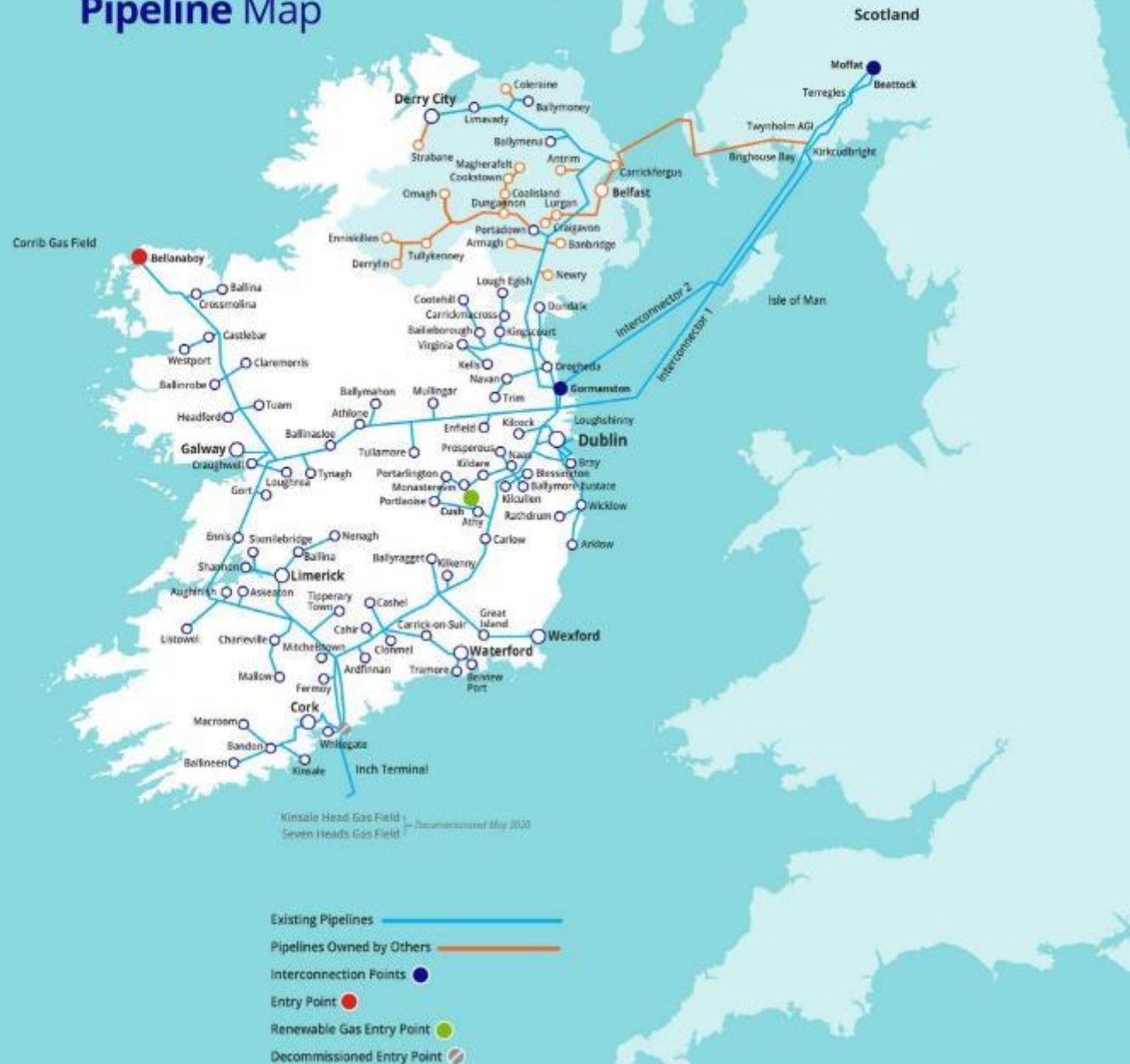


Critical Risks Associated with Working Around Gas Networks

Owen Wilson, Networks Safety Manager
Donal O Caoimh, Senior Pipeline Safety Engineer

Pipeline Map



- Gas Networks Ireland transports gas in Ireland through a network of steel and polyethylene (PE) pipework.
- The 2,500 km **Transmission** system is made up of steel pipes and operates from 19 bar to 85 bar.
- The 12,500 km **Distribution** system is made up mostly of polyethylene pipes and operates from 30 mbar to 4 bar
 - 20 mm – 400 mm dia.

Critical Risks Associated with Gas Pipelines

- 2 main forms of hazardous energy:
 - Chemical Energy
 - Natural Gas is highly flammable
 - Flammability limits are: 5% to 15% Gas in Air
 - Non-toxic (but asphyxiation is possible in confined spaces e.g. deep/narrow excavations)
 - Lighter than air and will rise when released
 - Made up mostly of methane and has an odorant added for safety purposes
 - Pressure
 - Low pressure: 30 mbar (0.45 psi) to 100 mbar (1.45 psi)
 - Medium pressure: 4 bar (58 psi)
 - High pressure: 19 bar (275 psi) to 85 bar (1,230 psi)
 - [Car tyre: ~ 2 bar (30 psi)]



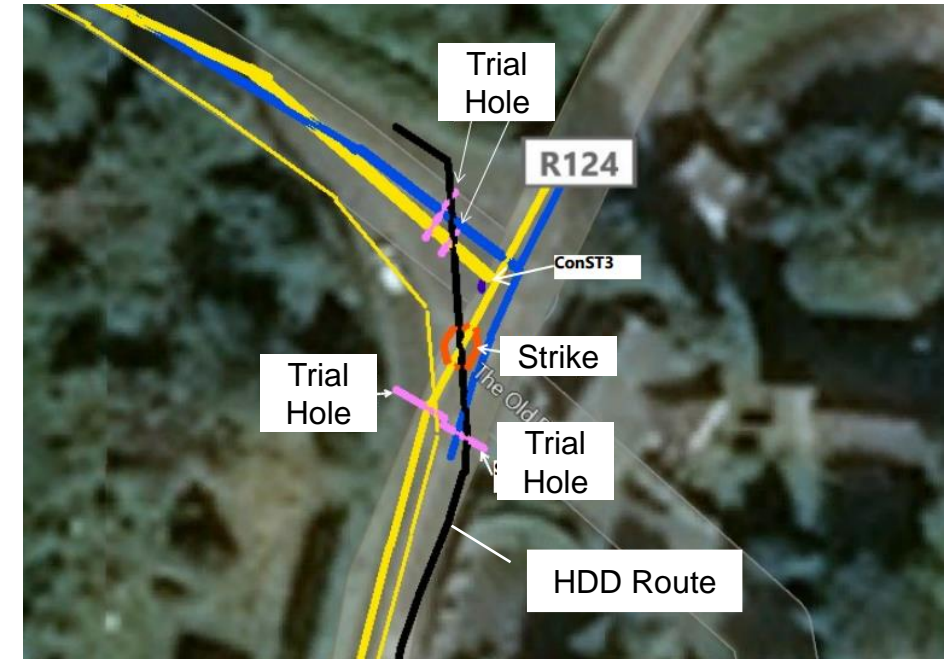
Incident #1 – Derbyshire, UK

- Video circulated widely on social media in 2022
- Fencing contractor installing farm fencing in Derbyshire, UK
- Contractor not obtained drawings of gas network
- Struck 7 bar gas main
- **Critical Risk(s):**
 - Sudden release of 7 bar stored pressure and flammable gas
- **Lessons Learned:**
 - Always obtain gas network drawings before breaking ground
 - Make sure you and the workers on the ground know how to read them



Incident #2 – North County Dublin

- Contractor installing a new utility across a road junction by Horizontal Directional Drill (HDD)
- Contractor had obtained gas network maps and had undertaken trial holes either side of the junction which uncovered gas pipelines at around 0.75 m depth
- Subcontracted HDD struck and damaged 180 mm 4 bar main at a depth of 1.4 m
- Contractor delayed reporting the incident and attempted to excavate/ investigate themselves
- Leak continued for ~14 hours. Approx. 294 Te of natural gas (methane) released. Around 140 Te of material excavated during repair
- Total repair took ~18 hours in exceptionally difficult conditions (overnight, waterlogged ground, deep excavations)

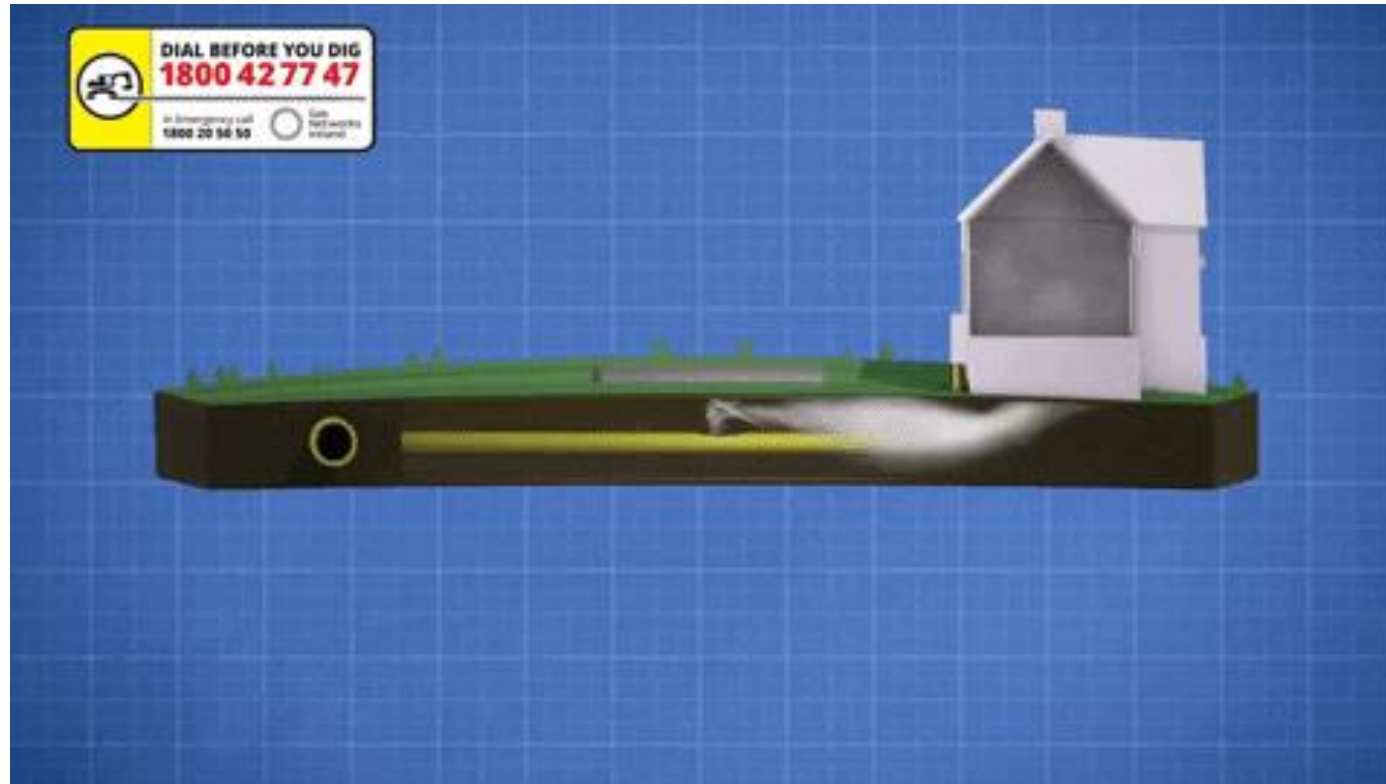


Incident #2 – North County Dublin

- **Critical Risk(s):**
 - Large underground release of 4 bar gas – risk of gas tracking into buildings, building up and finding an ignition source (resulting in explosion).
 - Environmental impact of large release of methane
- **Lessons Learned:**
 - Gas pipelines can change direction and depth. These may not always be marked on drawings
 - When directionally drilling always expose the gas main at the crossing point
 - Junction was congested with existing utilities – directional drilling was not an appropriate installation technique for the new utility
 - On smelling gas, call Gas Networks Ireland immediately and do not attempt to excavate or investigate yourself



Critical Risk



Incident #3 – Damaged gas service home-made repair

- Service damaged by 3rd party.
- Gas service to domestic house wrapped and buried.
- Gas leak reported to 1800 20 50 50.
- Gas service repaired by GNI.

Please do not cover up damage or attempt to repair.



Incident #4 – Dublin City



- Existing 125 mm 4 bar gas main buried to a depth of 0.7 m in unmade ground
- Main contractor constructing new entrance to hospital over route of gas main
- Main contractor lowered ground level significantly during works at hospital entrance
- Gas main left covered with 50 mm concrete and 10-20 mm tar. Valve cover placed over top tee that was too close to the surface to cover with tar. Gas main must have been exposed during works
- Gas main either side of entrance covered with rubble and lean mix concrete
- Landscaping contractor working for local authority outside hospital gate damaged top tee with mini digger
- Fire service called. Patients and staff evacuated from adjacent buildings. Services on nearby LUAS suspended. Traffic stopped by Gardaí. Gas supply to hospital off

Incident #3 – Dublin City



- **Critical Risk(s):**
 - Gas main had been left in a dangerous position by the main contractor – risk of damage and uncontrolled release of 4 bar gas
 - Impact on hospital patients and services
 - Disruption to public transport and road traffic
- **Lessons Learned:**
 - Environment around the gas pipeline may have changed since it was originally laid - gas pipeline drawings may not be accurate
 - If planning work that will change depth of cover over a gas pipeline, contact Gas Networks Ireland well in advance so that the pipeline can be safely moved if required

Transmission and Strategic Distribution Mains

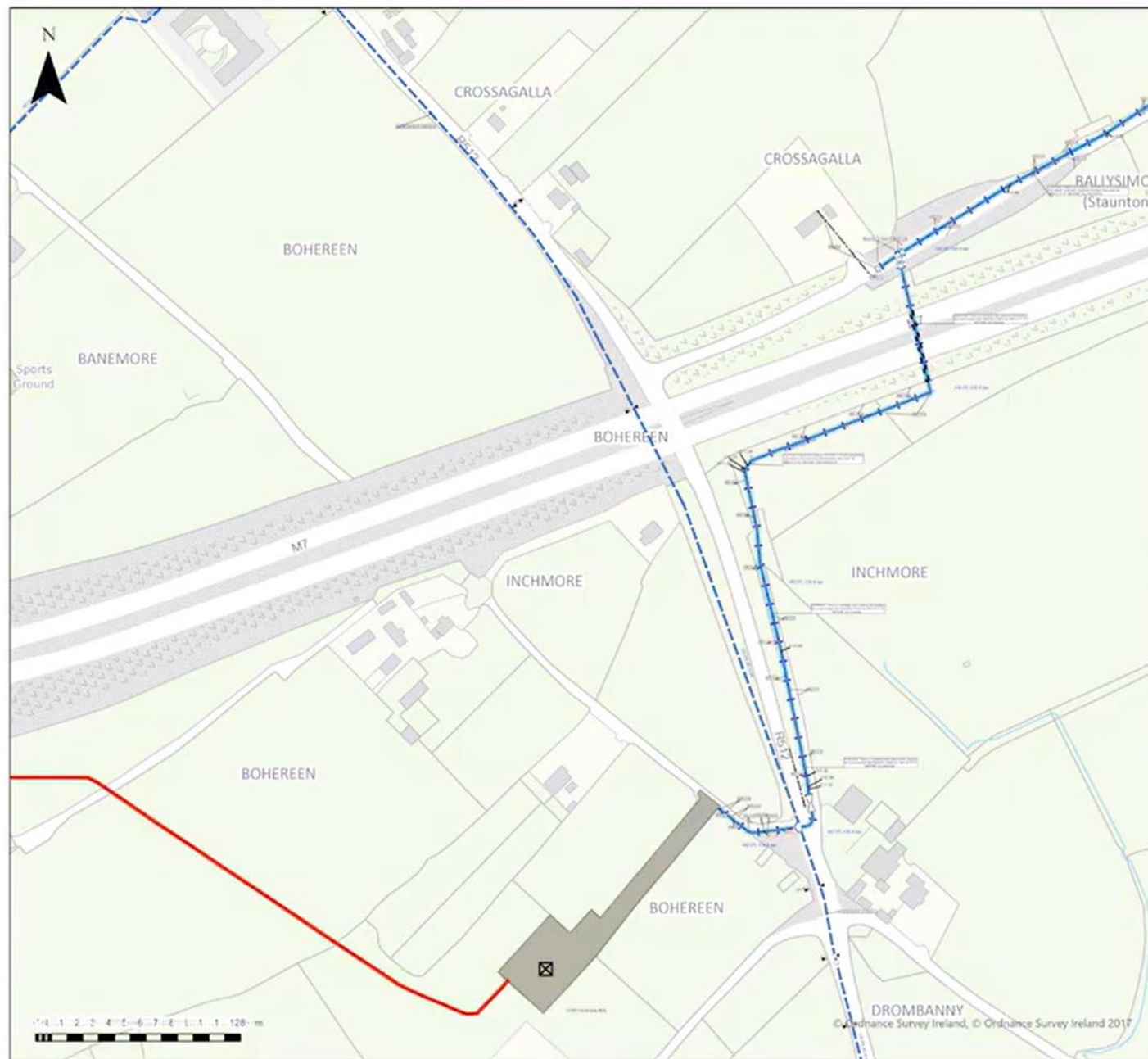
- Any work within 10m of transmission or strategic distribution pipelines require consultation with Gas Networks Ireland.
- Gas Networks Ireland will review plans in advance and organise supervision if required.
- Transmission gas pipelines are high-pressure steel pipelines detectable from above ground
- Strategic distribution mains are polyethylene (PE) so cannot be detected reliably from above ground
- Strategic distribution mains defined as:
 - 400mm diameter, and/or
 - Single supply to a town exceeding 5,000 customers.
- Strategic distribution mains require supervision due to
 - Consequence of outage
 - Time to repair 400mm PE mains

W: www.gasnetworks.ie/dial

E: dig@gasnetworks.ie



GIS Datashare



Aurora Telecom

Aurora Telecom Queries - 01-8926166 (Office Hours)
 Aurora_Network_Queries@gasnetworks.ie
 Aurora Telecom Emergency Only 1800 427399 / 01 2030120

works and

<p>Transmission Pipe (High Pressure)</p> <p>Transmission Pipe (Construction Issue)</p> <p>Distribution Pipe (Medium Pressure)</p> <p>Distribution Pipe (Low Pressure)</p> <p>Service Pipe (Medium Pressure)</p> <p>Service Pipe (Low Pressure)</p> <p>Strategic Pipe (Medium Pressure)</p> <p>Strategic Pipe (Low Pressure)</p> <p>Inserted</p> <p>Abandoned Pipe</p>	
<p>C=? Cover (depth in metres)</p> <p>CP CP Test Point</p> <p>End Cap</p> <p>Hot Tap</p> <p>Installation</p> <p>Valve</p> <p>Mains Verification**</p>	<p>Pressure Monitor</p> <p>Protection (Slabbing)</p> <p>Protection (Sleeve)</p> <p>Reducer</p> <p>Service Terminator</p> <p>Tee</p> <p>Transition</p>
<p>** Please contact GNI on 1800-427747 for specific information</p>	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DIAL BEFORE YOU DIG</p> <p>1800 4277 47</p> <p><small>In Emergency call 1800 20 50 50</small></p> </div> <div style="text-align: center;"> <p>Gas Networks Ireland</p> </div> </div>	

What to do if a gas pipe is damaged



**DIAL BEFORE YOU DIG**
1800 42 77 47

In Emergency call
1800 20 50 50

 Gas
Networks
Ireland

DO

- ✓ MOVE AWAY & UPWIND
- ✓ RESTRICT ACCESS
- ✓ REPORT DAMAGE TO GNI

DO NOT

- ✗ TURN SWITCHES ON OR OFF
- ✗ OPERATE PLANT
- ✗ INTRODUCE IGNITION SOURCES
- ✗ COVER UP DAMAGED PIPELINE
- ✗ TURN OFF GAS VALVE
- ✗ REPAIR DAMAGE YOURSELF

Thank you



www.gasnetworks.ie/dial