Defence Infrastructure Organisation

Gas Safety Management Plan (Section B)

Wyvern Barracks ARC UOTC ACIO ACF ATC

23/04/2025

Produced to meet the requirements of the Gas Safety (Management) Regulations 1996

(Gas Safety Management Plan (Section A) covers the requirements of the Gas Safety (Installation and Use) Regulations 1998

ESTABLISHMENT KEY PERSONALITIES (GAS) CONTACTS

Role	Name	Tel No.	Email
Head of Establishment	Lt Col Aaron West RIFLES	0300 169 2470	Aaron.West191@mod.gov.uk
Establishment's SHEF	WO2 S Barnes AFPA 6 RIFLES	07946 720697	Steve.barnes163@mod.gov.uk
Establishments 4C's Coordinator	Dean Bywood Barrack Manager	07745 557033	Dean.Bywood100@mod.gov.uk
Senior DIO Estate Representative or Equivalent	Mark Cubitt	07955 280440	wx-est-hd@rfca.mod.uk
Site DIO Estate Representative or Equivalent	Kelvin Walker	07508 130359	wx-est-mgr2@rfca.mod.uk
MMO Site Manager or equivalent	Maj Owen Mitchell QM 6 RIFLES	01392 492445	Owen.Mitchell455@mod.gov.uk
Gas Safety Manager (GSM)	Justin Westcott	07793222820	Justin.Westcott@vivodefence.com
Gas Responsible Person (GRP)	Riona Moroney	07854053184	Riona.moroney@vivodefence.com

The Content of this Gas Safety Management Plan (GSMP) have been Approved by the Gas Safety Manager:

Signature: JP Westcott **Date: 21/02/2025**

Authorisation for Implementation
The content and format of this GSMP has been agreed and authorised for implementation by Defence Infrastructure Organisation Technical Services Principal Gas Engineer (DIO TS PGE) and a unique reference number has been generated to support this.

Approved – J Obbard PGE – 18th Feb 2022

The Content of this GSMP have been agreed by the Senior DIO Estate Representative or Equivalent and future works following the findings will be supported:

Signature: M Cubitt **Date: 28/04/2025**

The content of this GSMP have been agreed by the Head of Establishment and future works following the findings will be supported

Signature:…AJ WEST MBE……Date:…6 MAY 25

Reviews and Amendments

GSMPs are 'living documents' that should be subject to continual review and updating as required. Although the level of attention required will vary considerably depending on the size and complexity of each site, GSMPs should be reviewed at least once per quarter by the GRP. Although it is likely that changes are not required at each review, the date of review and any changes made should be indicated on the tables below. The review of the GSMP will include a site visit to ensure that the site and the content of the GSMP remain valid. The reviews and amendments made will be deleted during the DIO TS three yearly review when the GSMP is re-authorised by the PGE.

Date	Page No.	Amendment
30/11/2021	All	Initial Development
05/05/2022	3	Added New Gas Emergency Number
05/05/2022	4	Changed Additional Gas Contact Details
05/05/2022	4	Updated Gas Supplier Details to Total Energies
05/05/2022	4	Changed Gas Emergency Contact Number
05/05/2022	8	Correction – Utilization Meters 11 to 10
05/05/2022	18	Changed Gas Emergency Contact Number
14/11/2022	Annex C	Reviewed & Updated Risk Assessments
20/02/2023	7	Altered Building 7 Inlet Pipework/ECV Description
20/02/2023	10	Updated ECV Records
20/02/2023	14 & Annex B	Added Gas Network & Line Drawing Details, Icon & Drawings
20/02/2023	17	Added Network Analysis Date and Survey Dates
20/02/2023	24-26	Added Network Analysis Information
20/02/2023	Annex C	Reviewed & Updated Risk Assessments
10/05/2023	N/A	No Amendments Required
18/08/2023	N/A	No Amendments Required
18/09/2023	15, 25 & 26	Added Network Validation Results
28/11/2023	Annex C	Updated Current Preventative Measures in R/A's
29/02/2024	10,11,16,17,20-30,21,22, 25	Added ECV Label Comment, Comment in Section 6-21, Emergency Exercise Update, Added Audit Details, Added Comments to Network Conclusions, Update R/A's
15/05/2024	N/A	No Amendments Required
30/08/2024	ii & 2	Updated HoEstates Details
18/10/2024		GSM re-authorisation (previously authorised 20/07/2023)
15/11/2024	N/A	No Amendments Required
19/02/2025	ii	Update GSM & GRP Contact details
19/02/2025	All	Update literature to reflect Vivo as MMO.

Date	Reviewed by	Authorised by	Comments
22/12/2021	M Fenwick	N King	Initial Review
05/05/2022	M Fenwick	M Fenwick	Quarterly Review
05/08/2022	M Fenwick	M Fenwick	Quarterly Review
14/11/2022	M Fenwick	M Fenwick	Quarterly Review
20/02/2023	M Fenwick	N King	Annual Review
10/05/2023	M Fenwick	M Fenwick	Quarterly Review
18/08/2023	M Fenwick	M Fenwick	Quarterly Review
28/11/2023	M Fenwick	M Fenwick	Quarterly Review
29/02/2024	M Fenwick	N King	Annual Review
15/05/2024	M Fenwick	M Fenwick	Quarterly Review
30/08/2024	M Fenwick	M Fenwick	Quarterly Review
18/10/2024	Neville King	Neville King	GSM re-authorisation
15/11/2024	M Fenwick	M Fenwick	Quarterly Review
03/02/2025	M Fenwick	M Fenwick	DNV De-Mobilisation Review / Handover
19/02/2025	R Moroney	R Moroney	Quarterly Review
21/02/2025	J Westcott	J Westcott	Initial review/approval Noting Network PPM to be scheduled and emergency exercise required.

FORWARD

MOD, as a gas conveyor within Great Britain, has submitted an Exemplar Gas Safety Case (MOD GSC) to demonstrate compliance with the Gas Safety (Management) Regulations 1996 (GSMR). Maintenance Management Organisations (MMO's) are engaged who have the overall contractual responsibility to operate and maintain the gas network assets under their Contract, including the management of the safe flow of gas within the system and the provision of an emergency service. The MOD delegate specific duties to the MMO but accountability for gas safety on each site rests with the Head of Establishment.

The MOD GSC considers all parts of the MOD estates gas supply system that forms part of the gas supply network. This includes all parts of the MOD estates network from the External Gas Distribution Network (EGDN) connection point to the emergency control valve (ECV) of individual consumers. The MOD GSC considers primarily those matters that relate to the management of the safe flow of gas within the system and the provision of an emergency service.

The conclusions of the assessments within the MOD GSC are:

- There is an adequate safety management system in place to manage the flow of gas safely in its gas supply system.
- Adequate arrangements are in place to comply with the requirements of GSMR and allow co-operation with other bodies that have duties under the regulations.
- Adequate arrangements are in place for ensuring that gas conveyed within the system meets the standards for composition and pressure.
- Adequate arrangements are in place for dealing with reports of gas escapes and investigation of incidents.
- Adequate arrangements have been made to ensure that the risk of a supply failure is minimised.
- Adequate arrangements have been made to ensure that supply emergencies are managed safely.

The MOD GSC is a generic document that outlines the gas safety systems and processes in place for gas networks within the MOD estate. Site-specific details and arrangements are contained within this establishment Gas Safety Management Plan (Section B) (GSMP). As a site-specific component of the MOD GSC, this GSMP has the same legal standing under GSMR.

The layout and structure of this GSMP mirrors that of its parent GSC

Following initial approval by the DIO PGE, the GSM is required to reapprove this GSMP annually. GSMP must be submitted to DIO TS every three years for PGE authorisation.

The HoE and Senior DIO Estate Representative or Equivalent would only be required to re-sign this GSMP annually following the GSM reapproval, unless significant changes to the gas system or a change in one of these key personalities occurs.

GSMP Section A documents detail MOD measures to ensure compliance with the Gas Safety (Installation and Use) Regulations 1998 (GSIUR) for installation pipework (downstream of Emergency Control Valves).

Although the legal status of this document applies in the UK only, the MOD apply the same requirements to the management of natural gas networks on its overseas estate in accordance with the currently published Secretary of State's Health and Safety policy statement.

Contents

1 THE DUTY HOLDER AND ESTABLISHMENT LEVEL KEY PERSONALITIES

1.1. Gas Safety Case Duty Holder.	
The duty holder for the MOD Gas Safety Case is the Permanent Under Secretary for Defence (PUS). However, day to day responsibility for the preparation and maintenance of the document is delegated to the DIO TS Head of Engineering and Construction, who also has the responsibility for managing the system in accordance with the Safety Case. PUS delegates maintenance responsibility to the Top-Level Budget Holders (TLB's), to manage safety of the gas network. The TLB's utilise MOD Contracts i.e. MMOs who have responsibility for maintaining the gas network on behalf of the MOD.	
Name: Address:	Permanent Under Secretary Main Building Horse Guards Parade Whitehall London SW1A 2HB

1.2. DIO Technical Services Principal Gas Engineer (PGE).	
The PGE assumes the role of Senior Authorising Authority which is a term used within the MOD to recognise the authority of the person responsible for overseeing the appointment of, and auditing Authorising Engineers (AEs). For Gas the AEs are replaced by Gas Safety Managers (GSMs).	
Name: Address: ☎: ✉:	Jeremy Obbard DIO HQ Whittington Barracks Lichfield WS14 9TJ 07748 903260 Jeremy.obbard100@mod.gov.uk

1.3. Establishment Personalities.		
Name of Establishment:	Wyvern Barracks ARC UOTC ACIO ACF ATC	
Establishment Address:	Barrack Road Exeter Devon EX2 6AR	
Head of Establishment (HoE) (This is the most senior MOD person identified, by the chain of command, as responsible for the establishment. The HoE holds accountability for ensuring site compliance with the requirements of GSMR and the MOD GSC, including this GSMP.)	Name: Position: Organisation: Address: ☎: ✉:	Lt Col Aaron West RIFLES CO MOD Exeter University Officer Training Corps Block 3 Wyvern Bks Exeter Devon EX2 6AR 01392 492444 Aaron.West191@mod.gov.uk
Establishment 4C's	Name: Position: Organisation: Address: ☎: ✉:	WO2 S Barnes AFPA 6 RIFLES AFPA MoD BN HQ 6 RIFLES Block 7 Wyvern Bks Exeter Devon EX2 6AR 07946720697 Steve.barnes163@mod.gov.uk

Establishment SHEF	Name: Position: Organisation: Address: ☎: ✉:	Dean Bywood Barrack Manager MoD 6th Battalion The Rifles Wyvern Barracks Exeter Devon EX2 6AR 07980 722427 Dean.Bywood100@mod.gov.uk
Senior DIO representative or equivalent (This may be the SEFM, but will vary depending on the contract this establishment falls under)	Name: Position: Organisation: Address: ☎: ✉:	Mark Cubitt Head of Estates Wessex Reserve Forces' & Cadets' Association Mount House Mount Street Taunton Somerset TA1 3QE 07955 280440 wx-est-hd@rfca.mod.uk
Site Guardroom (24 Hours)	☎:	Guardroom – 24/7 Contact: 01392 216980
Site emergency services (Are they 24 Hours?)	Fire ☎: Police ☎: Medical ☎:	999 999 999

1.4. Maintenance Management Organisation (MMO).		
The MMO for this establishment is:		**VIVO**
MMO Customer Services (24 hours)	Organisation: Address: ☎:	VIVO Helpdesk Helpdesk 25 Goodlass Road Hunts Cross Liverpool L24 9HJ 0800 030 9320
MMO Helpdesk – Gas Emergencies Only (24 Hours) **Note:** Please do not contact the general public National Gas Emergency Service for suspected gas escapes on RFCA infrastructure.	Organisation: ☎:	VIVO Helpdesk Helpdesk 25 Goodlass Road Hunts Cross Liverpool L24 9HJ 0800 030 9320
Site Contact	Name: Organisation: Address: ☎: ✉:	Dean Bywood Barrack Manager MoD, 6th Battalion The Rifles, Wyvern Barracks, Barrack Road, Exeter, Devon, EX2 6AR 07980 722427 Dean.Bywood100@mod.gov.uk
Gas Safety Manager (GSM)	Name: Organisation: Address: ☎: ✉:	Justin Westcott VIVO Defence Services Building 003 CTCRM Lympstone NR Exmouth Devon EX8 5AR 07793 222820 Justin.Westcott@vivodefence.com
Gas Responsible Person (GRP)	Name: Organisation: Address: ☎: ✉:	Riona Moroney VIVO Defence Services Building 003 CTCRM Lympstone NR Exmouth Devon EX8 5AR 07845053184 Riona.Moroney@vivodefence.com

1.5. Additional Gas Contacts.		
Meter Asset Manager (MAM)	Organisation: Address: ☎: ✉:	Energy Assets Ltd 6 Almondvale Business Park Almondvale Way Livingston Scotland. EH54 6GA 01506 405 405 RalphReekie@EnergyAssets.co.uk
Gas Supplier	Organisation: Address: ☎: ✉:	Totalenergies Gas & Power 55-57 High Street Redhill Surrey RH1 1RX 01737 275 746 gp.redhill.ccs@totalenergies.com
DIO SD EUS (Service, Delivery, Energy, Utility and Sustainability)	☎: ✉:	01213 113854 DIOSDEUS-enaccounts@mod.gov.uk
National Gas Emergency Centre (24 Hours)	☎:	0800 111 999
National Emergency Services (24 Hours)	Fire ☎: Police ☎: Medical ☎:	999 999 999

2 OPERATION UNDERTAKEN

2.1 Site Overview.

A brief description of the establishment and its current use. This should include how many separate sites are present, number of buildings being supplied by gas, what the gas is used for and number of personnel who will be affected by a gas outage. Any critical loads should be initial highlighted here (quick reaction forces, large medical facilities, temp controlled ammunition stores etc)

Wyvern Barracks ARC UOTC ACI0 ACF ATC is a single site establishment with 17 buildings on site, fourteen of which are supplied by gas.
Nine buildings are supplied with gas from the Low Pressure (LP) MoD Network at 37mbar.
Building 7 has two metered feeds.
Building 1 supplies gas to building 2 via installation pipework.
Building 7 supplies gas to building 6 via installation pipework.
Building 11 has an MoD supply to the plant room and an EGDN supply to the Kitchen.
There are 5 individual Low Pressure (LP) EDGN supplies on site feeding gas to buildings 11 (Kitchen) 18,19 and 22.
Building 22 has two EGDN individual supplies.

Wyvern Barracks was established as an artillery barracks for the Board of Ordnance under the name of Topsham Barracks around 1800. In 1873 a system of recruiting areas based on counties was instituted under the Cardwell Reforms and the barracks became the depot for the two battalions of the 11th (North Devonshire) Regiment of Foot.
Following reforms, the regiment evolved to become the Devonshire Regiment with its depot in the barracks in 1881
During the First World War a reserve brigade of the Royal Field Artillery was based at Topsham Barracks and during the Second World War units of the United States Army were based there.
After becoming home to the Devonshire and Dorset Regiment in 1958, the barracks went on to become the regional centre for infantry training as the Wessex Brigade Depot under the name of Wyvern Barracks in 1960.

Wyvern Barracks is currently home to Battalion HQ, HQ Company and an Assault Pioneer Platoon of 6th Battalion, The Rifles and Exeter UOTC as well as B Detachment of 243 Field Hospital and 72 Military Intelligence Company Detachment of 7 Military Intelligence Battalion.
The ATC Devon and Somerset Wing Headquarters and 13 (City of Exeter) Squadron are also based on site.

The buildings have a mix of uses and are used primarily for accommodation, storage, MT workshops, offices, catering facilities and meeting/conference rooms.
Day to Day there are around 50 people on site and there can be up to 500 people on site when there are functions, events or parades.

2.2 Document Centre.

Location of the establishment Gas Document Centre containing all information relating to the gas systems at this establishment (Ref: MOD GSC 10.2) and contact details if different to the GRP.

The Gas document centre is held electronically by VIVO, it can be accessed by the GSM & GRP.

2.3 Purpose of Pipeline(s).

A brief description of demarcation agreements between the EGDN, MAM and MOD. Number of MOD networks including operating pressures and number of buildings being supplied direct from the EGDN. End users of gas being supplied such as accommodation, workshops, catering facilities etc.

There are 6 EGDN gas meters at Wyvern Barracks fed from 3 separate EGDN supplies on to site.
There is one medium pressure supply and two low pressure supplies.

There is 1 bulk fiscal meter on site supplied at Medium Pressure (MP) by the EGDN network. This meter then supplies an MoD network at Low Pressure (LP) with a pressure of 37 mbar. This is a twin stream meter installation.
The working stream is set at 37mbar.
The standby stream is set at 40mbar.

There are 9 buildings fed from the MoD network. (1,3, 7 – 2 feeds, 8,9,10,11, ATC Store and ATC Office)
The bulk fiscal meter is in a purpose-built meter house to the North West side of the site behind building 3. The meter house is within the wire.

There are four buildings each with individual Low Pressure (LP) supplies fed from the EGDN Network, building 22 having two individual EGDN supplies making a total of five individual EGDN supplies.

Gas supplied from the MoD gas network is used for Heating, hot water, and commercial catering. The buildings on site are used as offices, accommodation, kitchens, training facilities, meeting rooms, workshop/garages & stores.

On the MoD network the MoD is responsible from the meter outlet valve of the Bulk Fiscal meter up to and including the appliances in the buildings.

On the EGDN single supply meters the MoD is responsible from the meter outlet / outlet valve up to and including the appliances.

2.4 Consumers.

Consumers can be broadly categorised as domestic or industrial / commercial. Gas supplies to domestic consumers are normally prioritised above industrial / commercial consumers.

Domestic consumers supplied from the MOD network:	0
Industrial / commercial consumers supplied from the MOD network:	9

2.5 Description of MOD Gas Networks.

A description of the MOD gas network(s) including location of primary meter(s), twin stream or single stream, primary meter kiosk construction and condition. Pipeline length, material, diameter, pressure, age and condition. Are any PRIs present and number of buildings being supplied?

The gas supply feeding the MoD Gas Network at Wyvern Barracks is supplied from the Wales and West MP network and enters the site at the North West side of the site behind building 3. The bulk fiscal meter is in a purpose-built meter house. The meter house is within the wire.
There is a 4" steel riser into the gas meter house connecting to a twin stream gas meter rig through the EGDN ECV.
The two stream pressures are set as follows:
The working stream is set at 37mbar.
The standby stream is set at 40mbar.

The gas runs through the MAM owned and operated gas meter and regulators and exits the meter house below ground in 4" steel. The meter outlet valve is the demarcation point between the MoD owned and operated Low Pressure (LP) network and the EGDN responsibility.
The outlet gas pressure is 37 mbar as per the meter rig working stream.

The MoD network is estimated to have been installed in the early 1990's.

The MOD network is buried along its entire length with the exception of building risers and is thought to be made up of PE and steel pipework.
The MoD network supplies the following buildings:

1 – 63mm PE Riser with building SIV
3 – 63mm PE Riser, no SIV found
7 - Front Plant Room – 20mm PE Riser, no SIV found
7 – Main Plant Room – 50mm Steel Riser, no SIV Found
8 – 50mm Steel Riser, no SIV found
9 – 50mm Steel Riser, no SIV found
10 – 50mm Steel Riser, no SIV found
11 Plant Room – 50mm Steel Riser with building SIV
ATC Office - 20mm PE Riser, no SIV found
ATC Store - 20mm PE Riser, no SIV found

All of the buildings have MoD owned and operated meters and regulators after each ECV with the exception of building 7, main plant room.
There is a 2" steel gas pipe that enters building 7 below ground by the main entrance. This pipe enters a duct with a screwed panel for access. The ECV at this point is the demarcation point, however there is no ECV handle on the valve. The gas pipe transitions to 3" steel through the ECV and runs above a false ceiling to the plant room, through the plant room and out into the brick built standalone gas meter house which sits outside of the plant room. This is a secondary gas meter. Before entry to the gas meter house the gas pipework reduces to 2" steel and runs through the MoD owned and operated AECV, regulator and secondary meter and back into the plant room to feed four heating boilers.

As referenced in the GSMP Part A there are 4 additional buildings with gas supplies. These are fed from the EGDN Low Pressure (LP) Network and there are a total of five MAM owned and operated meters and regulators to these buildings (11 Kitchen, 18,19 and 22 – 2 feeds)

The total network length is an assumed approximate from site drawings and carrying out the leakage survey.
A trial hole survey will be carried out to confirm (as far as possible) routes, material and condition of the gas network. Initial pipeline survey works are to be planned in within 3 months of the issue of this Gas Safety Management Plan.

Estimated MoD Network Pipework Length – 772 metres

2.6 Primary Meter Details.

The following table describes the basic arrangement of the incoming primary meter installation(s). (These are the responsibility of the MAM)

Number of primary meter installations:	6

Meter Name / ID	MAM Responsible	Inlet pipeline (responsibility of the EGDN)				Outlet pipeline (responsibility of the MOD)				Max Flow (M^3 hr)
		P tier – HP, IP, MP, LP	Pressure (mbar)	Material (EGDN Network)	Diameter (mm)	P tier – HP, IP, MP, LP	Pressure (mbar)	Material (MOD Network)	Diameter (mm)	
Wyvern Barracks Bulk Fiscal Meter	Energy Assets	MP	2 bar	Steel	100	LP	37	Steel	100	311
EGDN Single Supply 1	Energy Assets	LP	27.87	PE	63	LP	23.16	Copper	28	16
EGDN Single Supply 2	Energy Assets	LP	27.21	PE	63	LP	21.65	Steel	50	25
EGDN Single Supply 3	Energy Assets	LP	27.73	PE	63	LP	22.54	Steel	65	40
EGDN Single Supply 4	Energy Assets	LP	26.24	PE	63	LP	21.51	Steel	50	25
EGDN Single Supply 5	Energy Assets	LP	NTP	PE	20	LP	22.36	Copper	22	6

2.7 Utilisation Meters (meters supplied directly from the MOD gas network)

Utilisation Meter Details can be seen in the GSMP section A.

Number of utilisation meter installations:	10

2.8 Secondary Pressure Regulating Installations (PRIs).

The following table describes the basic arrangement of the PRIs. (This does not include utilisation meter governors installed downstream of the consumers ECV)

Number of PRI installations:	None

PRI Name / ID	Nominal Reg size (mm)	Inlet pipeline				Outlet pipeline				Kiosk construction / condition
		P tier – MP, LP	Pressure (mbar)	Material (MOD Network)	Diameter (mm)	P tier – MP, LP	Pressure (mbar)	Material (MOD Network)	Diameter (mm)	

2.9 Emergency Control Valves (ECVs).

The ECV(s) are included in the scope of the network and are therefore the responsibility of the MOD.

The MOD gas networks at this establishment terminates at: 10 ECV's

Building Name / Number	Incoming Gas Pressure	Appliance / Process / Domestic	ECV No. / Code	Indoors / Outdoors	Key required to access the ECV – Where from?	ECV Location	Handle Fitted	ECV correctly labelled	Nominal Valve Size
1	37.6 mbar	Heating	WX100/ECV/001	Indoors	Yes, Guardroom	Internal Gas Meter House	Yes	Not currently funded by the RFCA	50mm
3	NTP	Heating, Hot water and Catering	WX100/ECV/002	Outdoors	Yes, Guardroom	External Gas Meter House	Yes	Not currently funded by the RFCA	50mm
7 Front Plant Room	NTP	Heating	WX100/ECV/003	Outdoors	Triangle Meter Key	External Gas Meter House	Yes	Not currently funded by the RFCA	20mm
7 Main Plant Room	36.6 mbar	Heating	WX100/ECV/004	Indoors	No – Screwed Panel	Internal Duct by Main Entrance	No	Not currently funded by the RFCA	80mm
8	36.5 mbar	Heating	WX100/ECV/005	Outdoors	Yes, Guardroom	External Gas Meter House	Yes	Not currently funded by the RFCA	50mm
9	36.6 mbar	Heating	WX100/ECV/006	Outdoors	Yes, Guardroom	External Gas Meter House	Yes	Not currently funded	50mm

								by the RFCA	
10	36.9 mbar	Heating	WX100/ECV/007	Outdoors	Yes, Guardroom	External Gas Meter House	Yes	Not currently funded by the RFCA	50mm
11 Plant Room	36.2 mbar	Heating	WX100/ECV/009	Outdoors	Yes, Guardroom	External Gas Meter House	Yes	Not currently funded by the RFCA	50mm
ATC Office	NTP	Heating	WX100/ECV/010	Outdoors	Triangle Meter Key	External Gas Meter House	Yes	Not currently funded by the RFCA	20mm
ATC Store	NTP	Heating	WX100/ECV/011	Indoors	Yes, Guardroom	Internal Gas Meter House	Yes	Not currently funded by the RFCA	20mm

2.10 MOD Network Pipeline Details.

The table below shows the total pipeline lengths for the different pipe diameters and operating pressures.

Network Name / ID	Pressure (mbar)	Pipe Material	Pipe Diameter (mm)	Number of Sections	Total Length (m)
Network 001	37	PE	125	2	393
Network 001	37	PE	63	6	111
Network 001	37	PE	32	4	183
Network 001	37	Steel	100	3	71
Network 001	37	Steel	80	1	5
				Total length of all MOD networks:	772

2.11 Network Interconnection.

The outlet pipework system from each of the primary meter installations can be isolated networks or may be interconnected with other MOD systems. For isolated systems turning off the gas supply at a single primary meter installation will shut off supply to all buildings / processes on that pipe system. Interconnected systems will require two or more primary meter installations to be turned off. Figures 2.1 and 2.2 below show the differences.

The MOD pipework system on this establishment are:		Isolated
Supply from Primary Meter (Name / ID)	Pressure (mbar)	Can the interconnection be isolated?
None		

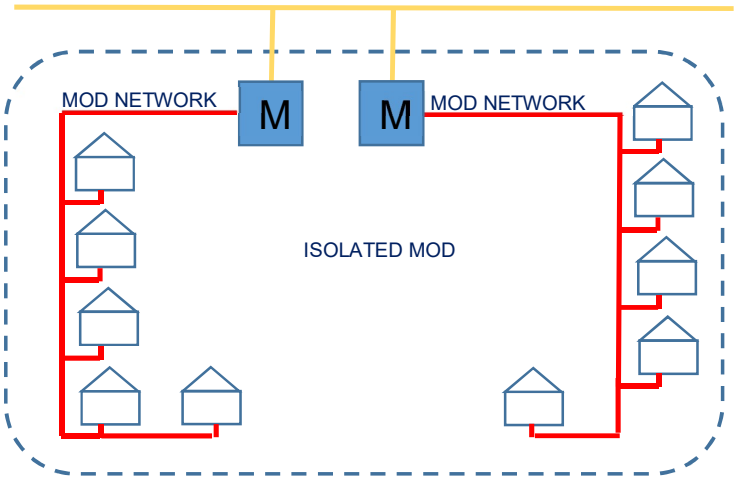


Figure 2.1 – Isolated MOD pipework systems

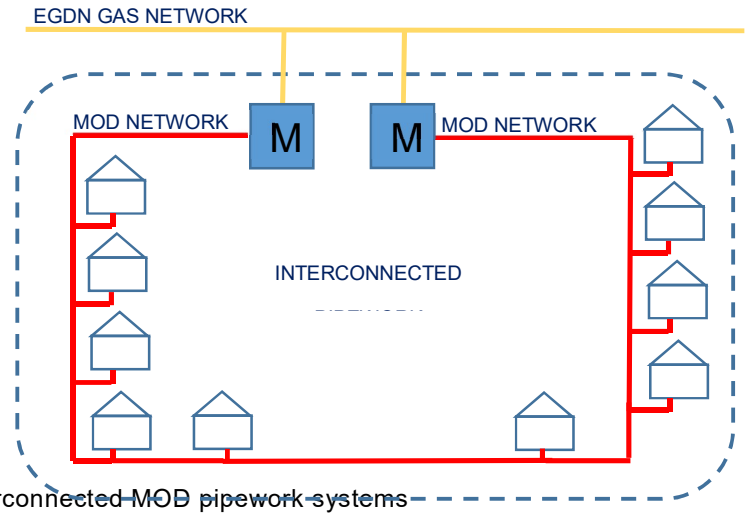


Figure 2.2 – Interconnected MOD pipework systems

2.12 Sensitive and Critical Loads.

The MOD does not have any 'interruptible consumers. Historically large industrial / commercial consumers, who had an alternative fuel supply, could opt to pay a lower rate for an interruptible contract which enabled the supplier to isolate their supply at short notice in order to preserve the gas supply to the public and 'firm contract' industrial consumers in the event of a supply shortage.

However, all industrial and commercial supplies are, effectively, 'interruptible' isolation of these will usually be requested by the supplier in times of supply emergencies in order to preserve domestic supplies for as long as possible.

Where Industrial / commercial consumers have particularly sensitive or critical end users these can be taken into consideration by the EGDN when requesting isolation. Sensitive consumers could include supplies such as a school, medical facility, temperature-controlled ammunition stores etc.

The number of sensitive loads at this establishment is:	None	
Facility / Consumers	Supplied from primary meter name / ID	Approx. max throughput (m^3 hr)
None		

2.13 Standby Alternative fuel Supplies.

Where operational critical supplies are present on site a standby alternative fuel supply should be considered which would enable continued operation in the event of either a local or national supply emergency.

Facility / Consumers	Supplied from primary meter name / ID	Approx. max throughput (m^3 hr)	Alternative fuel supply
None			

3 PLANT AND PREMISES

3.1 Drawings.

The gas layout drawings provide an overview of the gas network and the interfaces(s) with the EGDNs network.

The layout drawings should detail:

a) The site boundaries.
b) The primary meter installations.
c) Secondary PRIs.
d) Valve locations.
e) Pipeline routes, diameters, material and depth.
f) Operating pressure tier.
g) Demarcations
h) Responsibilities (EGDN / MOD)

The layout drawings are located at Annex B either embed as a PDF or hard copies. The drawings will be subject to the GRP quarterly review and following any physical changes or system updates. Hard copies of the drawings are located in the gas document centre.

Gas Layout Drawing Number	Revision Date	Scale	Detail
WX100-B-A1	12/12/2022	1:1000	Gas Network Layout Drawing
			 WX100-B-A1.pdf

3.2 Additional Drawings.

In addition to layout drawings the below additional drawings are available from the gas documents centre and GRP.

Additional Drawing Number	Revision Date	Scale	Detail
WX100-A-A3	25/11/2021	NTS	1 and 2
WX100-A-A3	25/11/2021	NTS	3
WX100-A-A3	25/11/2021	NTS	6 and 7
WX100-A-A3	25/11/2021	NTS	8
WX100-A-A3	25/11/2021	NTS	9
WX100-A-A3	25/11/2021	NTS	10
WX100-A-A3	25/11/2021	NTS	11
WX100-A-A3	25/11/2021	NTS	ATC Office
WX100-A-A3	25/11/2021	NTS	ATC Store
WX100-A-A3	25/11/2021	NTS	18
WX100-A-A3	25/11/2021	NTS	19
WX100-A-A3	25/11/2021	NTS	22
			 WX100-A-A3.pdf

3.3 Responsibility Interfaces and Access Arrangements.

For gas incidents or maintenance that affect the EGDN, the EGDN representative will become the network emergency controller. The EGDN establishment direct contact will be the GRP who will make all relevant arrangements for access to the primary meter(s) and plant room access (for emergency isolation etc).

As the MOD establishments are high security, all EGDN personnel who attend for gas supply emergencies or to carry out maintenance work will be granted access to site on an individual basis.

All EGDN personnel attending this establishment will be subject to site specific security procedures and will be required to be escorted whilst on site, access and escorting may vary depending on the nature of the visit, time of incident etc.

Below are the site-specific arrangements in place to allow the EGDN access during an emergency, as agreed by the HOE:

Guardroom –
24/7 Contact: 01392 216980

4. OPERATION AND MAINTENANCE DOCUMENTATION

4.1 MOD Network Maintenance.

Network maintenance is mandated in GSMR and all network maintenance requirements and tasks on MOD establishments are detailed in the MOD Gas Network Technical Standard TS/GAS-01. TS/GAS-01 has been written in line with legislation, industry standards and guidelines.

The testing, inspecting and maintenance frequencies vary depending on the task, the table below shows the intervals at which it should be conducted and the date the tasks have been complete.

TS/GAS-01 Job No.	Maximum Interval Period	Brief Description of Task	Task was completed on
1	**General**		
1.1	5 Years	Network Analysis – to model the adequacy of network design	03/02/2023
1.2	5 Years	Network Validation Survey – to check network analysis model with measured data	29/11/2021
2	**Iron Pipelines, mains and services (includes buried outlet pipework from Primary Meter Installations and PRIs.)** Note: iron pipes are not permitted for use with LPG – any such pipes must be immediately scheduled for replacement		
2.3	12 Month	FIM (or similar) leakage survey – Pipes within 30m of a building	N/A
2.4	12 Month	Over line pipe survey – Pipes within 30m of a building	N/A
2.5	5 Years	FIM (or similar) leakage survey – all pipe routes within site, regardless of proximity to buildings	N/A
2.6	5 Years	Over line pipe survey – all pipe routes within site, regardless of proximity to buildings	N/A
3	**Steel Pipelines, mains and services (includes buried outlet pipework from Primary Meter Installations and PRIs.)** Note: buried steel pipes are not permitted for use with LPG – any such pipes must be immediately scheduled for replacement, and the SME(Gas) informed		
3.1	12 Month	Cathodic Protection (CP) monitoring survey	N/A
3.2	12 Month	Leakage survey (where no CP installed) – pipes within 5m of buildings	29/11/2021
3.3	5 Years	Leakage survey (where no CP installed) – regardless of proximity to buildings	29/11/2021
3.4	5 Years	Over line pipe survey (where no CP installed) – regardless of proximity to buildings	29/11/2021
3.5	10 Years	Close Interval Potential Survey (CIPS) – for buried pipelines, mains and services with CP installed	N/A
4	**Polyethylene (PE) Pipelines, mains and services**		
4.1	5 Years	Leakage survey – All pipes within site regardless of proximity to buildings	29/11/2021
4.2	5 Years	Over line pipe survey – All pipes within site regardless of proximity to buildings	29/11/2021
5	**This section refers to LPG installations only – refer to TS/GAS-01**		
6	**Secondary Pressure Regulating Installations (PRIs).** Note: this is for secondary network PRIs only – it does not include the PRIs associated with the Primary Meter Installation(s), first-stage LPG regulators or the Meter regulator(s) installed downstream of the consumers / user ECVs		
6.1	12 Month	Functional check of PRI including safety / redundant systems	N/A
6.2	12 Month	Visual inspection of pipework within PRI housing	N/A

7	**Meter and PRI Housings** Scope for this activity includes the housing of all meter and PRI installations		
7.1	12 Month	Inspection of PRI housing (where present)	N/A
8	**Valves**		
8.1	12 Month	Inspection of valve chambers	29/11/2021
8.2	12 Month	Leakage detection survey within valve chamber	29/11/2021

4.2 Iron Pipework.

Where cast iron (including spun iron) or ductile iron pipework exists on an MOD establishment it is to be risk assessed in accordance with section 4.3 of the MOD GSC and, where required, entered into a mains replacement programme in order to comply with the UK mains replacement enforcement policy.

Below is the amount of Cast Iron and / or Ductile Iron pipe, and details, identified at this establishment from a survey:

Cast Iron (m):	Not Applicable
Ductile Iron (m):	

Pressure (mbar)	Nominal Diameter (“)	Cast Iron or Ductile Iron	Total Length (m)	Closet Proximity to buildings (m)	Risk Score	Planned Replacement Date

5. RISK ASSESSMENTS

5.1 Model Risk Assessments.

The Model Risk Assessment (RA) shown in the table below, highlight the factors that will affect the safe management of the flow of gas, and the provision of the emergency response service. These RA, reviewed and modified as appropriate to this establishment, are shown at Annex C. (These RA must be reviewed and authorised by the GRP as being correct for this establishment with the date entered at the top of the RA).

RA No.	Title (Model Risk Assessments)
1	Any gas leak considered hazardous to persons or property (Under med/low pressure conditions).
2	Fire or explosion near to, or directly involving, a pipeline or gas facility.
3	A failure of operation of pipeline/plant onsite, or immediately downstream of site, that is maintained by the gas transporter.
4	A failure of operation of pipeline/plant onsite that is maintained by site services.
5	Failure of safety critical equipment.
6	Under-pressure in the gas system.
7	Over-pressure in the gas system.
8	Failure in system during load shedding.
9	General changes to the gas network.
10	Failure of PPM, general operation of the gas network plant/equipment and safety inspections.
11	Emergency Shutdowns.
12	Interface with Gas Transporter.
13	Interface with the consumers.
14	Interface with Emergency Services.
15	Natural Disasters, civil disturbances, other unforeseen events.

5.2 Additional Site-Specific Risk Assessments.

In addition to the model RA shown above, the site-specific RAs shown below have been identified. These RA are shown in Annex D (As with the Model RAs above, these must be reviewed and authorised by the GRP as being correct for this establishment with the date entered at the top of the RA).

16	
17	
18	
19	

6. SAFETY MANAGEMENT SYSTEMS

No site-specific considerations (refer to MOD Gas Safety Case Section 6) unless stated below:
Provision of future network maintenance i**s** within the contract of VIVO

7. EMPLOYEE COMPETENCE

No site-specific considerations (refer to MOD Gas Safety Case Section 7) unless stated below:
No additional site specific measures in place

8. CONTRACTORS

No site-specific considerations (refer to MOD Gas Safety Case Section 8) unless stated below:
No additional site specific measures in place

9. HEALTH AND SAFETY COMMUNICATION – INTERNAL

9.1 Health and Safety Communication This section describes the systems in place to enable effective communications within this establishment. Different forms of communication are used to pass information to people within the MOD/MMOs depending on the type of information and the audience including in the event of an emergency.
9.1.1 Public Address System. The public address arrangements for this establishment are shown below
There is no public address system on site
9.1.2 Internal Electronic Correspondence. Details of any internal email or intranet correspondence are shown below
The site has the facility for email to be used for communication. Email addresses for Key site personalities are listed in section 1 of this document.
9.1.3 Direct Contact. Details of any site-specific arrangements for direct MOD / MMO contact with site personnel and families are shown below
Face to face meetings with key personnel are possible on a regular basis if required.
9.1.4 Emergency Plans. Details of any site-wide emergency plans and arrangements, including MMO documents are shown below
No specific gas emergency plan for the establishment is in place. MOD Exemplar Gas Safety Case to be used as guidance.

9.1.5 On-Site Emergency Services. Details of site-specific arrangements for communication with site emergency services, such as fire, are shown below
There are no on-site emergency services. Site personnel will dial 999 for Police, Fire and Emergency Medical services.

10. HEALTH AND SAFETY COMMUNICATION – EXTERNAL

No site-specific considerations (refer to MOD Gas Safety Case Section 10) unless stated below:
No additional site specific measures in place

11. AUDITS

11.1 GSM Audit.

The audit process in place monitors and measures compliance with legislation and company policy and is aimed at ensuring the safe flow of gas within the MOD networks and downstream of the consumers ECV.

The GSM audit role is primarily concerned with assuring that the GRP duties are being effectively undertaken and that the gas risks are being effectively managed on the site. All GSM Audits will be carried out using the standard audit template prepared by the DIO PGE. Every site with gas networks shall be audited as frequently as practicable, ideally annually and in accordance with a programme agreed with the DIO PGE. Every site shall be audited at least once every three years. Each GSM shall implement an audit programme which must be agreed by the DIO PGE. All completed audit reports shall be sent to the DIO PGE for review and filing.

As agreed with the PGE, GSM audits on this establishment will be carried out:	On a maximum of a three-yearly basis
The last GSM audit was conducted on:	20/07/2023
The last GSM audit was carried out by:	Neville King
The qualitive assessment of the GSM audit concluded this establishment is: (safe to continue / safe to continue subject to caveats / unsafe to continue)	Safe to continue subject to caveats
Audit findings:	See audit report
Points addressed following last audit:	

12. CO-OPERATION

12.1 Emergency Exercises. On MOD networks, the MMO utilises EGDN to provide a gas emergency response service for dealing with reported gas escapes. However, the EGDN response would normally be to isolate MOD supplies at the incoming meter installation(s). As this is likely to cause considerable inconvenience and expense to MOD facilities, where possible MMO staff / contractors would attempt to attend the emergency in advance of the EGDN personnel to assess the emergency and advise EGDN accordingly. It is the responsibility of the HoE to ensure that a gas emergency exercise is conducted on the establishment at least once in a three-year period. The HoE will require the support and involvement of the MMO and all key stakeholders such as the EGDN. Lessons learnt should be actioned and kept within the gas document centre.	
Date of last emergency exercise:	No previous emergency exercises
Date of next planned emergency exercise:	From Q4 2022
Date of last actual emergency involving EGDN:	No previous actual emergency reporting
Were the EGDN involved in the last emergency exercise:	
Were the MOD emergency services involved in the last emergency exercise or actual emergency:	
Summary of lessons learnt from the last emergency exercise or actual emergency:	
Date MMO emergency contact numbers and procedures were last tested:	

13. EMERGENCY SERVICE RESPONSE TO GAS ESCAPES

No site-specific considerations (refer to MOD Gas Safety Case Section 13) unless stated below:
No additional site specific measures in place

14. INVESTIGATIONS

No site-specific considerations (refer to MOD Gas Safety Case Section 14) unless stated below:
No additional site specific measures in place

15. GAS QUALITY

No site-specific considerations (refer to MOD Gas Safety Case Section 15) unless stated below:
No additional site specific measures in place

16. CONTINUITY OF SUPPLY

No site-specific considerations (refer to MOD Gas Safety Case Section 16) unless stated below:
No additional site specific measures in place

17. ADEQUATE NETWORK PRESSURE

17.1 Network Analysis.

Network Analysis is the primary tool by which the MOD satisfies itself that anticipated levels of demand can be supplied from its MP and LP networks to gas consumers. It allows different scenarios to be examined. The technique ensures the efficient management and operation of the MP and LP gas supply systems. It enables a detailed understanding of the gas supply system to be developed upon which cost effective planning and operating decisions can be made.

In accordance with industry recommendations Network Analyses must be repeated at every site containing an MOD Network at least five-yearly, or sooner, if for gas system modification purposes or when demand profiles have changed or are expected to change.

For this establishment the network analysis was undertaken by:	DNV
For this establishment the network analysis was undertaken on:	03/02/2023

17.2 Design Minimum Pressure.

The MOD utilises nominal minimum design pressures, in compliance with IGE/GL/1. These minimum pressures will be seen at the extremities of the systems under extreme conditions. To ensure that all gas equipment downstream of the meter can be safely operated, it is a gas industry recommendation that the network should maintain a minimum of 20.75 mbar at the end of any service pipe. However, for existing networks, it is permitted to have a pressure as low as 19 mbar at the end of any service under 1 in 20 peak six-minute conditions. This value must also include any temporary contingencies to support maintenance activities. Where any appliances have elevated minimum recommended operating pressures (P_{ign}), the DmP must allow for this, taking into account any pressure losses across the meter (4mbar) and through installation pipework (10% of P_{ign}).

The minimum modelled pressure (based on 1:20 peak 6 minutes flow conditions) at the outlet of the consumers ECV at the system extremity is:	20.9 mbar
The location of the minimum pressure is:	Building 3
The declared minimum pressure (DmP) is:	19 mbar

17.3 Network Analysis Results.

A brief description of the network analysis results is below;

Pipe Data

The pipe model was built from the 'WX100-B-A1.dwg' and 'WX100-B-A1.pdf' files produced by DNV from drawing records supplied by the RFCA. The files included the pipe lengths, connectivity, diameters and materials all used in the modelling.

Demand Data

The demand levels used in the analysis are the maximum estimated flows that the network is likely to experience. This criterion is stated in IGE/GL/1 Planning of Gas Distribution Systems of MOP not Exceeding 16 bar, section 4.2.1:
'Any system should be designed to meet the maximum demands placed upon it.
Note: Experience has shown that this is likely to be the maximum demand that will occur in any period of not less than 6 minutes, expressed as an hourly rate.'
The Wyvern Barracks ARC network is comprised of a mixture of building types and usage, and the principal uses for gas are for catering, space and water heating. The effects of diversity have not been considered. This undiversified demand modelling ensures that the worst-case scenario is assessed.

Supply Data

Gas is supplied to the main Wyvern Barracks ARC network via a medium pressure (MP) main. Supply pressure data obtained by DNV in the form of instantaneous pressure readings shows the outlet pressure of the main site regulator to be as follows:

Bulk Fiscal Primary Meter (BFPM) within the Gas Meter House had an outlet pressure of 40 mbar (working).
For the modelling, the instantaneous pressures recorded at the meter by the pressure gauge have been used.

The capacity of the main meter for the MoD network is 311 sm3/h which is greater than the estimated maximum flow through the meter (154 sm3/h). Therefore, the meter is adequately sized.
.
Pressure Modelling and Comparison

The network model was built and analysed as detailed above. The pressure data collected during the survey was compared with the modelled pressures, as shown in the table below.
19 mbar is used in this report as the minimum pressure requirement under maximum flow conditions for this network. This is taken as the pressure requirement for the inlet to the appliances. It is expected that the modelled pressures will fall below those recorded as the modelled demand is the estimated maximum and it is unlikely that these conditions were experienced whilst the survey was undertaken. Providing that the modelled pressures are not significantly lower than those recorded, or below the minimum pressure requirement, this should not be a cause for concern as the difference can be attributed to the lower demand flows being experienced.

The pipe data available at the time of producing this report, and which has been used to build the Synergi network analysis model of Wyvern Barracks ARC, was of a reasonable quality, although many of the pipe routes were based on assumptions.
Demands were estimated based upon appliance ratings determined during the site survey.
The main meter within the network has a larger capacity than the calculated maximum demand and is therefore adequately sized.
There is a good degree of confidence in the pressures predicted by the network model as a result of the pressure comparison against the recorded pressures.
Modelling of the documented infrastructure and maximum estimated gas demands shows that all the buildings modelled should receive gas with a pressure above the minimum limit of 19 mbar within the network.

17.4 Network Validation Survey.

As part of the network analysis validation procedure, pressure monitoring points are to be installed on MOD networks to enable pressure surveys to be conducted. In accordance with the recommendations of Section 8.3.2. of IGE/GL/1, pressure surveys will need to be carried out on MOD networks to verify that the results from the network models were indicative of the recorded pressures on the network. This is a practice which is widely used throughout the gas industry to check network models provide realistic results.

It is the responsibility of the MMO to ensure adequate pressure surveys are conducted at regular intervals to validate the pressures predicted by network analysis results. This must be conducted at a minimum of once every five years, in conjunction with a Network Analysis or when demand profiles on the network have changed. Similarly, if the results of a previous Network Analysis are suspected to be inaccurate (for example, low extremity pressures being experienced), a repeat Network Analysis should be undertaken.

For this establishment the latest validation survey was undertaken by:	DNV
For this establishment the latest validation survey was undertaken on:	29/11/2021

17.5 Network Validation Survey Results.

A brief description of the network validation survey results is below which includes a comparison of the modelled pressure and actual pressure record;

Pressure Survey and Network Analysis Results

Pressure Survey

In accordance with the recommendations of Section 8.3.2 of IGE/GL/1, a pressure survey would normally be carried out on the Wyvern Barracks ARC network in order to verify that the results from the network model were indicative of the recorded pressures on the network. This is a practice which is widely used throughout the gas industry to provide confidence in network analysis models.
The network was surveyed on the 29th November 2021. Single point pressure readings using a Druck pressure gauge or similar were recorded. These were attached to the outlet of the supply regulators and at the meter points in the buildings.
A simple pressure survey of short-term single readings was undertaken at 7 meter / appliance locations in the modelled area. The recorded pressures taken in this type of survey may be standing pressures where the appliances are not operational, or working pressures, where they are. There may be several mbar differences between these pressures.

Building	Modelled Flow (sm^3/h)	Pressure (mbarg)	
		Single Read	Modelled
Gas Mter House: BPFM	0	40 (Working)	40
Building 1 : Offices	7.4	37.6 (Standing)	39
Building 2: Stores	4.2		39
Building 3: Officers Accommodation	56.6		20.9
Building 6: Guard Room	0		36.9
Building 7 (Front): Offices	6		36.7
Building 7 (Back): Offices	32.8	36.6 (Working)	37.2
Building 8: Accommodation	8.7	36.5 (Working)	37.2
Building 9: Accommodation	10.3	36.6 (Working)	37.3
Building 10: Accommodation	11.4	36.9 (Standing)	37.5
Building 11 Plant Room: Offices	10.5	36.2 (Working)	32.9
ATC Offices: Offices	2.5		32.2
ATC Stores: Stores	3.6		30.8

All of the modelled pressures are similar to the recorded pressures as expected.
As a result of the pressure comparison, there is a reasonably high level of confidence in the modelling of the network.
The modelled network supplies each demand with gas above the minimum pressures of 19 mbar.
The minimum modelled pressure on the network is 20.9 mbar at the inlet to Building 3. This shows a modelled pressure drop of 19.1 mbar from the supply (40 mbar).

Please note,

No test points were installed on supplies to the following buildings:

Building 3: Officers Accommodation
Building 6: Guard Room
Building 7 (Front): Offices
ATC Offices: Offices
ATC Stores: Stores

It was therefore not possible to fully validate the findings of the network analysis modelling.
Defects have been raised for the installation of appropriate test points to facilitate future operation and maintenance testing requirements.

Follow-on works will be undertaken to update and revalidate the network analysis once funded

17.6 Corrective measures.	
Following the network analysis and network validation survey the below corrective or mitigation measures have been planned at this establishment;	
MOD network name / ID:	MoD Network 01
The results for the Wyvern Barracks ARC model as a whole are satisfactory.	

18. GAS SUPPLY EMERGENCIES

No site-specific considerations (refer to MOD Gas Safety Case Section 18) unless stated below:
No additional site specific measures in place

19. GAS QUALITY – SOLE CONVEYER

No site-specific considerations (refer to MOD Gas Safety Case Section 19) unless stated below:
No additional site specific measures in place

20. DISCONTINUING GAS SUPPLY

No site-specific considerations (refer to MOD Gas Safety Case Section 20) unless stated below:
No additional site specific measures in place

21. RESTORATION OF SUPPLIES

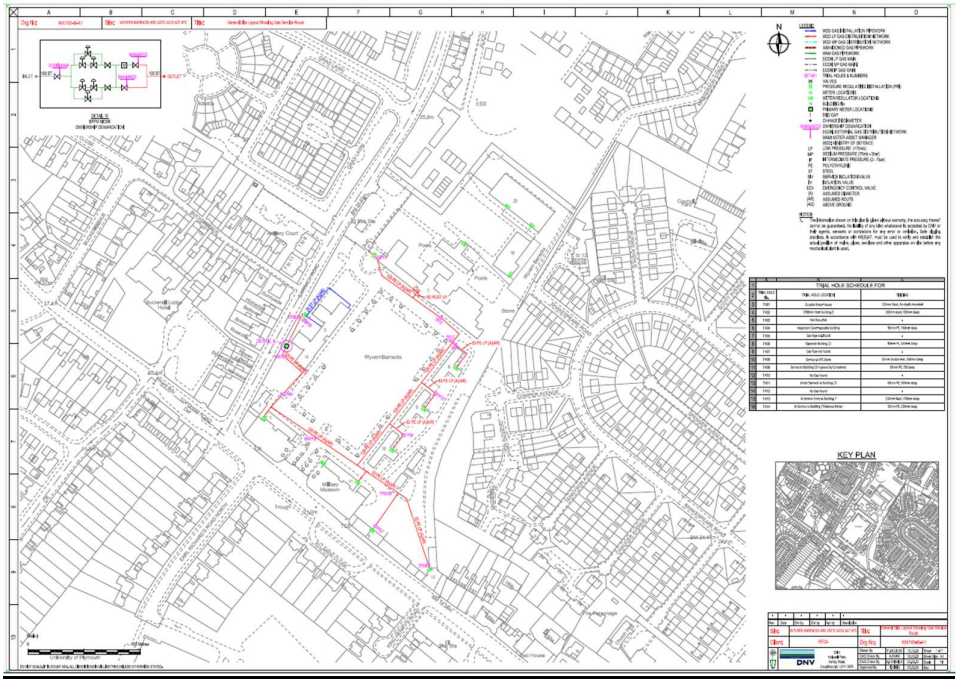
No site-specific considerations (refer to MOD Gas Safety Case Section 21) unless stated below:
No additional site specific measures in place

ANNEX A - ABBREVIATIONS

4C's	Co-ordination, Co-operation, Communication and Control
AE	Authorising Engineer
CI	Cast Iron
CIPS	Close Interval Potential Survey
CP	Cathodic Protection
DI	Ductile Iron
DIO SD EUS	Defence Infrastructure Organisation Service Delivery, Energy, Utility and Sustainability
DIO TS	Defence Infrastructure Organisation Technical Services
DIO	Defence Infrastructure Organisation
DmP	Design Minimum Pressure
ECV	Emergency Control Valve
EGDN	External Gas Distribution Network
FIM	Functional Independence Measure
GRP	Gas Responsible Person
GSIUR	Gas Safety (Installation and Use) Regulations1998
GSMR	Gas Safety (Management) Regulations 1996
GSC	Gas Safety Case
GSM	Gas Safety Manager
GSMP	Gas Safety Management Plan
HoE	Head of Establishment
HP	High Pressure
IGEM	Institute of Gas Engineers and Managers
IP	Intermediate Pressure
LP	Low Pressure
LPG	Liquified Petroleum Gas
MAM	Meter Asset Manager
MMO	Maintenance Management Organisation
MOD	Ministry of Defence
MP	Medium Pressure
NA	Network Analysis
NG	Natural Gas
NVS	Network Validation Survey
PE	Polyethylene
PGE	Principal Gas Engineer
PRI	Pressure Reduction Installation
PUS	Permanent Under Secretary
RA	Risk Assessment
SHEF	Safety, Health, Environment and Fire
TLB	Top Level Budget Holder

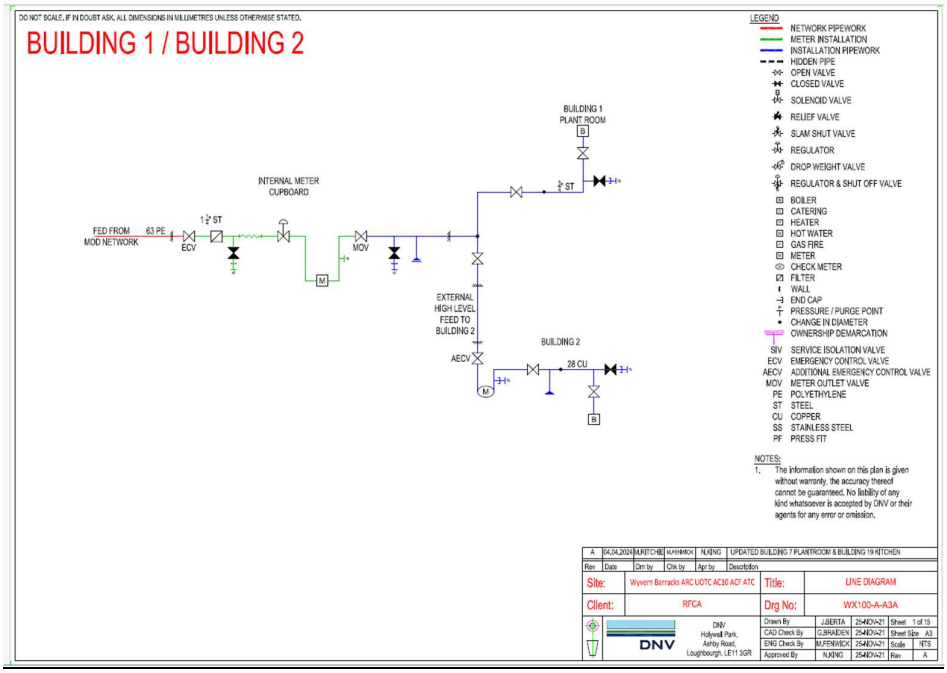
ANNEX B - SITE LAYOUT DRAWINGS.

Gas Network Layout Drawing

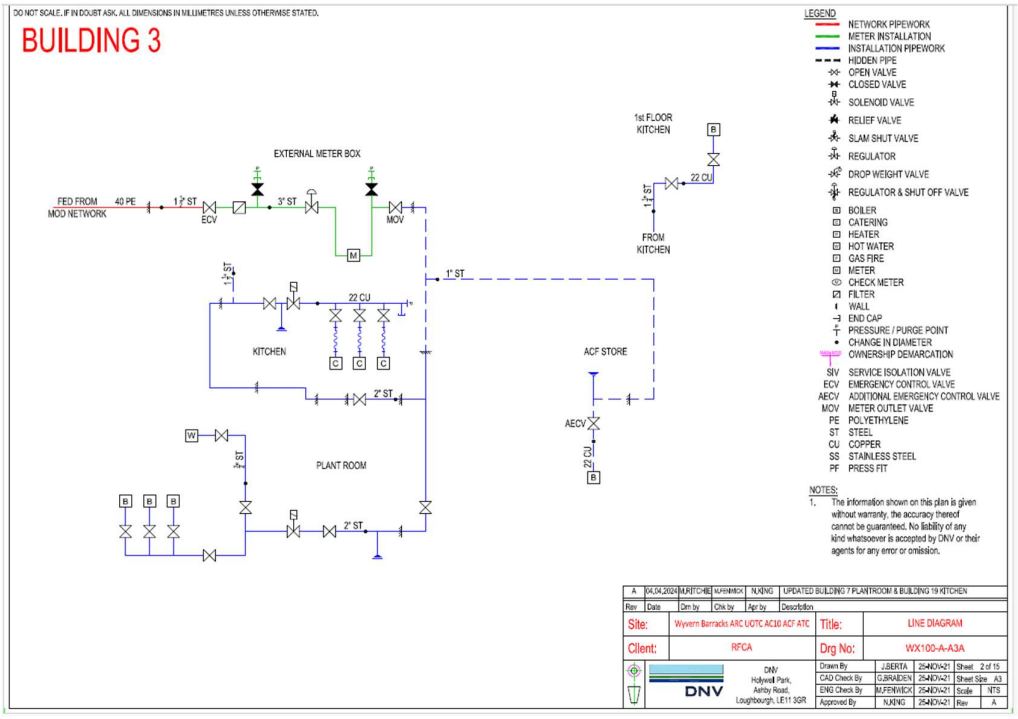


Gas Line Drawings

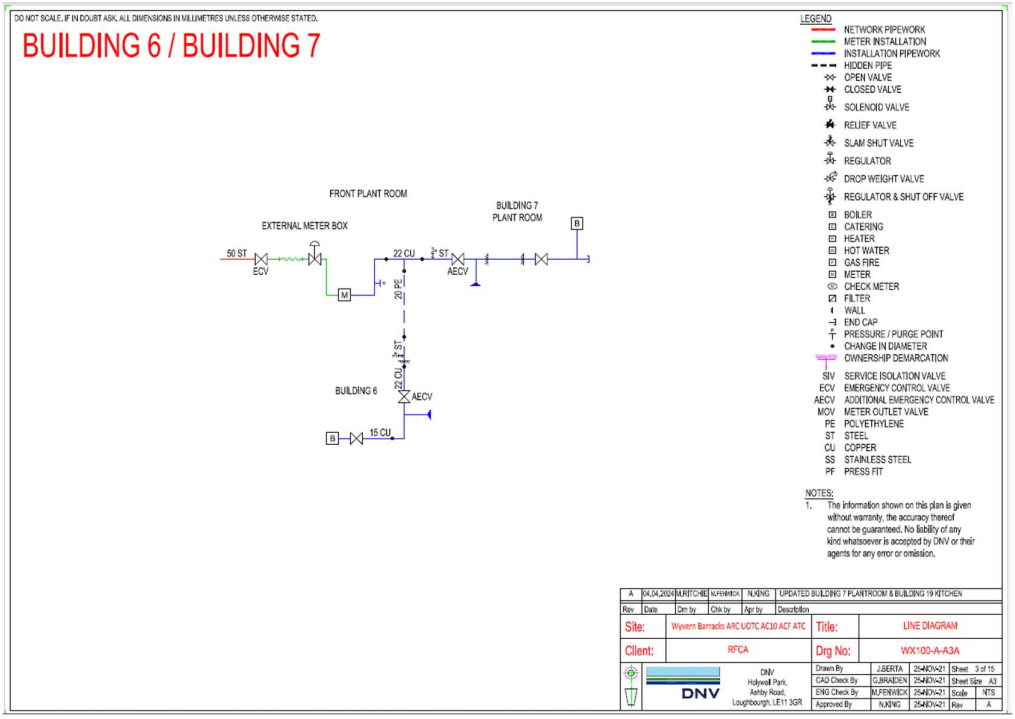
Building 1 and 2



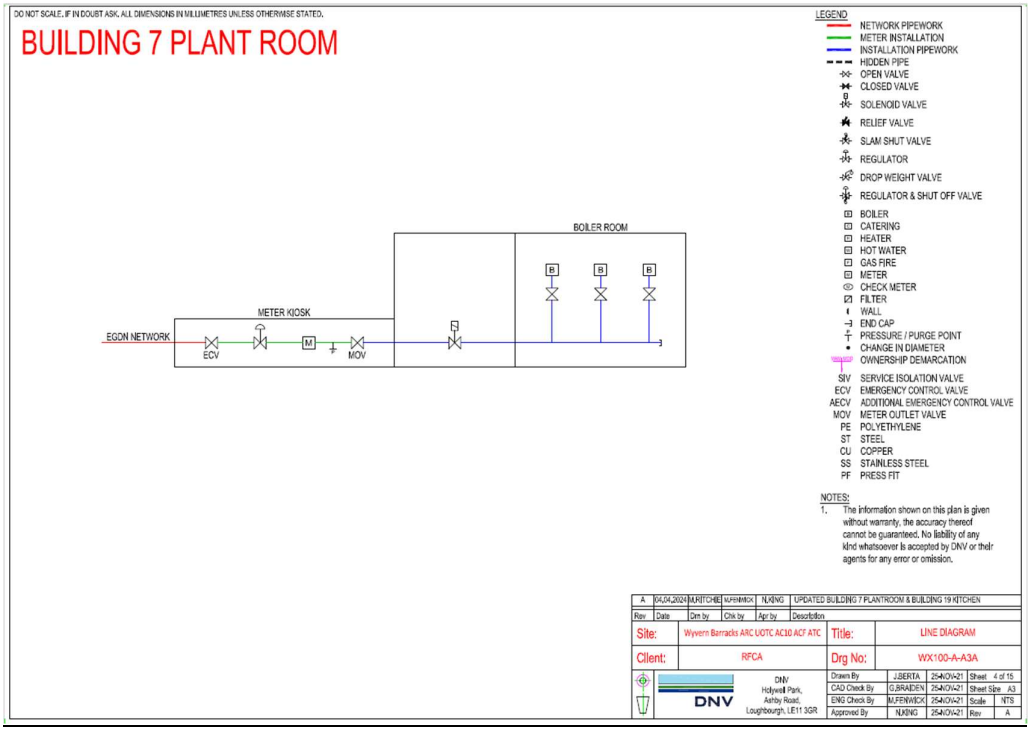
Building 3



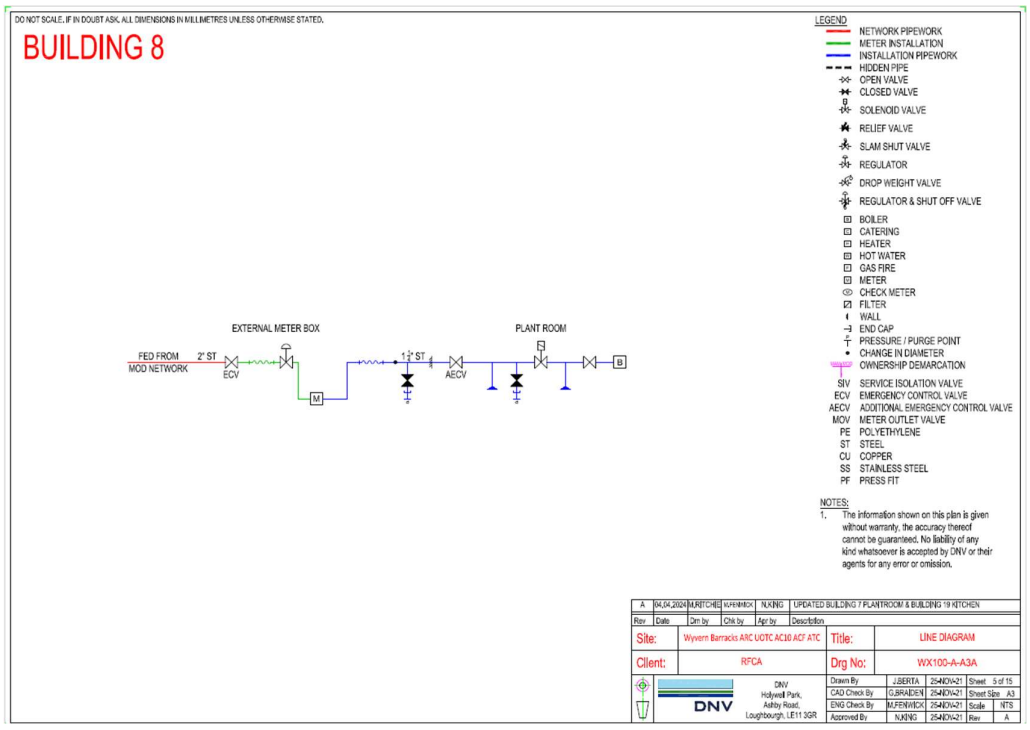
Building 6 and 7



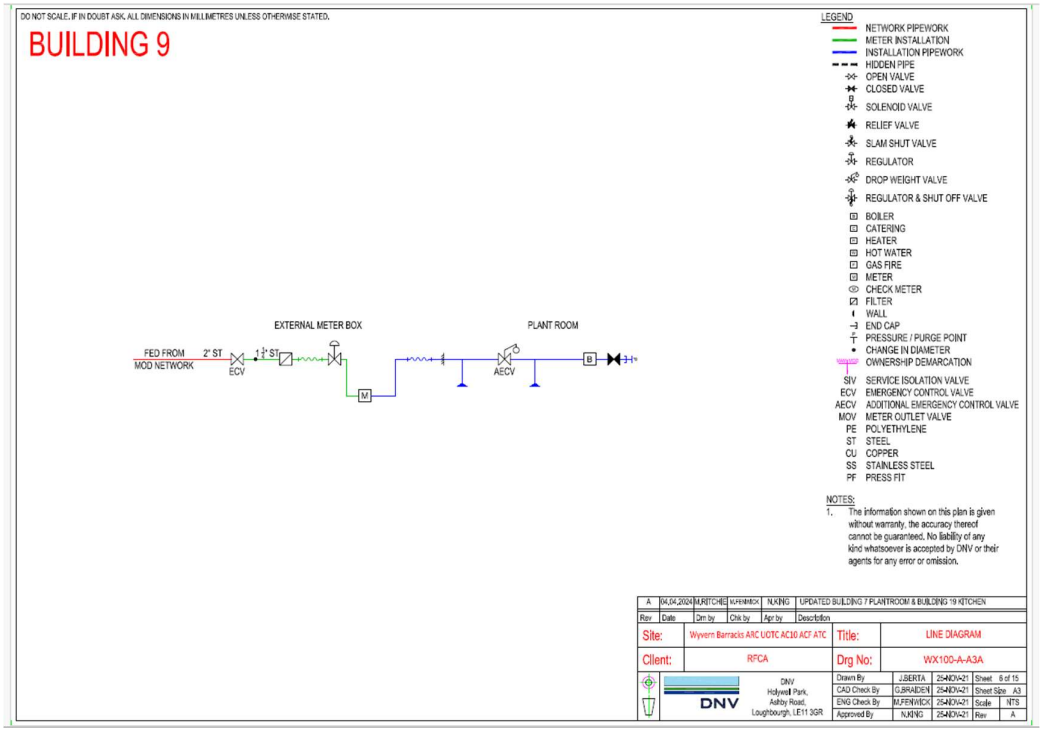
Building 7 Plantroom



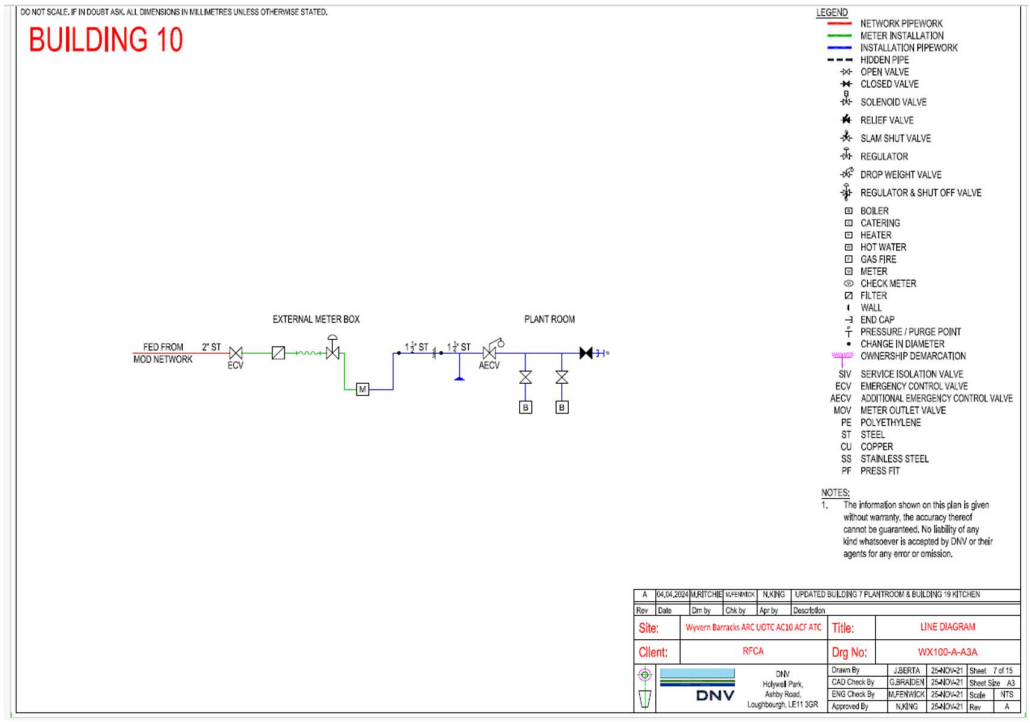
Building 8



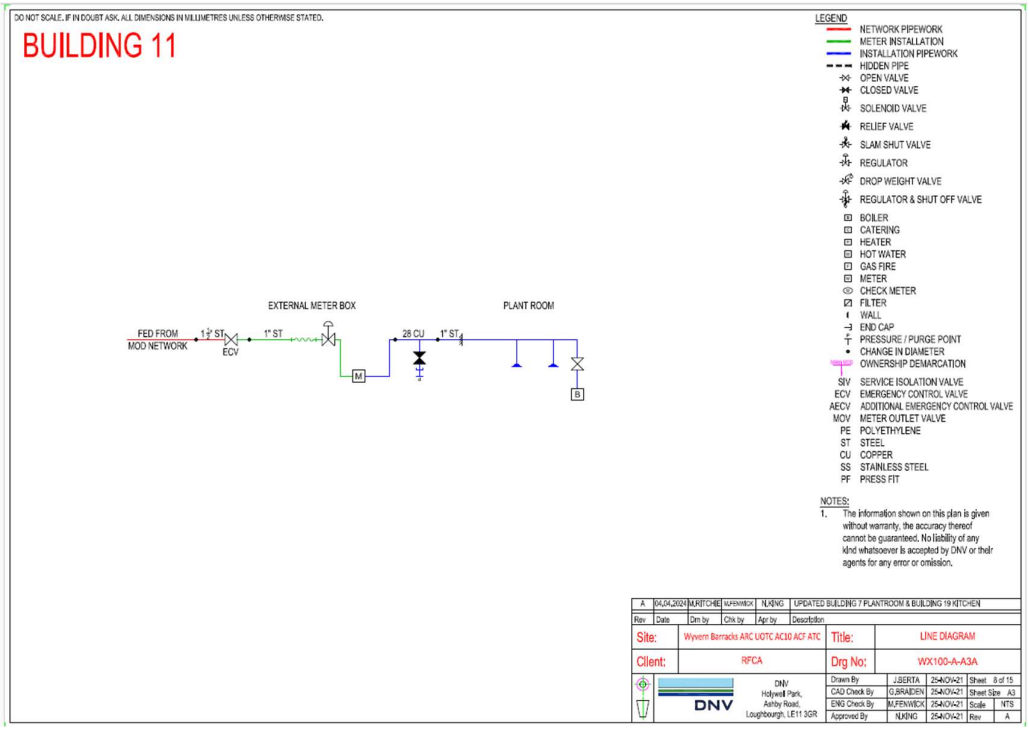
Building 9



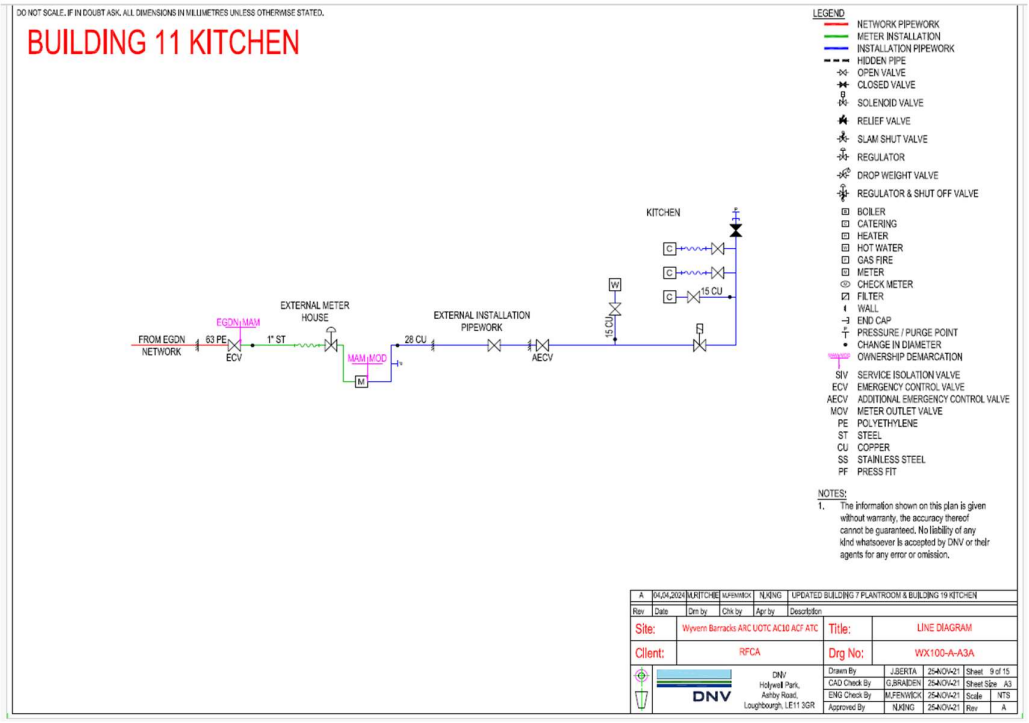
Building 10



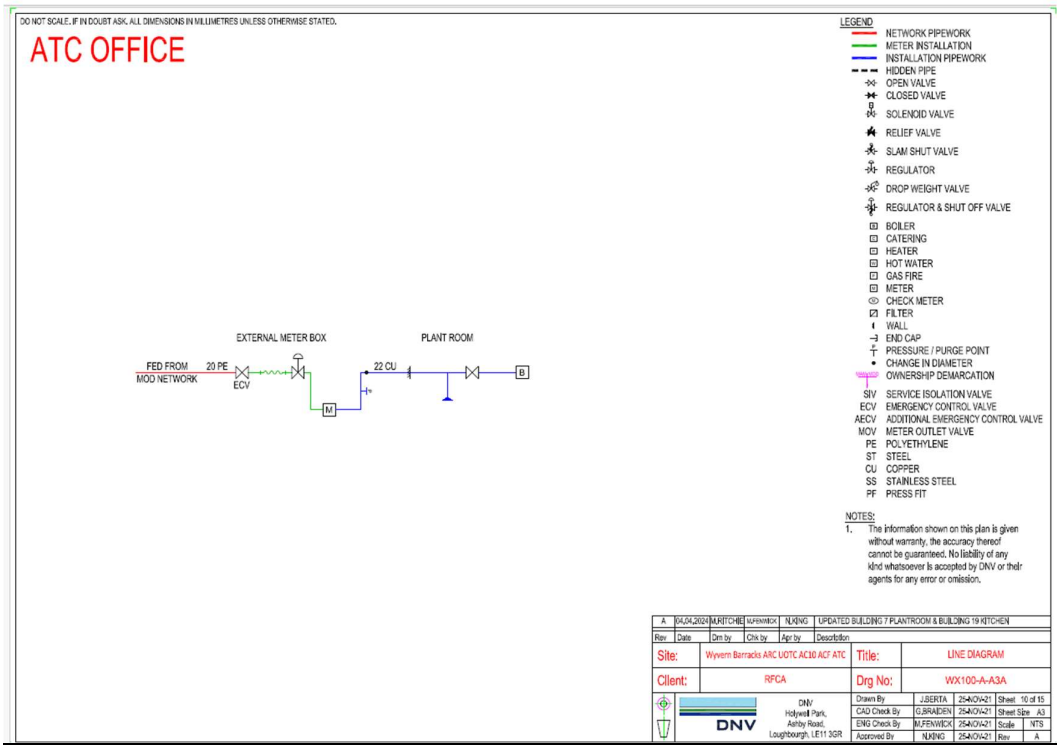
Building 11 Plantroom



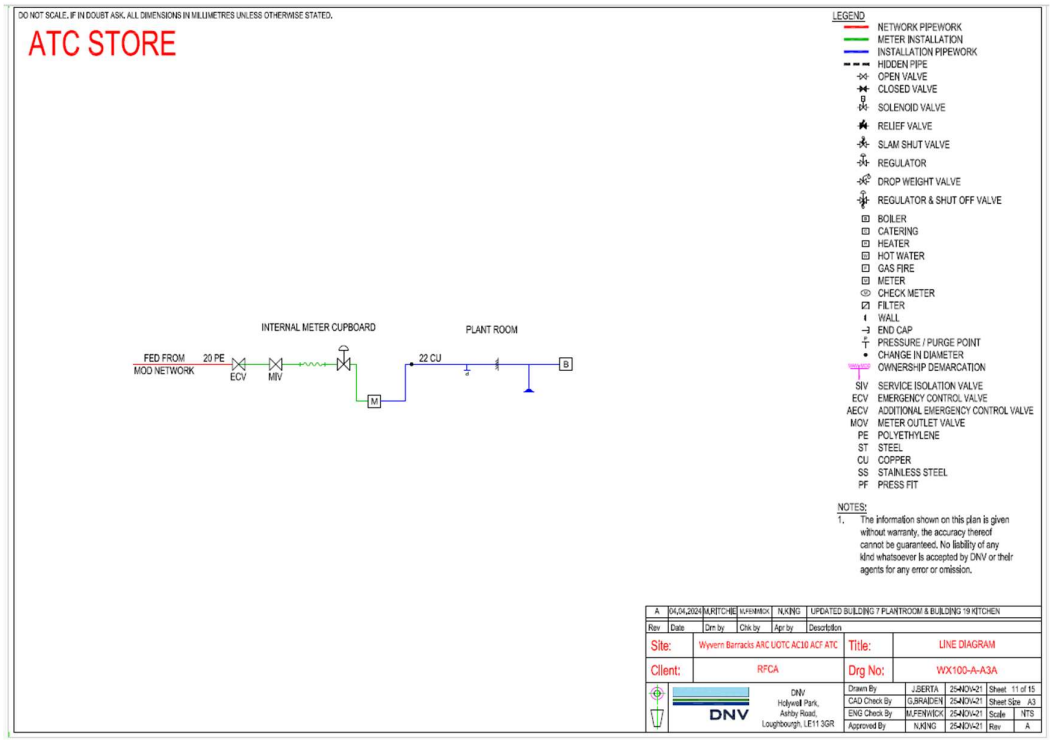
Building 11 Kitchen



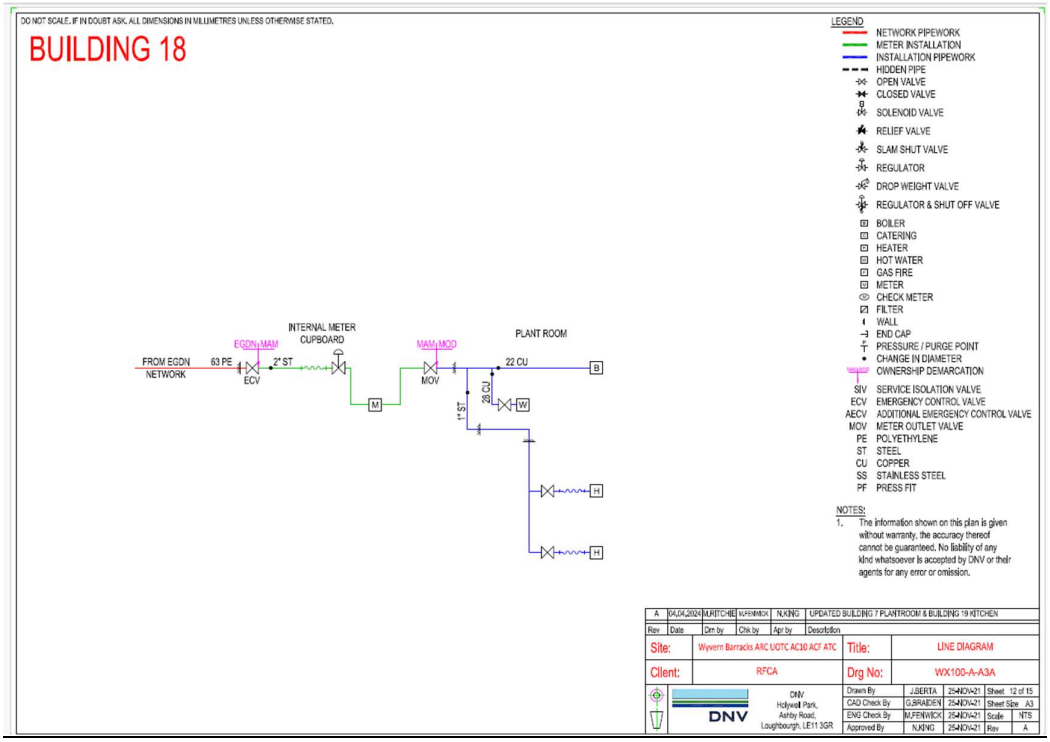
ATC Office



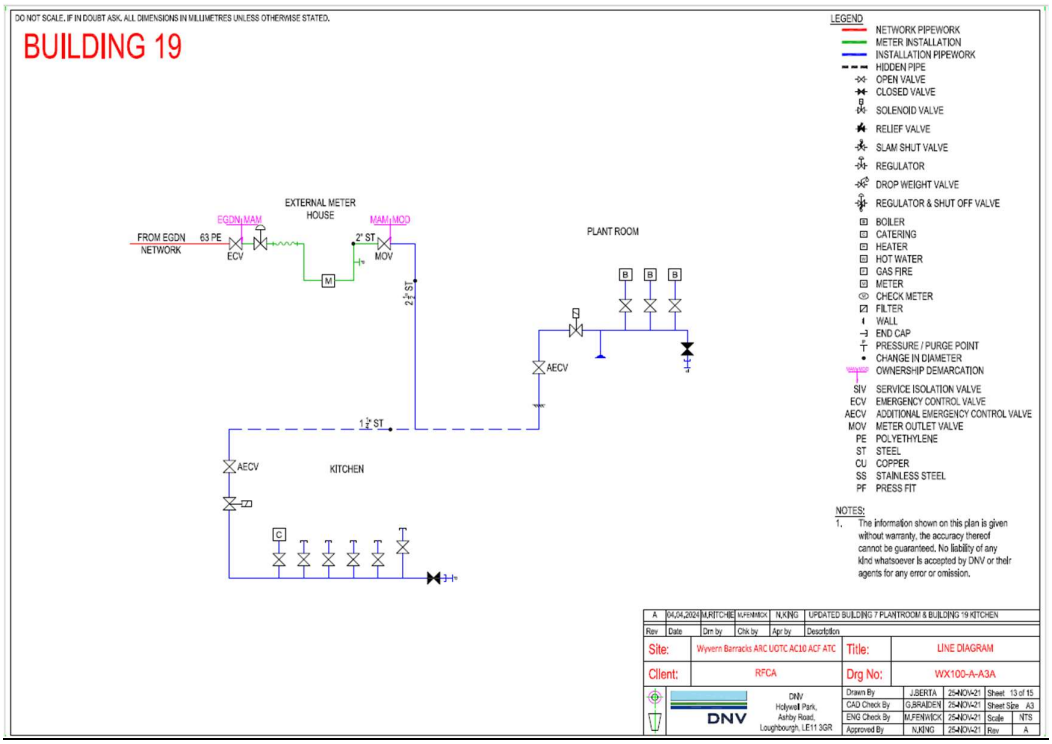
ATC Store



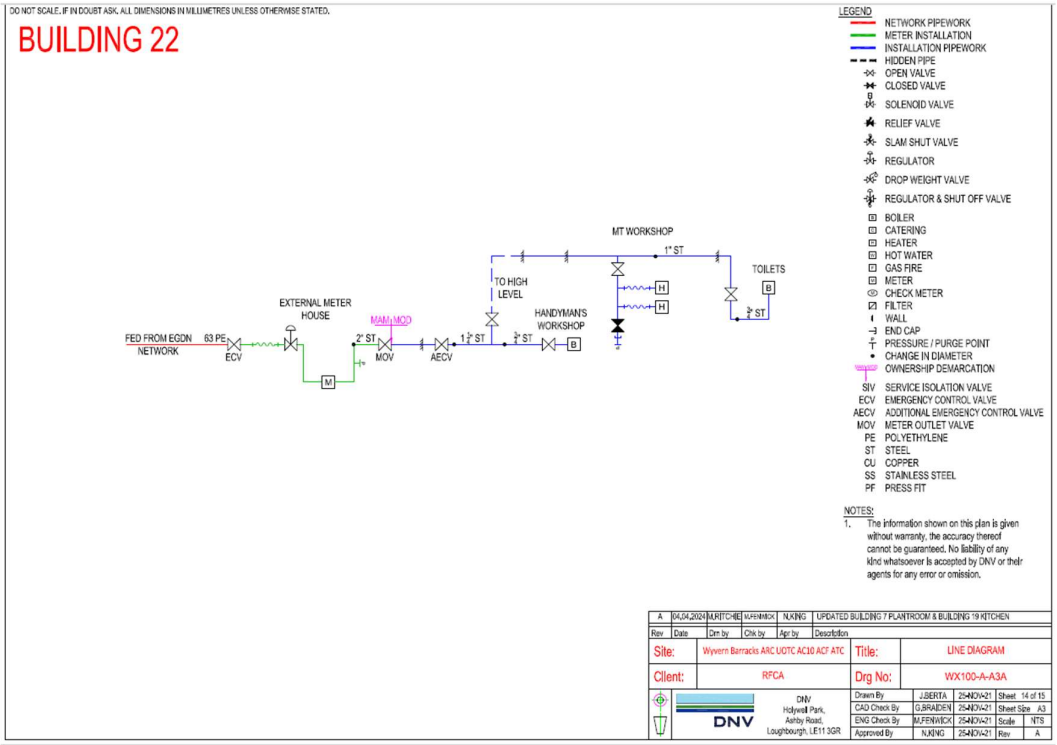
Building 18

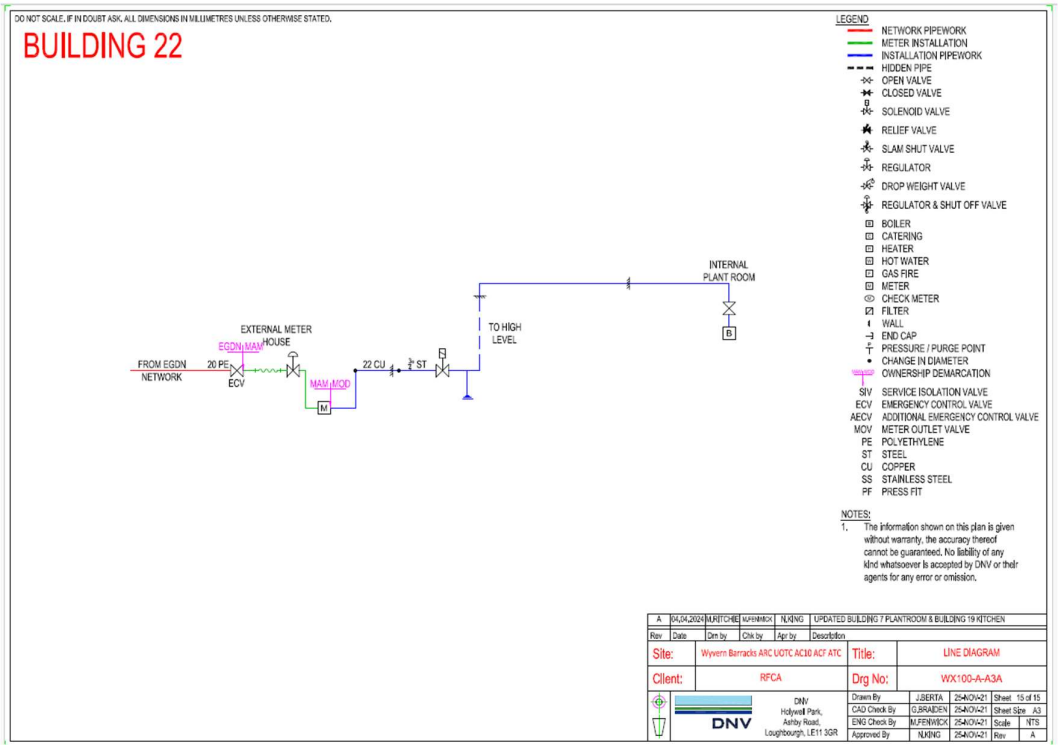


Building 19



Building 22


DO NOT SCALE. IF IN DOUBT ASK. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
BUILDING 22
MT WORKSHOP
1" ST
TOILETS
TO HIGH LEVEL
EXTERNAL METER HOUSE
MAM1/MOD
HANDYMAN'S WORKSHOP
FED FROM EGDN NETWORK
63 PE
ECV
2" ST
MOV
1½" ST
AECV
¾" ST
M
H
B
LEGEND
NETWORK PIPEWORK
METER INSTALLATION
INSTALLATION PIPEWORK
HIDDEN PIPE
OPEN VALVE
CLOSED VALVE
SOLENOID VALVE
RELIEF VALVE
SLAM SHUT VALVE
REGULATOR
DROP WEIGHT VALVE
REGULATOR & SHUT OFF VALVE
BOILER
CATERING
HEATER
HOT WATER
GAS FIRE
METER
CHECK METER
FILTER
WALL
END CAP
PRESSURE / PURGE POINT
CHANGE IN DIAMETER
OWNERSHIP DEMARCATION
SIV SERVICE ISOLATION VALVE
ECV EMERGENCY CONTROL VALVE
AECV ADDITIONAL EMERGENCY CONTROL VALVE
MOV METER OUTLET VALVE
PE POLYETHYLENE
ST STEEL
CU COPPER
SS STAINLESS STEEL
PF PRESS FIT
NOTES:
1. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. No liability of any kind whatsoever is accepted by DNV or their agents for any error or omission.
A 04.04.2024 MJRITCHIE MJFENWICK NJKING UPDATED BUILDING 7 PLANTROOM & BUILDING 19 KITCHEN
Rev Date Drn by Chk by Apr by Description
Site: Wyvern Barracks ARC UOTC AC10 ACF ATC
Title: LINE DIAGRAM
Client: RFCA
Drg No: WX100-A-A3A
DNV
Holywell Park, Ashby Road, Loughbourgh, LE11 3GR
Drawn By JJBERTA 25-NOV-21 Sheet 14 of 15
CAD Check By GJBRADEN 25-NOV-21 Sheet Size A3
ENG Check By MJFENWICK 25-NOV-21 Scale NTS
Approved By NJKING 25-NOV-21 Rev A


DO NOT SCALE. IF IN DOUBT ASK. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
BUILDING 22
INTERNAL PLANT ROOM
TO HIGH LEVEL
EXTERNAL METER HOUSE
EGDN1/MAM
FROM EGDN NETWORK
20 PE
ECV
22 CU
¾" ST
MAM1/MOD
M
B
LEGEND
NETWORK PIPEWORK
METER INSTALLATION
INSTALLATION PIPEWORK
HIDDEN PIPE
OPEN VALVE
CLOSED VALVE
SOLENOID VALVE
RELIEF VALVE
SLAM SHUT VALVE
REGULATOR
DROP WEIGHT VALVE
REGULATOR & SHUT OFF VALVE
BOILER
CATERING
HEATER
HOT WATER
GAS FIRE
METER
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ANNEX C

ANNEX C - MODEL RISK ASSESSMENTS

Site Reviewed Model Risk Assessment - 01	
For: Wyvern Barracks ARC UOTC AC10 ACF ATC	**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Any gas leak considered hazardous to persons or property	
Risk	Any leak at any pressure can be quantified as a hazard. The higher the pressure and/or depending on the location of the leak the risk to the surrounding area varies
	Depending on the severity of the leak, other hazards such as explosions, fires, supply failures, pollution and associated financial implications could arise
	Depending on how quickly & thoroughly the gas leak is dealt with the resulting hazards from the incident will vary.
Caused By	Damage to pipelines from digging
	Failure of control equipment
	Damage caused by general construction
	Corrosion of pipelines
	Failure of mechanical joints and seals
	Deterioration or rupture of pipeline
	Poor communication between involved parties can exacerbate the problem
	Length of response time by first responders
Hazards Resulting from Risk	Damage to pipelines caused by uncontrolled escaping gas
	Risk of causing a supply emergency
	Damage to persons & property
	Risk of Explosions & Fire
	Pollution of environment
	Purging maybe required after corrective action
Current Preventative Methods	Permits to Dig
	Planned Preventative Maintenance
	Type & Quality control of materials used in gas network
	Strict adherence to emergency procedures in the event of an emergency
	Isolation via emergency stops
	Installation of gas network to industry standards
Further Required Preventative Methods	Pressure monitoring
	More accurate gas network layout drawings
	Use of the gas safety management plan
	Training of all involved parties
	Training and simulated gas emergency drills
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.

Site Reviewed Model Risk Assessment - 02	
For: Wyvern Barracks ARC UOTC AC10 ACF ATC	**Approved by: Riona Moroney**

Fire or explosion near to, or directly involving, a pipeline or gas facility	Date reviewed: 19/02/2025
Risk	Any fire or explosion directly involving a gas pipeline or facility could cause a major incident.
	Any fire or explosion near to a gas pipeline or facility may cause personal injury and or damage to property.
Caused By	Undetected trapped gas
	Unresolved gas leaks
	Failure of control equipment, pipelines, seals, joints etc.
	Damage to gas pipelines through digging and/or general construction
	Incorrect initial procedure when dealing with a gas leak
	Inadequate action by first responder
Hazards Resulting from Risk	Fire and/or explosions causing death and/or injury to general populous
	Damage and/or destruction of surrounding properties
	Damage to gas pipelines, gas control centres & other gas related equipment
	Disruption of gas supply
	Secondary Explosions & Fire resulting from inaction
Current Preventative Methods	Scheduled Maintenance
	Designed for purpose
	Permits to Dig
	Strict adherence to emergency procedures, including ventilating and evacuating area
Further Required Preventative Methods	Pressure monitoring
	Use of the gas safety management plan
	Training and simulated gas emergency drills
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.

Site Reviewed Model Risk Assessment - 03		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
A failure of operation of pipeline/plant onsite, or immediately downstream of site, that is maintained by the EGDN		
Risk	Any incident directly involving the medium pressure pipelines onsite can only be dealt with by Wales and West Utilities in the event of a leak the response time by Wales and West Utilities has an impact on the severity of the incident	
	The level of cooperation and communication between EGDN and the onsite parties has an impact on the eventual severity of the incident	
Caused By	Poor response time by Wales and West Utilities	
	Poor communication between onsite parties and Wales and West Utilities	
	Poor coordination of onsite parties and Wales and West Utilities	
	Poor communication of procedures	
	Lack of supply resulting in drop in supply pressure, resulting in site wide gas supply failure	
Hazards Resulting from Risk	Disruption of gas supply to whole site	
	Re-commissioning & purging after corrective action	
	Re-ignition of non-automatic ignition systems	
	Long down time due to above hazards	
Current Preventative Methods	Usage of DNV emergency number to ensure all GSM's and RP's are informed of leak and can communicate with site	
	General communication between DNV and Wales and West Utilities	
Further Required Preventative Methods	Communication of site procedures to Wales and West Utilities	
	Understanding Wales and West Utilities procedures	
	Training and simulated gas emergency drills	
	Training for quicker response time	
	Pressure monitoring	
	Planning for load shedding (reduces the risk of site wide gas failure)	
	Fitting automatic ignition systems as standard	
	Use of the gas safety management plan	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 04		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
A failure of operation of pipeline/plant onsite that is maintained by site services		
Risk	Any incident directly involving the low or medium pressure pipelines onsite can be dealt with by the onsite gas operatives. In the event of a leak the response time by the onsite operatives has an impact on the severity of the incident	
	The level of cooperation and communication between onsite parties such as emergency services and gas operatives has an impact on the eventual severity of the incident	
Caused By	Poor response time by site services	
	Poor communication between onsite parties	
	Poor coordination of onsite parties	
	Poor communication of procedures	
Hazards Resulting from Risk	Disruption of gas supply to whole site	
	Re-commissioning & purging after corrective action	
	Re-ignition of non-automatic ignition systems	
	Long down time due to above hazards	
Current Preventative Methods	Scheduled Maintenance	
	Designed for purpose	
	Permits to Dig	
	Strict adherence to emergency procedures	
	Management of gas infrastructure and adherence to Gas safety Case and Gas Safety Management Plans	
Further Required Preventative Methods	Pressure monitoring	
	Use of the gas safety management plan	
	Training and simulated gas emergency drills	
	Training for quicker response time	
	Planning for load shedding (reduces the risk of site wide gas failure)	
	Fitting automatic ignition systems as standard	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 05	
For: Wyvern Barracks ARC UOTC AC10 ACF ATC	**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Failure of safety critical equipment	
Risk	Failure of safety critical equipment can have a severe impact on the safety of the gas network.
Caused By	Lack of/or poor maintenance
	Incorrect use of equipment
	Ageing equipment
Hazards Resulting from Risk	Lack of control over gas network, resulting in a gas incident
	Lack of control over gas network during a gas incident
Current Preventative Methods	Scheduled Maintenance
	Designed for purpose
	Regular operational training
	Management of gas infrastructure and adherence to Gas safety Case and Gas Safety Management Plans
Further Required Preventative Methods	Pressure monitoring
	Further training of gas operatives
	Replacing old equipment where required
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.

Site Reviewed Model Risk Assessment - 06		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Under-pressure in the gas system		
Risk	If at any point the pressure in a gas network drops below a certain level, gas safety regulators will stop the flow of gas. These regulators are fitted to gas appliances and in some instances will also be downstream of the gas meter into individual houses. There is also a regulator on the main intake to the site.	
	If the pressure in a gas network, leading into a house or facility, drops below a certain level a gas safety regulator will terminate the flow of gas. This will cause the pilot lights to be extinguished. On this site, due to the multitude of buildings and houses, it may take up to 3 days to re-ignite all the systems.	
Caused By	Gas leaks	
	Poor gas network management	
	Failure of Compressors	
	Inadequate supply of gas in the system	
	Failure of pressure control system	
Hazards Resulting from Risk	Loss of gas supply	
	Gas safety regulators being tripped (requires manually resetting on older models)	
	Long recovery period	
	Potential for air in the gas network	
Current Preventative Methods	Scheduled Maintenance	
	Designed for purpose	
	Network Analysis and Validation	
	Management of gas infrastructure and adherence to Gas safety Case and Gas Safety Management Plans	
Further Required Preventative Methods	Pressure monitoring	
	Regular training of gas operatives	
	Replacing old equipment where required	
	Fitting automatic ignition systems as standard	
	Replacing manual gas safety regulators with automatic cut-outs	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 07		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Over-pressure in the gas system		
Risk	If at any point the pressure in a gas network climbs above a certain level, gas safety regulators will stop the flow of gas. These regulators are fitted to gas appliances and in some instances will also be downstream of the gas meter into individual houses. There is also a regulator on the main intake to the site	
	If the pressure in a gas network, leading into a house or facility, climbs above a certain level a gas safety regulator will terminate the flow of gas. This will cause the pilot lights to be extinguished. On this site, due to the multitude of buildings and houses, it may take up to 3 days to re-ignite all the systems.	
Caused By	Failure of pressure control system	
	Incorrect pipe/valve sizing	
	Blockages in system	
	Poor gas network management	
Hazards Resulting from Risk	Rupture of gas pipes due to high pressure related	
	Damage to valves and other control equipment	
	Damage to seals and joints	
	Loss of gas supply	
Current Preventative Methods	Scheduled Maintenance	
	Designed for purpose	
	Management of gas infrastructure and adherence to Gas safety Case and Gas Safety Management Plans	
Further Required Preventative Methods	Pressure monitoring	
	Regular training of gas operatives	
	Use of the gas safety management plan	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 08		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Failure in system during load shedding		
Risk	In the event of a gas supply emergency, load shedding can be used to stabilise the pressure in the system. However, if a section is isolated and the consumers on that branch use their gas supply the pressure in that branch will drop below acceptable levels and the pressure safety regulators will trip	
Caused By	Insufficient communication between onsite parties and the end user	
	Insufficient means of monitoring pressure	
Hazards Resulting from Risk	Loss of gas supply	
	Gas safety regulators being tripped (requires manually resetting on older models)	
	Long recovery period	
	Potential for air in the gas network	
Current Preventative Methods	RAMS	
Further Required Preventative Methods	Better communication	
	Pressure monitoring	
	Use of the gas safety management plan	
	Fitting automatic ignition systems as standard	
	Replacing manual gas safety regulators with automatic cut-outs	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 09		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
General changes to the gas network		
Risk	If during the design phase the sizing of the system is under/oversized, it could result in under/over pressure scenarios.	
	If during the installation of a gas network, the work is not carried out to the relevant British Standards and if the work is not undertaken by operatives trained and skilled to the same British Standards, failure may take place.	
Caused By	Incorrect pipe sizing at design phase	
	Underestimating impact on overall site gas supply	
	Incorrect installation of plant and pipelines	
	Under qualified gas operatives used for gas works	
Hazards Resulting from Risk	Damage to pipelines and gas network plant and equipment	
	Risk of causing a supply emergency	
	Damage to persons & property	
	Risk of Explosions & Fire	
Current Preventative Methods	Using trained individuals to carry out work to the gas network	
	Checking credentials of design authority for gas network redesign	
	Compliance with IGEM TD/3 and TD/4	
Further Required Preventative Methods	Monitoring competence of gas network operatives	
	Use of the Gas Safety Management Plan	
	Further checking/commissioning of completed works	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 10		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Failure through PPM, general operation of the gas network plant/equipment and safety inspections		
Risk	Inadequate action during maintenance can cause failure in the system	
	If safety inspections are not carried out regularly, the system may be vulnerable to failure	
	The day-to-day operation of the system is vital to the overall performance of the gas network. If the day-to-day operation is not undertaken to industry standards, the gas network could be vulnerable to failure	
Caused By	Gas plant & pipelines are not sufficiently maintained	
	Scheduled activities do not take place.	
	Operatives are insufficiently trained	
	Inadequate co-ordination of operation	
	Inadequate communication between onsite parties	
	Inadequate planning of scheduled activities	
	Inadequate inspection and testing of equipment	
Hazards Resulting from Risk	Damage to pipelines and gas network plant and equipment	
	Risk of causing a supply emergency	
	Damage to persons & property	
	Risk of Explosions & Fire	
Current Preventative Methods	Monitored and maintained	
	Using trained individuals to carry out work to the gas network	
	Following PPM schedules to carry out works	
	Awareness Training, drills and exercise	
	Using qualified operatives	
	Management of gas infrastructure and adherence to Gas safety Case and Gas Safety Management Plans	
Further Required Preventative Methods	Monitoring competence of gas network operatives	
	Checking credentials of design authority for gas network redesign	
	Employ better lines of communication between parties	
	Compliance with the Gas Safety Management Plan	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 11		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Emergency Shutdowns		
Risk	Emergency shutdowns can be used in the event of a gas incident which warrants the gas network or part thereof to be shut down. If this process fails, it can have a severe impact on the resolution of the incident	
Caused By	Failure of emergency shutdown valves	
	Ageing emergency shutdown valves	
	Lack of sufficient facilities for segregated shutdowns	
Hazards Resulting from Risk	Escalating hazard cause by existing emergency	
	Damage to pipelines and gas network plant and equipment	
	Risk of causing a supply emergency	
	Long down time	
Current Preventative Methods	Management of gas infrastructure and adherence to Gas safety Case and Gas Safety Management Plans	
	Use of site gas layout drawings	
Further Required Preventative Methods	Use of the Gas Safety Management Plan	
	Providing strategically placed emergency shutoff valves	
	Scheduled PPM	
	Checking credentials of design authority for gas network redesign	
	Replacing old equipment where required	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 12		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Interface with Gas Transporter		
Risk	If interfaces between the site team and the gas transporter are not managed carefully, the fallout from gas incidents can become more pronounced	
Caused By	Poor response time by EGDN	
	Poor communication between onsite parties and EGDN	
	Poor coordination of onsite parties and EGDN	
	Poor communication of procedures	
Hazards Resulting from Risk	Damage to pipelines	
	Resultant hazards from any gas incident can escalate	
	Risk of causing a supply emergency	
	Damage to persons & property	
	Risk of Explosions & Fire	
Current Preventative Methods	Usage of DNV gas emergency number to allow communication between DNV RP and EGDN	
Further Required Preventative Methods	Communication of site procedures to EGDN	
	Understanding EGDN procedures	
	Training and simulated gas emergency drills	
	Regular communication through fixed procedures	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 13		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Interface with Consumer		
Risk	If communication between the site team and the end user are not carefully established, the fallout from gas shortages could result in the system having to be purged and the pilot lights re-ignited. On a large site such as this, it could take up to three days to re-ignite all pilot lights.	
Caused By	Poor communication	
	Lack of understanding	
	No method of checking on gas usage	
Hazards Resulting from Risk	Risk of causing a supply emergency	
	Loss of pressure in system	
	Long recovery period	
	Potential for air in the gas network	
Current Preventative Methods	Pressure monitoring system	
	Use of the Gas Safety Management Plan	
Further Required Preventative Methods	Pressure monitoring system	
	Use of the Gas Safety Management Plan	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 14		
For: Wyvern Barracks ARC UOTC AC10 ACF ATC		**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Interface with Emergency Services		
Risk	The first responder has a duty to minimise the risk to the surrounding area upon arrival. If the gas incident is within an enclosed area, isolating the system is the correct course of action. However, in a open, well ventilated area, isolating the system may not be necessary, and could cause secondary hazards	
Caused By	Poor communication	
	Lack of understanding	
Hazards Resulting from Risk	Risk of causing a supply emergency	
	Causing the need to purge systems	
	Long downtime of gas network	
Current Preventative Methods	Usage of DNV gas emergency number to allow communication between DNV RP and Emergency services if a gas incident is called in	
Further Required Preventative Methods	Providing training to the Emergency Services, so that they will be able to better tackle gas incidents	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.	

Site Reviewed Model Risk Assessment - 15	
For: Wyvern Barracks ARC UOTC AC10 ACF ATC	**Approved by: Riona Moroney Date reviewed: 19/02/2025**
Natural Disasters, civil disturbances, other unforeseeable events	
Risk	The risk of unforeseeable events causing gas related incidents cannot be planned for. However, it is possible to minimise the impact of the resulting hazards
Caused By	Explosions
	Ground tremors
	Gas pipe sabotage
Hazards Resulting from Risk	Damage to pipelines caused by uncontrolled escaping gas
	Risk of causing a supply emergency
	Damage to persons & property
	Risk of Explosions & Fire
	Pollution of environment
	Purging maybe required after corrective action
Current Preventative Methods	High security levels
Further Required Preventative Methods	Use of the Gas Safety Management Plan
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.

ANNEX D

ANNEX D - ADDITIONAL SITE-SPECIFIC RISK ASSESSMENT TEMPLATE
Please copy and add further sheets as required

Additional Site-specific Risk Assessment 16	
For:	**Approved by:**
	Date reviewed:
Risk	
Caused By	
Hazards Resulting from Risk	
Current Preventative Methods	
Further Required Preventative Methods	
Audits	In the event of an incident, near miss or any other hazardous occurrence this RA must be reviewed and updated as appropriate.