

Dial Before You Dig
028 9055 5819



Foreword

This booklet has been prepared and issued by Phoenix Natural Gas Ltd (PNGL) to assist those involved in excavation works in the vicinity of underground gas mains, services and other plant and provides key information relating to the gas network and advice on the necessary safeguards required in the prevention of damage and avoidance of accidents.

It is intended that this booklet be available to all utilities, contractors, builders and developers alike responsible for the management, planning, supervision and undertaking of excavation works.

Please note that this booklet does not substitute the guidance contained within the Health and Safety Executive document HSG47 entitled 'Avoiding Danger From Underground Services' and therefore should be used in conjunction with it.

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1. Introduction

This document has been produced in recognition of the high level of risk associated with damage to the Phoenix Natural Gas Limited [PNGL] network that could result in fatal or severe injuries to operatives, others present or the general public through fire, explosion or asphyxiation.

The purpose of this publication is to increase awareness of the dangers of working in close proximity to gas pipes when adequate precautions are not taken and to promote safe digging practices.

Where high potential / dangerous occurrences are witnessed, or where gas released exceeds 500kg, PNGL have a legal obligation to notify Health and Safety Executive NI (HSENI).

Note: It is our policy at Phoenix Natural Gas to always charge for damages caused to our apparatus.



2. Natural Gas in Northern Ireland

The PNGL distribution network is supplied via the Scotland to Northern Ireland pipeline (SNIP) and the Belfast Transmission pipeline (BTP) which are owned and operated by Mutual Energy, and the South-North pipeline owned and operated by Gas Networks Ireland (GNI) UK.

2.1 Natural gas transmission

Natural gas transmission pipelines are steel pipelines which operate at pressures ranging from 7bar to 75bar. They are generally routed cross country with marker posts indicating their presence where the pipeline crosses public highways.

There are four natural gas transmission pipelines in Northern Ireland.

- The Belfast Gas Transmission Pipeline – Operated by Mutual Energy
- The North West Pipeline – Operated by GNI (UK)
- The South North Pipeline – operated by GNI (UK)
- Also shown the Gas to the West pipeline operated by Mutual Energy.



2.2 Natural gas distribution

PNGL natural gas distribution system operates at pressures ranging from 75mbar to 7bar and is located in public highways and footpaths to deliver gas to both domestic and industrial and commercial premises.

The map below shows the licence areas of the three gas distribution network operators currently operating in Northern Ireland.

- Phoenix Natural Gas
- Firmus Energy
- SGN Natural Gas Northern Ireland

Depending on where your planned works are located, it is your responsibility to contact the correct natural gas network operator to obtain plans and/ or assistance before commencing work.

NOTE: PNGL do not provide information on the transmission pipelines, or other distribution networks. Please contact the relevant operator as they may have pipelines and/or plant which pose a significant hazard to your workers (see section 2.3).



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2.3 Network operator contact details



02890 437 580



02894 427 941



08456 108 0066



0800 9121 722

**NI Gas Emergency Number:
0800 002 001 Available 24/7- 365 Days a year**

3. Why Does the Risk Exist?

The PNG network is constructed of polyethylene [PE] pipe ranging from 20mm to 450mm in diameter delivering gas within three distinct pressure tiers.

- Intermediate pressure 7 bar [100psi]
- Medium pressure 4 bar [60psi]
- Low pressure 75 mbar [1.1psi]

Where adequate precautions have not been taken; scraping, gouging, and puncturing of PE pipe by common excavation tools can all lead to an uncontrolled release of gas. The higher the operating pressure the greater the volume release of gas. In all instances there is a real risk of gas igniting and/or tracking into buildings.



Note: Be aware that damage may also result from hot works [welding, use of naked flames] adjacent to pipes and such works must be appropriately risk assessed. Hot works include, but are not limited to, welding apparatus and the use of naked flames.

4. Properties and Behaviour of Natural Gas

Natural gas unlike other gases (e.g. LPG) is lighter than air. It is primarily made up of methane (96%) and during an uncontrolled release has the following characteristics / behaviour;

- In open excavation where there is an unobstructed path natural gas will travel straight to atmosphere where it will be diluted and dispersed.
- Underground and where a release path to atmosphere is not available, gas will quickly track through ducts, voids and annular gaps or follow the line of other services.

Note: Do Not Cover a damaged gas pipe as this could force gas into adjacent properties.

- At specific concentrations in air, known as the flammability range [5% - 15% gas in air] AND where an ignition source is immediately present natural gas will ignite. Potential sources of ignition include;
 - Naked flames
 - Electrical switches (being operated either ON or OFF)
 - Non intrinsically safe equipment e.g. mobile phones/machinery
- At high concentrations in enclosed areas or confined spaces, for example any excavation, or property cellar, asphyxiation may occur (starved of oxygen causing suffocation)

4.1 Risks from a damaged gas pipe:

- When gas escapes or is released in an uncontrolled way, it can fuel a fire, give rise to an explosive atmosphere or cause asphyxiation
- Gas can quickly fill underground cavities and travel into buildings through soil, or following the line of other buried utilities.
- Gas can only burn if exposed to an ignition source to reduce the likelihood of this happening:
 - do not turn electrical switches on or off
 - do not operate any plant or equipment
 - do not use naked flames or smoke
 - do not use mobile phones in the vicinity
- move people away from, and upwind of the affected area.

If gas has entered a confined space or building:

- Open doors and windows
- Turn off the supply at the meter
- Do not expose to an ignition source

Contact 0800 002 001 Immediately



5. The Network

Gas pipes and equipment run throughout the PNG network and can be found in carriageways, footpaths, grass verges, private ground and other various locations. It should never be assumed there are no live utilities present.

The PNG network is supplied from transmission high pressure regulating sites (HPRS) where pressure is reduced and distributed around the network at the following pressures:

Intermediate pressure (IP - 7bar/7000mbar)

This is the main trunk main around the network which has pressure regulating sites to reduce pressure to MP and LP to allow gas to be supplied to customers. Normally there are no services or meters taken from IP, only a limited number of large industrial and commercial customers.

Medium pressure (MP - 4bar/4000mbar)

Domestic and industrial and commercial customers are supplied at this pressure tier and meter boxes must be external to the property. Normally not within a town/city centre or to blocks of apartments where internal meters are required.

Low pressure (LP - 75mbar)

Domestic and industrial and commercial customers are supplied at this pressure tier and meter boxes can either be internal or external to the property. Normally within a town/city centre and blocks of apartments whereby internal meters are required.

6. Construction Methods

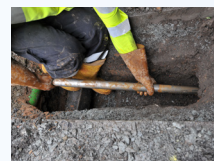
Throughout the construction of the PNG gas distribution network there have been a number of installation techniques employed for both services and mains. The network itself is virtually an all PE system comprising PE80 – medium density [yellow] and PE100 – high density [orange] polyethylene. There are 3 main methods of construction for both mains and services;



OPEN CUT - where PE pipe has been laid by conventional trenching techniques. Pipe is laid with a sand or fine-fill surround with gas marker tape on top. In certain circumstances additional protection in the form of steel plates / box sections or plastic / concrete tiles may be used.



INSERTION – where pipe has been inserted either as loose fit or close fit inside old cast iron [CI] or ductile iron [DI] towns gas infrastructure. The carrier pipe is then broken out to access the inserted PE pipe when required i.e. new connections.



DIRECTIONAL DRILLING / MOLING - where PE pipe has been laid using no-dig technology from one pit to another and pulling the pipe through.

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Pipe laid using 'no-dig' techniques will NOT have any sand or fine-fill surround or marker tape.

As a guide buried gas pipes will normally be found at depths ranging from 375mm to 1m and may have positioned above them plastic marker tape, protective tiles or steel plates. Pipes will also be found within ducts (common on new build sites) or inserted in old towns gas infrastructure [cast iron (CI) / ductile iron (DI)].

Depths of such CI and DI pipes may vary from guidance contained in HSG47 and appropriate care should be taken. When found these pipes should be treated as if 'live'.

Please bear in mind that service connections in particular will have a reduced cover as these are made onto the top crown of the mains pipe.

Trial holes should be undertaken to determine the location, depth and route of gas pipes.

Note

It is imperative that natural gas pipes are not mistaken for plant belonging to other utilities. In particular;

- Cast iron [CI] and ductile iron [DI] conduits must not be confused for water mains.
- Small diameter PE 100 [orange] pipes must not be confused with street lighting cable / ducts.

Where sufficient information is not readily available such pipes should be treated as if they are live gas carrying pipes.

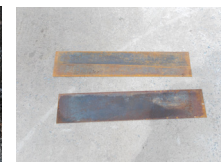
Given the variation in construction techniques the absence of marker tape, additional protection, fine-fill surround or imported fill must not be taken as reliable proof that a gas pipe is not present.



Marker tape



Plastic Tile



Steel Plate

6.1 District Pressure Regulating Installations (DPRI)

DPRI's control the pressure of the gas throughout the network and are a critical piece of equipment to maintain supply to customers. Due to the significance of damage to such equipment PNG need to review the scope of works surrounding the apparatus, and determine the level of supervision required.

You will be able to identify these on site by street furniture – shown below.



6.2 Mains

Gas mains are normally all recorded on PNG plans and usually run parallel to property in the carriageway, footpath or grass verge. They range in size from 50mm to 450mm diameter and are orange or yellow in colour.

Orange pipe	= IP & MP
Yellow pipe	= LP

NOTE: There is a limited use of PE inserted in steel sleeves like bridge structures or where shallow depths can only be achieved.



6.3 Services & meters

Natural gas services are connected on to mains and are generally not identified on PNG record plans therefore their presence should always be anticipated. Visible indicators which help identify their existence include external meter boxes / cabinets, above ground house entry fittings, valve box covers and reinstatement patches.

Services will normally run at right angles to the main however this may not always be the case. Services can be taken off mains both parallel to both gable walls or the front of properties and connection points may not always be a direct route to the meter.



6.4 Valves

Gas mains and services will sometimes have valves connected to them. Valves are not always isolation valves but can be strategic network valves which can have extreme consequences to the network if closed.

No-one must operate valves, other than authorised PNG personnel with specialist valve keys.

Valves boxes with toby lids are constructed to allow future access, and can be identified during site surveys.



6.5 Purge Points

Purge points are installed onto gas pipes and used either for purging out any excess air, or pressure monitoring of the network. They can be commonly found the end of legs of mains, and either side of valves, they can also be found in other locations.

Purge points are installed under street furniture (see section below), however can also be capped off and buried if no longer needed. For example, at the end of a leg of main there is no evidence of a toby lid, there will more than likely be a purge point which has been capped off and buried.

This is an example why no mechanical excavation should take place within 500mm of a known gas main or service.

Note: Purge points are not always detailed on our drawings.



6.6 Connection fittings

Connections to gas mains are made by either a top tee, branch saddle or equal tee. Purge points and top tees are both highly likely to be in the vicinity of a connection point and can either be either under a toby lid at ground level, or capped off and buried.

Top tees also rise up to 200mm above the gas main which is another example why hand digging should take place within 500mm of a known gas main or service.





7. How to Request a Plan

PNG operate a free 'Dial Before You Dig' service which provides drawings for those involved in any works in the vicinity of PNG's gas pipes or equipment. Colour drawings can be sent out by post, email or collected from Phoenix Natural Gas Ltd. For larger areas / projects a digital extract from GIS can be emailed.

When requesting drawings or safety information please provide 10 days' notice. The following information may also be required

- Your contact details (Name / Company / Phone no. / Email / Address)
- The location(s) of the intended works (Grid ref. / Postcode / Address)
- The scope of works to be undertaken
- The start time and expected duration
- Any high risk activity (e.g. piling / directional drilling / demolition / hot works)

Information can be requested by:

Telephone: 028 9055 5819

8.30am to 5pm, Monday to Thursday

8.30am to 4.30pm Friday

Note: (Except Bank/Public holidays)

028 9055 5830

Outside normal working hours (above) AND emergency works only

Post:
Dial Before You Dig
Phoenix Natural Gas Ltd
197 Airport Road West
Belfast
BT3 9ED

Email:
dialbeforeyoudig@phoenixnaturalgas.com



Up to date drawings should be used (normally recommended no greater than 4 weeks old) and the contractor carrying out the works on site should hold the original PNG drawings on site so they are readily available.

Do Not Start work without colour PNG drawings on site.

PNG endeavour to respond within five working days. If drawings are not of the intended works area, contact Dial Before You Dig to discuss new accurate plans being provided. Organisers or planners of any work should ensure the drawings are made available to site personnel.

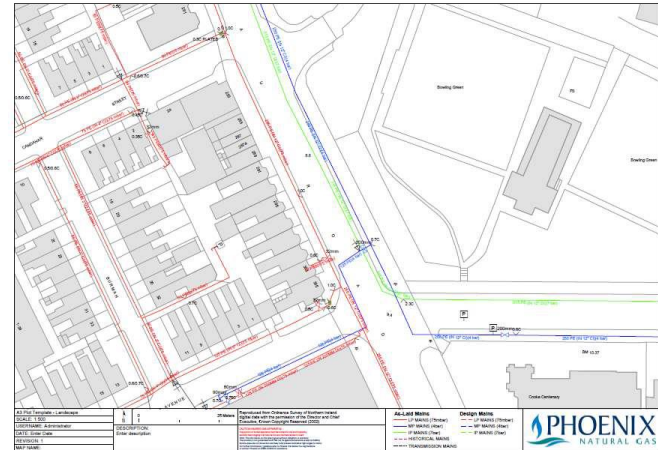


8. How to Interpret a Plan

	63 PE80(75 mbar)	Low pressure (75 mbar)
	125 PE100(4 bar) D/D	Medium pressure (2/ 4 bar)
	250 PE100 (IN 12" CI)(7 bar)	Intermediate pressure (7 bar)
	6inch Cast Iron	Historical mains
	0.8C	Depths of cover

* If you obtain a natural gas map from PNG with 7 Bar (green) pipework for the area of proposed works, consultation must take place **before starting any works.**

PNG will advise you on safety measures and arrange for supervision if deemed necessary.



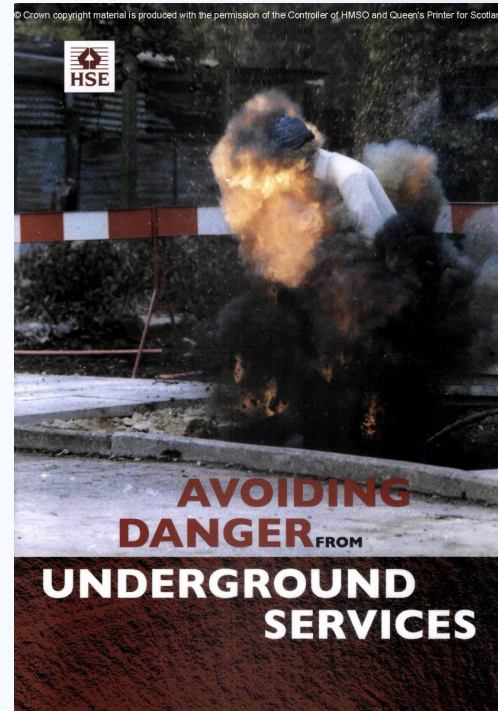
Note: The information on this plan is given without obligation or warranty.
The accuracy is not guaranteed on PNG Ltd, its agents and servants accept no liability.

PNG recommends the all work in the vicinity of gas pipelines are carried out in accordance with HSG47 Avoiding danger from underground services.

CAUTION! BURIED GAS APPARATUS

The position of buried apparatus must be marked on site and located by hand digging trial holes before any mechanical plant is used.

Service pipes are not shown but are likely to be present and laid at right angles to mains.



9. Safe Systems of Work

A safe system of work as commended by the HSE guidance document HS(G) 47 includes:

- Planning the Work
- Plans
- Pipe Locating
- Safe Digging Practices
- PNG must be consulted for advice before piling, directional drilling or boring is to take place in the vicinity of a gas pipe.
- Extra care should be exercised when performing “hot work” (such as welding) where a gaseous atmosphere could exist.
- Extra care should also be taken when using welding equipment, burners, torches or other heat generating equipment near gas apparatus (even if there is no potential for a gaseous atmosphere to exist) to ensure that the heat or sparks generated do not lead to melting of polyethylene pipes or damage to pipeline coatings

9.1 Planning the Work

At the planning stages of the job, PNG Records Department should be contacted on 02890 555819 giving a minimum of 10 working days’ notice requesting the appropriate utility drawing and safety information. Requests should be made in writing and include details of the intended works, anticipated duration and start date and be accompanied by a detailed site / location plan. (Refer to section 7)

NOTE: Works involving demolition, development, construction and use of directional drilling should be discussed at an early stage.

9.2 Plans

When replying to requests for information by post we will issue colour plans. It is imperative that the coloured gas plans are available for the entirety of the proposed works and that all necessary detailed information is passed to contractors and those personnel directly engaged and responsible for the works.

9.3 Pipe Locating

Pipe detecting devices may be used to help locate CI and DI conduits inserted with gas carrying PE pipes. Such devices cannot trace PE itself and therefore it is especially important to use drawings and safe digging practices. This is particularly important for service connection pipes, which will not be marked on plans.

9.4 Safe Digging Practices

All information furnished by PNG is deemed to be accurate and given in good faith. This information should be used as a guide and given that PE pipe will not be detectable by a Cable Avoidance Tool [CAT] and Genny. Employing safe digging practices is the only way to avoid damages and the following is recommended;

- Use plans on site to identify route of main.
- Survey site to be sure you identify physical features.
- Mark out approximate location / route with paint/ marker.

- Hand dig trial holes as necessary to physically prove location prior to mechanical excavation.
- Do not use mechanical excavation within 500mm of the proven pipe location.

Note: The majority of damage to gas apparatus is caused by mechanical plant.

- Do not leave PE pipe exposed
- Ensure all gas pipes are adequately supported / anchored and never use them as a sling support or step.
- Ensure that those completely the work replace any protective measures removed such as plastic mats or steel plates before backfilling operations commence.

10. High Risk Locations

10.1 Critical pipe lines and pressure reduction installations

Additional precautions are therefore necessary during execution of works near to such pipe and plant. These items of pipe and plant will be identified on drawings supplied by PNGL and additional requirements will be stipulated in our supplementary 'Risk' letter.

These requirements can be summarised as follows;

- Prior to commencement, contact PNG 10 days in advance so that we may co-ordinate a visit to site by a member of the company's engineering team where the following is proposed;
- Excavation within 3m of gas mains
- Excavation within 10m of pressure reduction equipment
- Piling activities with 15m of gas mains or pressure reduction equipment

Note: Once the risks on site have been assessed by a PNG Engineer and control measures agreed, which may necessitate a Permit to Work, these distances may be relaxed.

Excavation in the vicinity of mains operating at 7bar must be witnessed by PNG personnel.

10.2 Isolation of the Gas Supply

Isolation of the gas supply will be undertaken where a property owner requests that the supply of gas to the premises is interrupted. For example, this can be undertaken to enable a property owner to undertake works and be connected again once completed.

Such works are to be completed only by authorised parties.

10.3 Demolition

If you have a gas meter or supply you no longer require at your property or business premises and would like to have it disconnected from the mains, you will need to contact us to carry out the work on your behalf. This work must only be carried out by PNGL authorised personnel.

In the case of a demolition, it would be highly dangerous for the contractors, individuals and buildings nearby if the gas service was not safely disconnected from the mains supply.

**In both cases detailed here please contact
Phoenix Natural Gas directly to discuss your requirements**

11 – Other factors

11.1 – Tree Planting

If trees or shrubs are to be planted in the vicinity of our gas mains and services the selection of tree or shrub and how it is planted must be considered carefully.

This is to avoid tree root damage to buried mains or services and to ensure any subsequent excavations necessary won't damage the trees or shrubs.

11.2 – Works in Gardens

If you are going to be carrying out work around your home or a third party is carrying out work on your behalf we can supply you with a site map of our gas mains and services but your own gas service won't be marked. The simplest way to understand the location of your gas service is to know the location of the meterbox or where it enters the house.

NOTE: Your gas service pipe usually takes the shortest route to the gas main.

12 - What to do if a gas pipeline is damaged (or if you smell gas in the area)

- Report the location immediately to: Northern Ireland Gas Emergency Call Centre (24hr) on 0800 002 001
- Do not turn any electrical switches on or off e.g. ignition switches
- Do not operate any plant 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 in the vicinity of the leak
- Provide accurate information on your location and the nature of the incident
- Do not attempt to repair the damage

- Do not cover up a damaged main or service, this may lead to gas travelling through soil, ducts, sewers, chambers or voids and potentially building up inside a premises or confined space
- Do not operate any gas valves in the road or footpath (you may be causing further problems by doing so)
- Assist PNG Engineers/Emergency personnel as requested
- Remember any damage to gas pipes, even if the pipe does not appear to be leaking, must be reported to Phoenix Natural Gas

13 – Additional reference material

- HS(G) 47 – Avoiding danger from underground services – available free from Health and Safety Executive (Northern Ireland) www.hseni.gov.uk

