherever possible, to give at least 7 days notice – except in the case of an emergency. For more extensive works, we will give an extended period of notice.
- Where practicable you will be consulted prior to the work, as to the preferred route used to access the land.
- Wherever possible to schedule works to suit your requirements and we will keep you informed of the programme of works.
- The working area will be suitably fenced off.
- That throughout the works and on completion, gates will be closed and locked – as required.
- To comply with any regulations which may be necessary to prevent the spread of animal or plant disease.
- To take all reasonable measures to prevent damage to land, buildings, fencing, stock, crops and the environment.
- Any damage we cause to land, drainage, walls, fences, hedges or gardens will be reinstated in a manner agreed or failing this, we will pay reasonable compensation.
- To take all reasonable precautions to protect fishing and sporting interests.
- Precautions will be taken to avoid pollution or obstruction of watercourses and existing services and water supplies will be reinstated, as required.
- Any injury and disruption to existing land drainage is minimised.
- Where excavation works are required, topsoil and subsoil will be stored separately, and on completion of works, reinstated correctly.
- Working areas will be kept tidy and cleared on completion of works.
- Boundary walls, fences or hedges are not removed to facilitate access, without prior consultation.

When works on your land are required, we advise landowners and occupiers not to alter their planned cropping programmes or farming activities without first speaking to our Agricultural Liaison Team. For any of our works undertaken on the land, landowners and occupiers will be indemnified under the terms of the Grant of Deed of Easement.

All works shall be executed under the supervision of our Land Agency Contractor's ALOs, acting on behalf of BGE (Northern Ireland). The ALOs will supervise the execution of the works and maintain contact with you or the occupier. We will accept responsibility for all of the actions of our agents and of all persons employed by us in connection with the works, except actions carried out expressly at your request or that of the occupier of the land, where you have not informed us or our agent.

Safety

Safety is the main priority of BGE (Northern Ireland) and is one of our core values. We operate and maintain the pipeline network in accordance with the highest international safety standards. We acknowledge and appreciate the invaluable contribution our landowners make in helping maintain an excellent safety record. The safety advice in this section may help prevent a serious accident or incident.

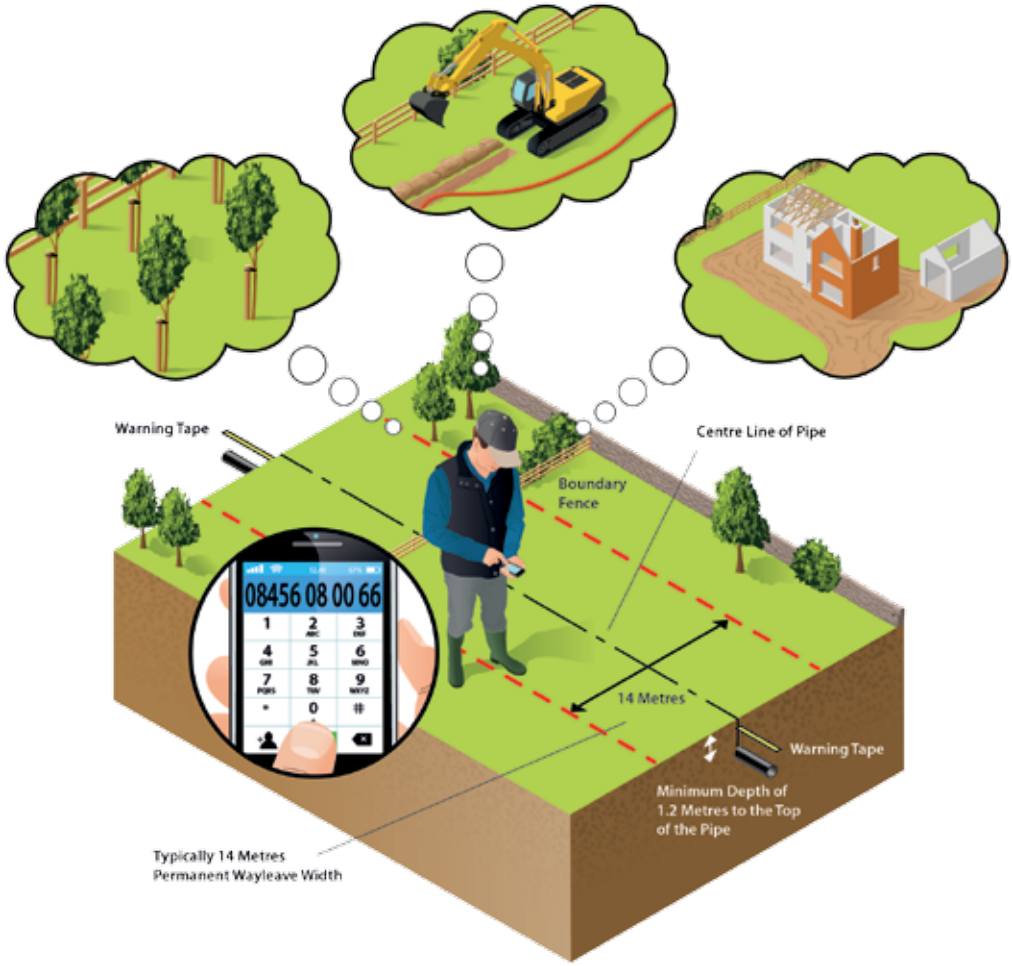


Advice and Information for Working in Proximity to Transmission Pipelines

- The steel pipeline is protected with a coating and even minor damage to this coating can have an impact on pipeline safety.
- The depth of the pipeline can vary, however the top of the pipeline is generally not more than 1.2 metres below ground level.
- Do not assume that the route of the pipeline follows a straight line within a field, it may deviate between pipeline marker posts.
- If you are planning on carrying out any excavation on your land please call our **Dial Before You Dig** service on **08456 08 00 66** to get a drawing of the pipeline location in your land before you break ground.
- You will need a **BGE (Northern Ireland) Excavation Permit** if you are planning to carry out any excavation within the BGE (Northern Ireland) wayleave (normally, but not always, extending 7 metres either side of the centre line of the pipeline). The permit contains a brief description of the proposed work and any conditions that may apply. The excavation work will need to be supervised by BGE (Northern Ireland) and this supervision is ***free of charge***.
- Our objective is to ensure that your proposed work is completed as quickly and safely as possible within the terms of the Grant of Deed of Easement.

Generally, normal agricultural activities will not affect the integrity of the pipeline. However, please contact our **Dial Before You Dig** service on **08456 08 00 66**, prior to undertaking any work within the wayleave which involves the use of tracked or wheeled excavators, irrespective of depth, or mechanical soil penetrating machines such as fence post augers.

For Whatever You're Planning . . . **Dial Before You Dig**



Before Works

- If you are unsure whether there is a gas pipeline in the vicinity of the proposed works please contact the **Dial Before You Dig** service on **08456 08 00 66**. Please provide your name, address, telephone number and the town land name of your land.
- If necessary, we will arrange to mark out the pipeline location on site prior to work commencing. This service is provided free of charge.
- We would appreciate as much notice as possible of proposed excavations within the wayleave, five working days if possible but two days notice at the very minimum.

During Works

- Please do not commence any excavations in the vicinity of the pipeline until a BGE (Northern Ireland) supervisor has arrived on site and you have signed the Excavation Permit.
- Please comply with all instructions from the BGE (Northern Ireland) supervisor.

After Works

- We will be present during the backfilling process and until all works are completed.

DIAL BEFORE YOU DIG
08456 08 00 66
BGE (Northern Ireland)

Cleaning Ditches, Installing Drains or Services and **Constructing Fences**

Cleaning or deepening ditches, works to land drains or constructing fences with a fence post auger can damage the pipeline.

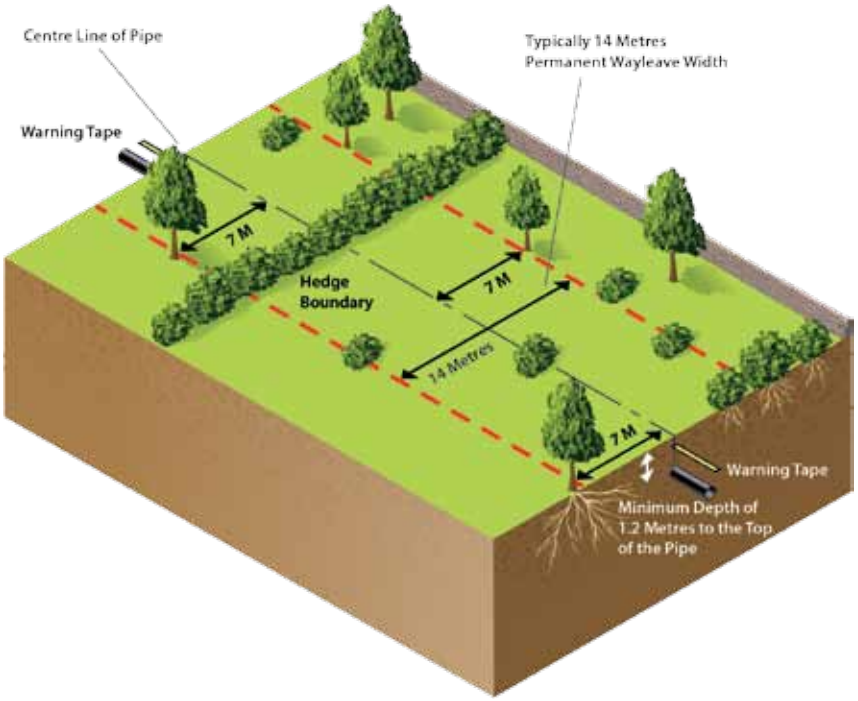
Once again, prior to undertaking these activities, we request that you inform BGE (Northern Ireland) and seek advice from our **Dial Before You Dig** service on **08456 08 00 66**.

Planting Near Gas Pipelines

The planting of trees such as poplar and willow are not allowed within 7 metres of the centreline of the pipeline. Other trees such as ash, beech, horse chestnut, sycamore, etc. are not permitted within 6 metres of the centreline of the pipeline. The planting of shrubs or hedges is allowed within the wayleave but must not exceed a height of 4 metres.

For detailed information on species permitted over the pipeline, please contact BGE (Northern Ireland).

Prior to tree planting or removal of existing trees in the vicinity of the pipeline, we would again request that you contact us on **Dial Before You Dig 08456 08 00 66.**



In the Event of Damage to a Gas Pipeline

In the event of damage to a gas pipeline, cease work immediately and follow these safety measures:

- Do not turn any electrical switches on or off (e.g. ignition switches).
- Do not operate any plant machinery or equipment.
- Move people away from and upwind of the affected area.
- Restrict employee and public access to the affected area.
- Prevent smoking, the use of naked flames, the use of mobile phones and other ignition sources.
- Report the leak/damage immediately to our **24 hour emergency service** on **0800 002 001**.
- Provide accurate information on your location and the nature of the incident.
- Do not attempt to repair the damage.
- Do not cover up a pipeline. This may lead to gas travelling through ducts, sewers, chambers or voids and potentially building up inside a premises or confined space.
- Do not turn off any gas valves in the road or footpath (you may be causing further problems by doing so).
- Assist the BGE (Northern Ireland) emergency personnel as required to safeguard life and property.

It is critical that any damage to gas pipelines are reported to BGE (Northern Ireland), even if the pipe does not appear to be leaking.

For further advice visit www.bordgaisnetworks.ie/dial to download our safety booklet *"Safety Advice for working in the vicinity of Natural Gas Pipes"* or contact the HSE NI on 0800 0320 121.

Further Information and Contacts

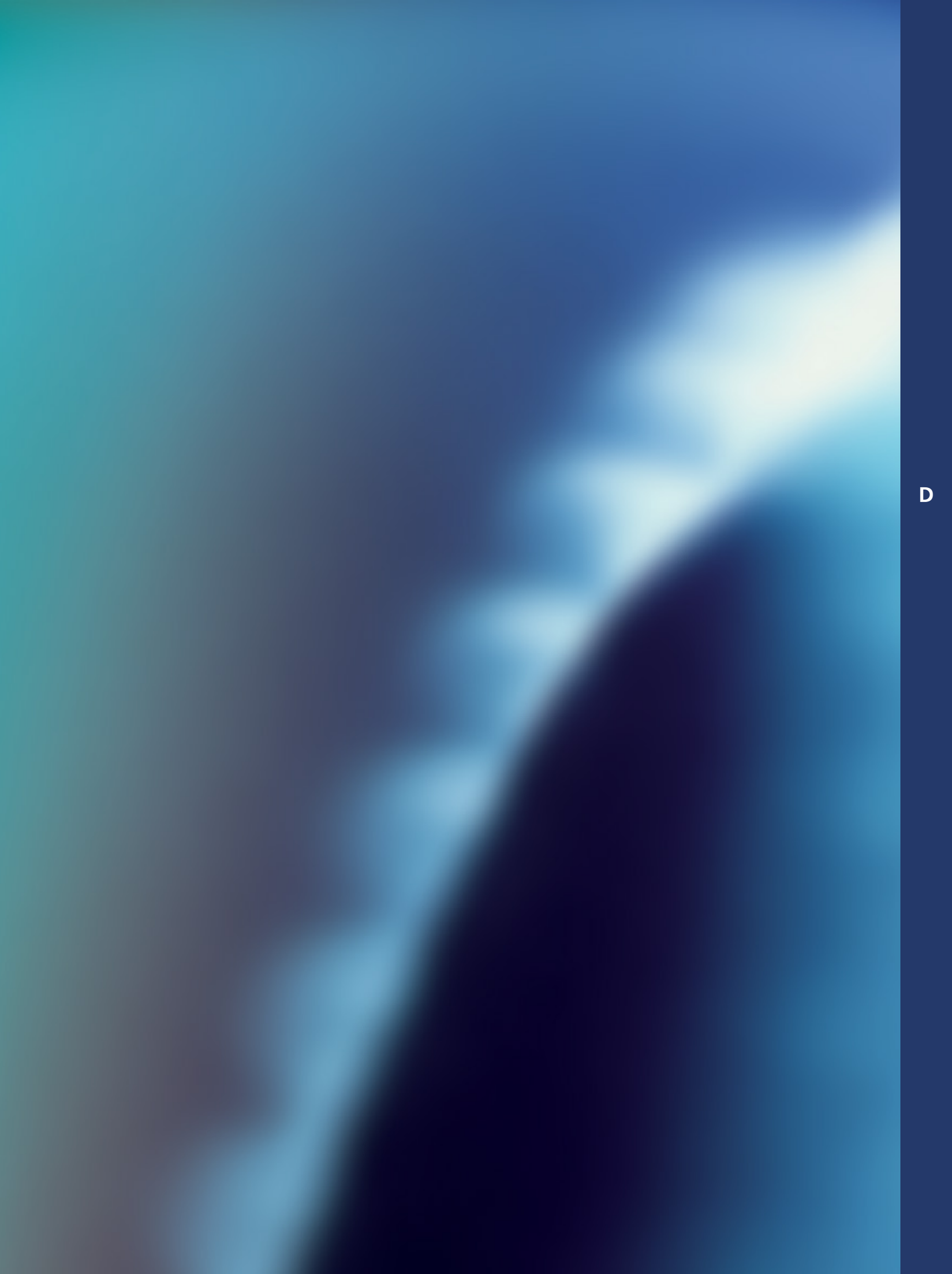
Dial Before You Dig:	**08456 08 00 66**
Network Maps/Design Aids for Construction Industry	**08456 08 00 66**
24 Hour Emergency Service	**0800 002 001**
General Enquiries	**0044 28 944 66 453**

For further information please see our website:
www.bordgaisnetworks.ie

100%

BGE (Northern Ireland)

32448/11/2012



1. Preparation of the Working Width

This involves surveying the route to ensure the pipeline is laid as detailed in the design mapping.

As the route is surveyed, spread fences will be erected at both sides of the working area. (The type of fencing will be agreed with each landowner). Field boundaries will be cleared to allow for site vehicular access.

Where necessary, the working area will incorporate temporary water supplies, temporary electricity services, access gates for livestock and boundary gates at road crossings.

BORD GÁIS NETWORKS

2. Top Soil Stripping

Topsoil will be stripped, typically to a depth of 150mm, and stockpiled at one side of the working area. The remaining subsoil surface will form the running track for all pipeline traffic. Care will be taken to ensure that subsoil excavated at a later stage does not contaminate the topsoil stockpile.

BORD GÁIS NETWORKS

3. Archaeology

The topsoil stripping will be monitored by archaeologists. In the case of an archaeological find, detailed examination, recording of data and possible protective measures will be put in place prior to works continuing in that area. Major finds will be documented and recorded.

BORD GÁIS NETWORKS

4. Pipe Stringing

Individual pipe lengths, with a factory-applied coating, will be laid along the spread on wooden supports, at their approximate final position. The pipe ends are then prepared for the welding process.

BORD GÁIS NETWORKS

5. Pipe Bending

A pipe bending engineer will survey and assess the pipe route. A pipe bending crew, with specialised machinery, will then cold bend the required pipe lengths in situ. This allows for changes in direction or topography.

BORD GÁIS NETWORKS

6. Trenching

Trenching may be carried out using tracked excavators. Excavated material will be stored on one side of the trench adjacent to the running track and topsoil will be stored on the opposite side of the trench. This will help to avoid topsoil contamination.

The trench will be excavated to a sufficient depth to allow a minimum cover of 1200mm over the top of the pipe or extra cover when required at special locations. To ensure safe and stable bedding for the pipeline, the trench floor will be examined for rocks and levelled with sand or gravel, where necessary.

BORD GÁIS NETWORKS

7. Pipe Welding

Pipe lengths will be welded by suitably qualified welders, radiographically tested and coated with a similar wrap to the factory-applied coating. Each weld is examined and assessed to ensure the required standard is achieved.

Following completion of the welding process, the pipe is set in “strings” on wooden supports to await trenching and ditching operations.

BORD GÁIS NETWORKS

8. Pipe Ditching and Backfilling

The pipe “strings” will be lowered into the trench using side boom tractors or excavators. The excavated material will be backfilled in layers and compacted to ensure consolidation, similar to that of the adjacent subsoil. Large rocks will be removed from the fill material.

Where necessary, field drains will be installed or reinstated across the pipe trench. As a safety provision, warning tape is positioned within the backfill material.

BORD GÁIS NETWORKS

9. Special Fabrications or Crossings

Minor crossings will typically be carried out by the open cut or trenched method. Where conditions dictate that the standard technique may not be used, such as road, river and rail crossings, a trenchless installation technique is used. A typical trenchless technique involves excavating pits at either side of the relevant crossing and boring the pipe underneath.

BORD GÁIS NETWORKS

10. Reinstatement

Reinstatement activities include land drainage, subsoil ripping/ grading, topsoil reinstatement, removal of spread fences and replacement of field boundaries. Marker posts will be placed at various field boundaries to facilitate monitoring of the pipeline by both walkover and flight surveys.

Reinstatement of the land may not necessarily be completed in the same season as the main construction contract, as some activities such as reseeding and replanting are seasonal and may require continuous dry weather.

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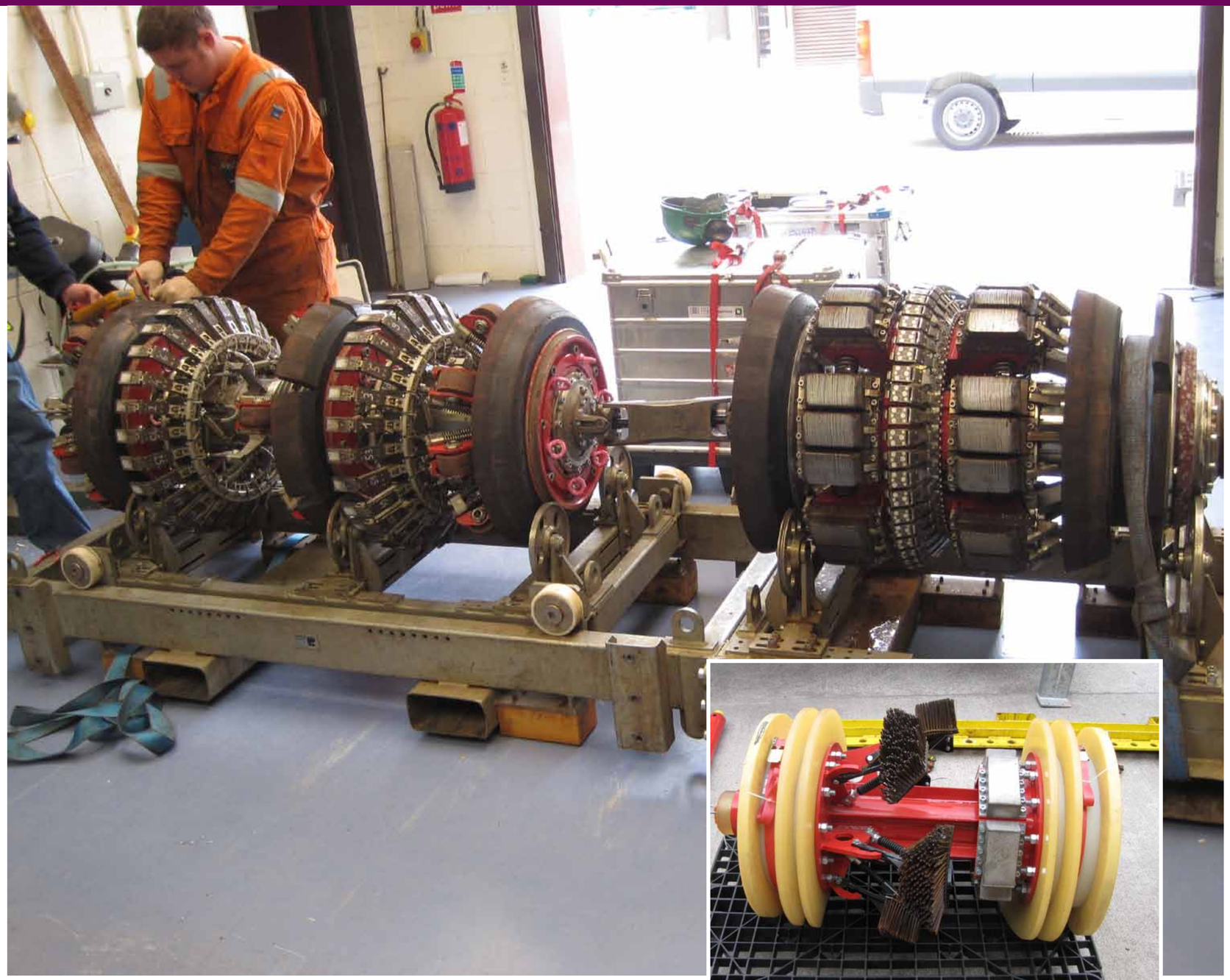
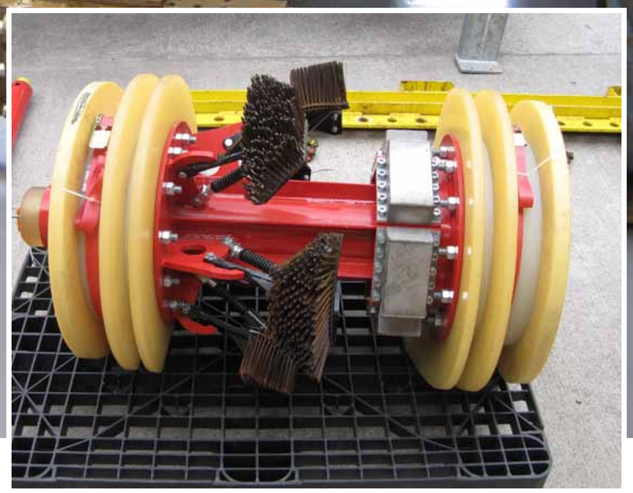
11. Testing and Commissioning

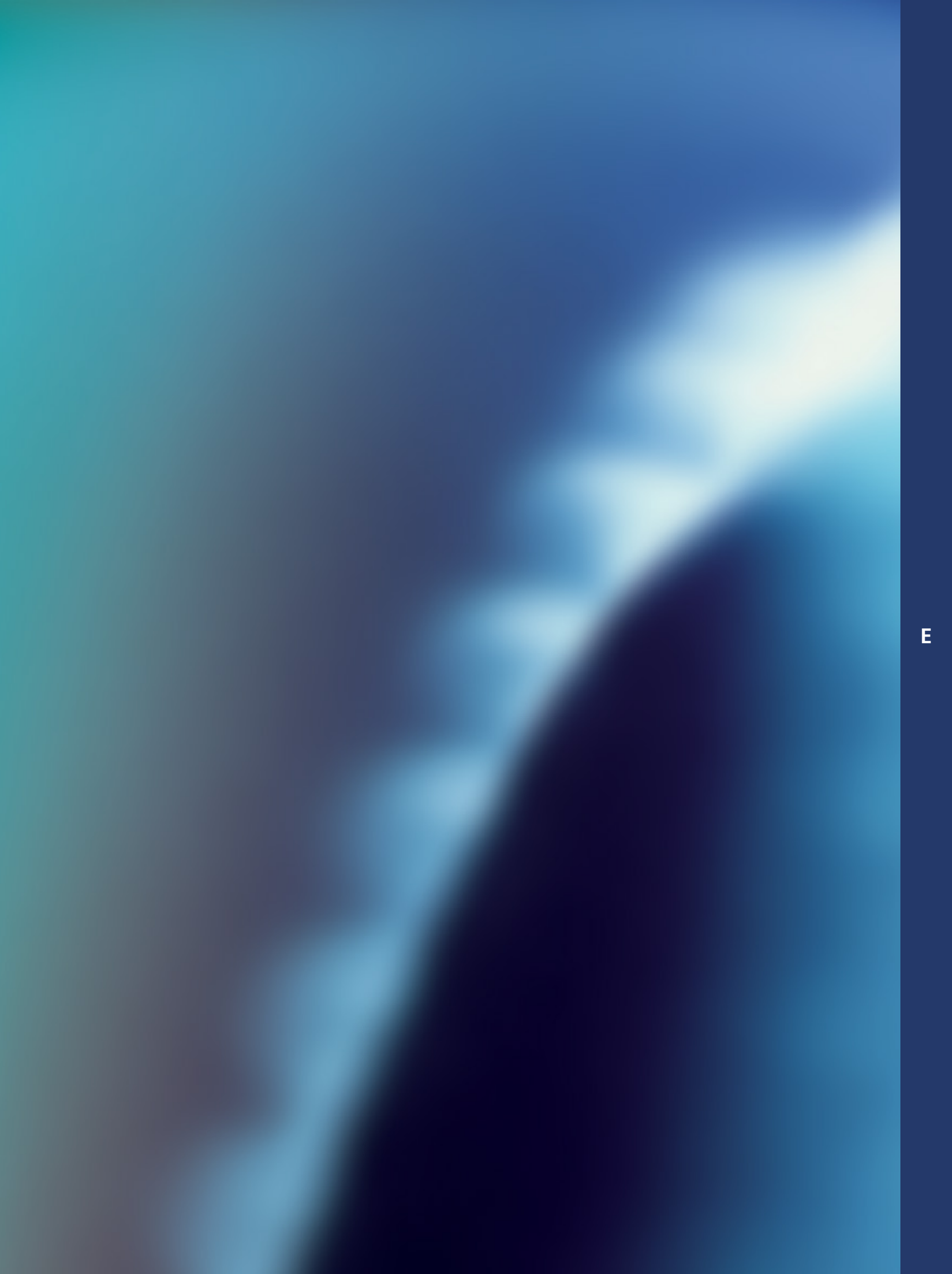




Following mechanical completion, a specialised contractor will carry out a hydrostatic pressure test on either the entire pipeline or subdivided sections.

Upon satisfactory completion of the hydrostatic test, the pipeline is emptied and dried. The clean dry pipeline will typically be commissioned by purging air from the line using nitrogen and then introducing natural gas. The pressure is gradually increased to full working pressure.

BORD GÁIS NETWORKS



All dimensions in metres unless otherwise stated

High pressure transmission pipelines are shown in red.
The position of the transmission pipeline system shown on this plan is believed to be correct but the board accepts no responsibility in the event of inaccuracy.
Service pipes are not shown. The true position of transmission pipelines must be verified on site by a BGN representative. No work should be carried out within 3m either side of a transmission pipeline in a public roadway, or within 7m either side of a transmission pipeline in all other locations, without the prior consent of BGN.
BGN Transmission Department can be contacted at 021 - 4534562.

NORTH-WEST PIPELINE

SOUTH-NORTH PIPELINE

STRABANE

MAGHERAFELT

COOKSTOWN

OMAGH

DUNGANNON

PORTADOWN

ENNISKILLEN

DERRYLIN

LEGEND:

- POTENTIAL ROUTES
- POTENTIAL 4 BAR FEEDER MAIN
- EXISTING PIPELINES

PORTADOWN - DUNGANNON	=	28km
DUNGANNON - COOKSTOWN	=	17km
COOKSTOWN - MAGHERAFELT	=	8km
DUNGANNON - OMAGH	=	38km
OMAGH - ENNISKILLEN	=	35km
ENNISKILLEN - DERRYLIN	=	23km
NORTH WEST PIPELINE - STRABANE	=	28km
TOTAL	=	177km

- AGI
- TOWN CONNECTION

0 10 20 km

Transmission Operations.
P.O. Box 51, Gasworks Road, CORK

BORD GÁIS NETWORKS

GAS TRANSMISSION NETWORK INFORMATION

Issue:	OPTION 1 (FINGLETON-MCADAM DESIGN)		
Location:	GAS TO WEST NI		
Plot Date:	01/05/2014	Contact:	ROC
Plotted by:	TK	Scale:	1:250000

All dimensions in metres unless otherwise stated

High pressure transmission pipelines are shown in red.
The position of the transmission pipeline system shown on this plan is believed to be correct but the board accepts no responsibility in the event of inaccuracy.
Service pipes are not shown. The true position of transmission pipelines must be verified on site by a BGN representative. No work should be carried out within 3m either side of a transmission pipeline in a public roadway, or within 7m either side of a transmission pipeline in all other locations, without the prior consent of BGN.
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NORTH-WEST PIPELINE

SOUTH-NORTH PIPELINE

MAGHERAFELT

COOKSTOWN

DUNGANNON

GARVAGHY

OMAGH

STRABANE

ENNISKILLEN

DERRYLIN

DERRYHALE

LEGEND:

- POTENTIAL ROUTES
- POTENTIAL 4 BAR FEEDER MAIN
- EXISTING PIPELINES

DERRYHALE - DUNGANNON	=	28km
DUNGANNON - COOKSTOWN	=	17km
COOKSTOWN - MAGHERAFELT	=	8km
COOKSTOWN - OMAGH	=	46km
OMAGH - GARVAGHY	=	15km
DUNGANNON - GARVAGHY	=	26km
GARVAGHY - ENNISKILLEN	=	35km
ENNISKILLEN - DERRYLIN	=	23km
NORTH WEST PIPELINE - STRABANE	=	28km
TOTAL	=	226km

- AGI
- TOWN CONNECTION

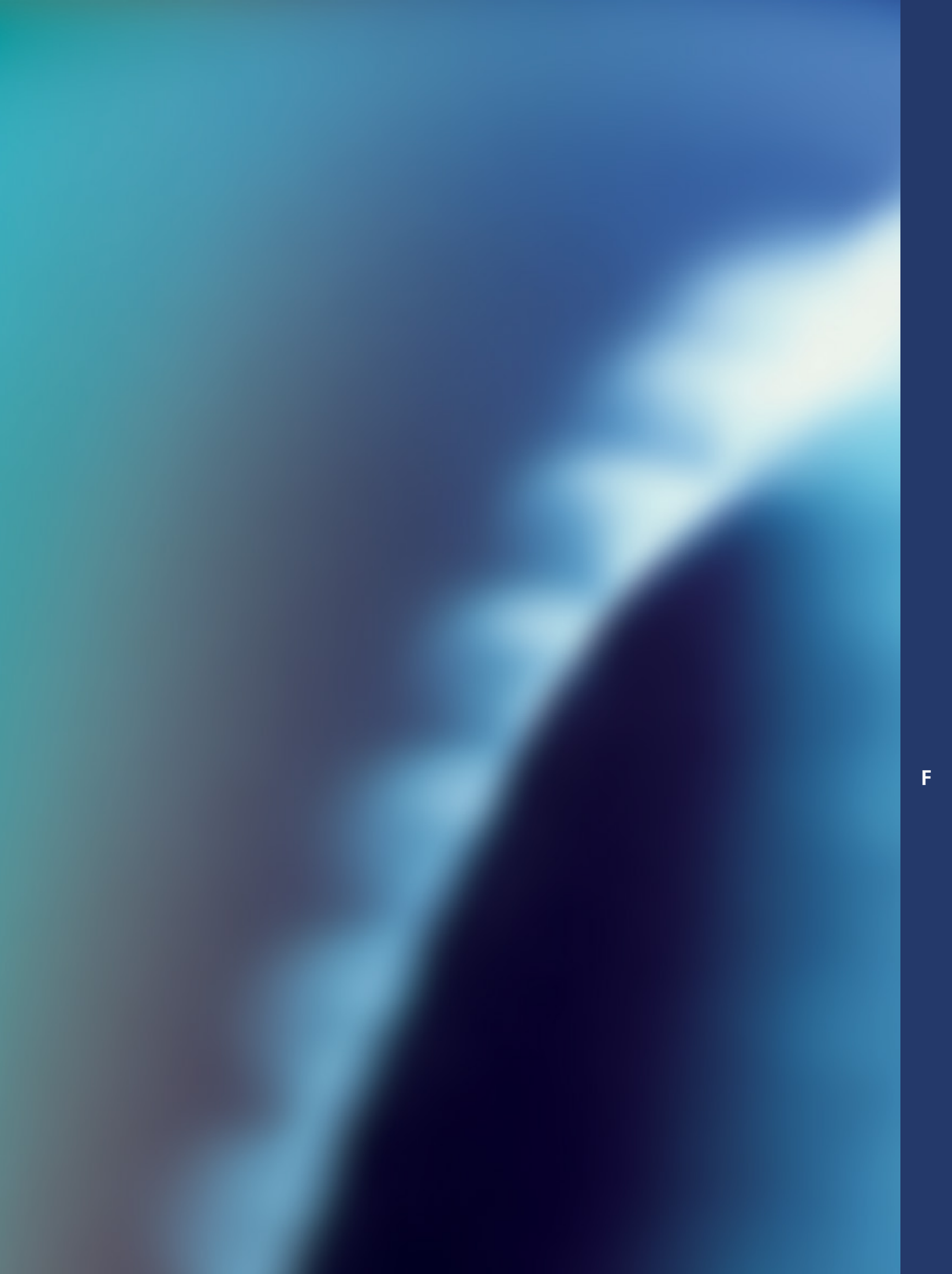
0 10 20 km

Transmission Operations.
P.0. Box 51, Gasworks Road, CORK

BORD GÁIS NETWORKS

GAS TRANSMISSION NETWORK INFORMATION

Issue:	OPT 2 (BGE UK POSSIBLE OPTIMISATION)		
Location:	GAS TO WEST NI		
Plot Date:	01/05/2014	Contact:	ROC
Plotted by:	TK	Scale:	1:250000



End to End Contract Process