



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

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OFGEM – Final Determination Report

GD2 Engineering Justification Paper Reviews

QEM-1910-RPT-003 Rev.01

Revision	Date	Issued For	Owner	Checked By
00	17/11/2020	First Issue	T. Voss	S. Elliott
01	27/11/2020	Issue for FD	T. Voss	S. Elliott



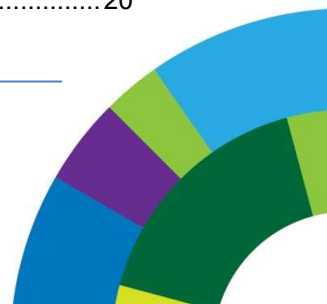


Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

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Contents

1. Executive Summary	6
2. Introduction	9
3. The Review Team	11
4. Methodology	12
4.1. Preparation	12
4.2. Execution	13
5. Cadent	15
5.1. New EJPs	15
5.1.1. Lowestoft Harbour	15
5.1.2. HP Valves	15
5.1.3. HyNet Pre-Construction	15
5.2. Repex	16
5.2.1. Distribution Mains and Associated Services (Iron, PE, Steel & Other)	16
5.2.2. Services Not Associated with Mains Replacement	16
5.2.3. London Medium Pressure	16
5.3. Capex	17
5.3.1. Cathodic Protection	17
5.3.2. Reduced Depth of Cover	17
5.4. Deep Dives	18
5.4.1. Capacity Upgrades - >7 bar reinforcements (AGI) - Base case	18
5.4.2. Offtakes & PRS Metering Systems	18
6. SGN	19
6.1. New EJPs	19
6.2. Repex	19
6.2.1. Tier 2B Iron Mains and associated services – Southern	19
6.2.2. Iron Pipes >30m and Steel Pipes Including Associated Services Southern	19
6.2.3. Tier 2B Iron Mains and associated services – Scotland	20
6.2.4. Iron Pipes >30m and Steel Pipes Including Associated Services Scotland	20
6.2.5. Tier 3 Iron Mains and associated services – Scotland	20

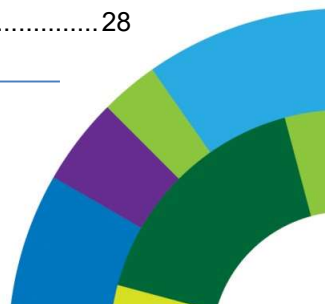




Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

6.2.6.	Tier 3 Iron Mains and associated services – Southern	21
6.2.7.	Cams Hall Tunnel	21
6.2.8.	IP Services - Reconfiguration.....	21
6.3.	Capex	21
6.3.1.	Battle 2	21
6.3.2.	Westerham 2	22
6.3.3.	St Mary's Cray	22
6.3.4.	Georgetown	22
6.3.5.	Brackley	22
6.3.6.	Marden	23
6.3.7.	Wivelsfield	23
6.3.8.	E&I Minor Works Repair Programme	23
6.3.9.	Campbeltown Ambient Vaporiser	24
6.3.10.	Responsible Demolition.....	24
6.3.11.	Process Safety	24
6.4.	Deep Dives	24
6.4.1.	R02 Pipeline – Replacement Local to Dunkeld/ Transmission	24
6.4.2.	LTS Capacity Works Programme Transmission	25
6.4.3.	Provan PRS Full Site Rebuild and AGI Pipework Rationalisation/Transmission	25
6.4.4.	Ulysses Telemetry Replacement Programme.....	25
6.4.5.	Winkfield South East Offtake.....	25
6.4.6.	Newton Mearns PRS & Waterfoot PRS Rationalisation/ Transmission	25
6.4.7.	Electrical, Instrumentation & Control Upgrade Programme	26
6.4.8.	Winkfield South Offtake	26
6.4.9.	Industrial & Commercial AMR Equipment Replacement Programme.....	26
6.4.10.	Mappowder NTS Offtake.....	26
7.	Wales & West Utilities	28
7.1.	New EJPs	28
7.2.	Repex	28
7.2.1.	Mains	28
7.3.	Capex	28





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

7.4.	Deep Dives	28
8.	Northern Gas Networks	29
8.1.	New EJPs	29
8.2.	Repex	29
8.2.1.	Mandatory Repex	29
8.2.2.	Non Mandatory Repex	29
8.3.	Capex	30
8.4.	Deep Dives	30
Appendix 1 – EJP Review Outcomes Detail		31
Appendix 2 – EJP Review Team Biographies		58
Rob Graham – QEMS: CEO & Project Sponsor		58
Tony Voss – ARV Consulting: Project Manager - Local Transmission & PRS		58
Stuarty Elliott – QEMS: Project Coordination - Security Infrastructure		58
Jeremy Bending – QEMS: Cost Benefit Analysis		58
John Wilkinson – QEMS: Electrical & Instrumentation		59
Mark Danter – QEMS: Pressure Reduction Statistics (General)		59
Peter Christie – QEMS: Iron, Steel, PE Mains, Services & Risers		59
Simon Lane – QEMS: Iron, Steel, PE Mains, Services & Risers		59
Adam Sadler – QEMS: Pre-Heating		59
Tim Green – QEMS: Local Transmission and Cathodic Protection		60
Paul Howard – QEMS: Industrial, Commercial & Service Governors, Crossings		60
Appendix 3 – [Spare]		61

Disclaimer

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Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

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Glossary

• AGI	-	Above Ground Installation
• AMR	-	Automated Meter Reading
• ARV	-	ARV Consulting Limited
• BPDT	-	Business Plan Data Template
• Capex	-	Capital Expenditure
• CBA	-	Cost Benefit Analysis
• CP	-	Cathodic Protection
• DD	-	Draft Determination (Engineering volumes / need case)
• DG	-	District Governor
• E&I	-	Electrical & Instrumentation
• EJP	-	Engineering Justification Paper
• FD	-	Final Determination (Engineering volumes / need case)
• GDN	-	Gas Distribution Network
• GT	-	Gas Transmission
• HSE	-	Health & Safety Executive
• HP	-	High Pressure
• I&C	-	Industrial and Commercial
• IMRRP	-	Iron Mains Risk Reduction Programme
• IP	-	Intermediate Pressure
• LDZ	-	Local Distribution Zone
• LP	-	Low Pressure
• LTS	-	Local Transmission system
• MOB	-	Multi Occupancy Building
• MP	-	Medium Pressure
• NARM	-	Network Asset Risk Metric
• NGN	-	Northern Gas Networks
• Opex	-	Operational Expenditure
• PE	-	Polyethylene
• PRS	-	Pressure Reducing Station
• PV	-	Photo Voltaic
• QEMS	-	QEM Solutions Limited
• Repex	-	Replacement Expenditure
• SGN	-	Gas Network Company Serving Scotland & Southern England
• SME	-	Subject Matter Expert
• SQ	-	Supplementary Question
• UHF	-	Ultra High Frequency
• WWU	-	Wales & West Utilities



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

1. Executive Summary

As part of the process of reviewing spending requests submitted by the UK's gas distribution network (GDN) companies for the RIIO-GD2 price control process, the Ofgem Engineering Hub required the support of an independent engineering team with experience in the gas distribution sector to review investment proposals for gas distribution schemes, above ground installations such as system entry points and other pressure reduction stations. The review focused on specific named projects as well as network wide asset health replacement programmes of gas distribution equipment. The purpose of the review was to highlight areas of engineering spend where the proposed investment needs case was not justified or had insufficient justification / doubt relating to the volumes proposed.

The review focused on individual network company's spending proposals and flagged areas where reductions or deferrals in workloads were deemed possible based on the need (or not) to complete the work during the RIIO-GD2 period. Given the multi discipline nature of the investment requests, the review also assessed a number of cost benefit analyses associated with the engineering type justifications across more than one discipline. Where a needs case was accepted, but the proposed volumes within an EJP were challenged or undefined, an independent view was offered by the review team of modified volumes or uncertainty mechanism.

QEM Solutions (QEMS) and ARV Consulting (ARV) undertook these assessments at the Draft Determination (DD) phase and published the findings in report QEM-1910-RPT-002 Rev.00

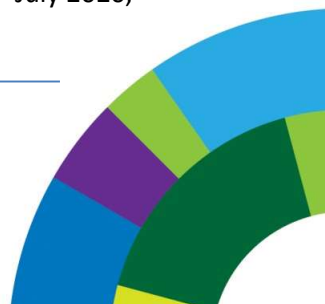
A period of consultation followed the DD phase where the network companies were invited to respond to the engineering justification paper review findings. The network companies were given access to the engineering review DD report, it's detailed appendices and all associated analysis that the engineering team had undertaken to support the cost assessment work, including engineering CBA analysis and deep dive assessments of the submitted engineering cost breakdowns.

Both QEMS and ARV were re-engaged, via a competitive process, to review the network company consultation responses on behalf of, but independently from, the Ofgem Engineering Hub. A team of 11 gas industry subject matter experts that undertook the DD reviews, collectively with c. 360 years of experience between them, was re-assembled for the task and set to work using online collaboration resources, fed from the Ofgem 'Huddle' virtual data room.

The original DD process undertaken by QEMS / ARV reviewed a total of 159 EJPs including the related business plan data templates and cost benefit analyses across all of the gas distribution networks, totaling £5,785m in value. The review scope addressed the proposed GDN intervention volumes for Replacement (Repex) and Capital (Capex) expenditure interventions only.

During the consultation phase, a further 3 new EJP's with a cumulative total value of £41m were submitted for engineering review, bringing the Final Determination (FD) EJP total to 162.

The programme for the QEMS / ARV consultation review work was mobilised on 13th July 2020, with the target completion date of early October 2020.



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The engineering consultation review process addressed only those documents submitted by a network company in response to the engineering DD findings. If no new documentation was submitted during consultation by a network company for an EJP, then the FD finding would be unchanged from the DD finding.

The consultation responses allocated to QEMS/ARV by the Engineering Hub for review are summarised below:

Network	Responses to Capex DD finding	Responses to Repex DD Finding	New Deep Dive	New EJP
Cadent	2	3	2	3
SGN	11	8	10	0
Northern Gas Networks	0	2	0	0
Wales & West Utilities	0	1	0	0
Totals	13	14	12	3

Of the above consultation responses / challenges submitted by the network companies to the engineering DD findings, and following the QEMS/ARV review of those submitted consultation responses, the following table summarises the impacts of the submitted consultation documentation:

Network	Original Capex DD Changed?	Original Repex DD Changed?	Deep Dives Supporting Network Response	New EJPs Accepted
Cadent	1	1	1	3
SGN	7	5	7 ¹	0
Northern Gas Networks	0	2	0	0
Wales & West Utilities	0	0	0	0
Totals	8	8	8	3

Notes:

1. Of the 7 reviews where consultation cost data was submitted, 6 were only partially supported and require further address.

On 2nd October 2020, an EJP summary sheet was issued by QEMS/ARV to the Ofgem Engineering Hub with the summary FD findings for those EJP's where a network company had submitted consultation response material for review.

On 20th October 2020, a full EJP Tracker template was issued with the completed review outputs for all 162 EJPs.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

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This outcomes summary is further broken down in the following sections of this report for each of the gas distribution network companies:

- Section 5: Cadent
 - Serving the North West, West Midlands, North London & East of England
- Section 6: SGN
 - Serving Scotland and Southern England
- Section 7: Wales & West Utilities (WWU)
 - Serving Wales and the South West of England
- Section 8: Northern Gas Networks (NGN)
 - Serving the North East of England

This report and its findings do not offer an indication of the Ofgem price control Final Determination outputs, nor is Ofgem bound by any of its content. It is an independent review of the intervention volumes proposed by the GDNs in RIIO-GD2 and is offered solely to Ofgem to assist with asset volume definition to the price control cost model inputs.





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

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2. Introduction

The Ofgem Engineering Hub is an internal division at Ofgem comprising a team of engineers dedicated to providing support to the management of transmission and distribution network issues within the Systems and Networks Directorate.

As part of the UK regulatory process of reviewing spending request submitted by the UK's GDN companies for the RII-GD2 price control process, the Ofgem Engineering Hub required the support of an independent engineering team with experience in the gas distribution sector to review responses to the Draft Determination, which included further information relating to investment proposals for gas distribution schemes, above ground installations such as system entry points and other pressure reduction stations.

The initial engineering justification paper reviews that led to the Draft Determination in July 2020, focused on specific named projects as well as other asset health network wide replacement programmes of gas distribution equipment. As such, the review of the investment proposals considered elements such as:

- Asset condition and predicted deterioration
- Supply and demand picture
- Normal maintenance practices and replacement spend
- Normal cost/benefit justification for expenditure

The purpose of this subsequent review was to address new information submitted by the network companies during the consultation period in response to the Ofgem Draft Determination. The initial review that led to the Draft Determination in July 2020 involved the review of 159 engineering justification papers.

Inevitably, the consultation responses received from the network companies focused on Draft Determination outcomes where the proposed investment needs case was not adequately defined, or had insufficient justification or doubt relating to the volumes proposed. The reviews of the consultation period responses focused on whether any of the new information supplied was sufficient to positively alter any Draft Determination outcomes.

QEM Solutions and ARV Consulting were engaged and asked to work collaboratively to undertake the reviews of the consultation responses on behalf of, but independently from, the Ofgem Engineering Hub. A team of 11 gas industry subject matter experts with, collectively, c.360 years of experience between them was re-assembled for the task and set to work using online collaboration resources, fed from the Ofgem 'Huddle' virtual data room.

Of the original 159 EJPs that were submitted that led to the Draft Determination, a further 3 new EJP were submitted. Of the new 162 EJP total, 42 consultation responses were allocated to QEMS/ARV by the Engineering Hub for review. All consultation response information was made available for on-line review by the QEMS/ARV resources.

The consultation review scope addressed the proposed GDN intervention volumes for Repex and Capex only. Opex was not in scope for the QEMS/ARV reviews.





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

The programme for the review work was mobilised on 13th Jul 2020, with the target completion date of end of early Oct 2020. The 42 consultation responses allocated to QEMS/ARV by the Engineering Hub for review are summarised below:

Network	Response to Capex EJP finding	Response to Repex EJP Finding	New Deep Dive	New EJP
Cadent	2	3	2	3
SGN	11	8	10	0
Northern Gas Networks	0	2	0	0
Wales & West Utilities	0	1	0	0
Totals	13	14	12	3

Each of these consultation response documents was independently reviewed by the QEMS/ARV team, complying with the process as described in the following 'Methodology' section of this report and volume / needs case determinations made for each.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

3. The Review Team

In June 2020, Ofgem undertook a nationwide call for competition via 'myTenders' to procure gas distribution support resources to support the Ofgem Engineering Hub addressing the consultation responses. Both QEM Solutions and ARV Consulting independently and successfully responded to the Ofgem call for competition.

ARV Consulting is an independent energy transmission & distribution infrastructure consultancy business offering professional services and consulting advisory services to the UK's gas and electricity transmission and distribution markets. QEM Solutions is a business providing project services resources, technical consultancy, management consultancy and software solutions to the energy utility and infrastructure industry.

Both QEMS and ARV mobilised on 13th Jul 2020. The majority of the resources engaged to review the DD EJPs were re-engaged for this FD consultation review work in order to ensure continuity and consistency of review.

The following collaborative team was assembled and mobilised to manage and undertake the EJP RIIIO-GD2 EJP reviews:

Resource	Years in Industry	Qualifications	Role & Assigned EJP Lead Asset Category
Rob Graham	20+	BSc Civil & Environmental Engineering	Project Sponsor
Tony Voss	33	BEng (Hons) Electronics Chartered Engineer	Project Manager Local Transmission Systems Offtakes & PRS General
Stuart Elliott	20	BSc (Hons) Civil Engineering	Project Coordinator Security Infrastructure Gas Holders
Jeremy Bending	40	BSc (Hons) Production Engineering & Management Chartered Engineer	Cost Benefit Analyses Scottish Independent Undertakings
John Wilkinson	40+	Incorporated Engineer	Odourisation & Metering E&I Scopes
Mark Danter	30+	BEng (Hons) Computer Engineering Chartered Engineer	Offtakes & PRS General Slamshuts & Regulators
Peter Christie	40	BEng Mechanical Engineering Chartered Engineer	Repex (All categories of mains, services and risers)
Simon Lane	40	City & Guilds Gas Distribution City & Guilds Streetworks	Repex (All categories of mains, services and risers)
Adam Sadler	20	BEng (Hons) Building Environment Engineering Chartered Engineer	Offtakes & PRS Pre-Heating
Tim Green	38	Engineering Council Part 2 Examination HND Mechanical Engineering	Local Transmission Systems Cathodic Protection
Paul Howard	45	City and Guild Gas Governor Fitter BTEC in Gas Utilisation	I&C and Service Governors Crossings PRS & Offtake Filters

Biographies for each resource are included in Appendix 2.

4. Methodology

4.1. Preparation

In total 42 consultation responses were allocated to the Engineering Hub for review by QEMS/ARV.

The suite of review guidance documents used for the Draft Determination remained available to QEMS/ARV for the consultation response reviews:

- Ofgem Guidance – Engineering Justification Paper Frameworks for RIIO-GD2 and RIIO-GT2
- GD and GT Engineering Justification Paper Review Procedure
- Network Output Measures Health & Risk Reporting Methodology & Framework

For the 3 new EJPs submitted, the original Ofgem review templates also remained available:

- Asset Health EJP Review Template (NB: No Ofgem requirement to ‘score’ these EJPs)
- Major Project EJP Review Template (NB: No Ofgem requirement to ‘score’ these EJPs)

For the consultation response documents, QEMS/ARV created a new template to capture the review outcomes, which made reference to the review documents from the Draft Determination.

Each consultation response was allocated the same Lead Reviewer SME and Peer Reviewer that had undertaken the Draft Determination review, to ensure familiarity and consistency of review. Critically, the consultation review process guidance was underpinned by the sole focus of determining asset ‘Volumes’ within the new documents reviewed.

In all cases, the review process took account of the following questions:

- Is the new data complete with all reference material available?
- Does the new data make a clear and unambiguous ‘needs case’ for intervention in the RIIO-GD2 period?
- Have all reasonable options been considered and validated?
- Is the Preferred Option proportionate to the needs case?

The network companies, during the consultation process, were afforded the opportunity to generate Draft Determination questions (DDQs) to Ofgem relating to the outcomes of the initial reviews, in order that they may receive clarifications or challenge those outcomes.

In addition, a process for Ofgem to generate post-DD supplementary questions (SQPs) was also developed and SQPs were directed to the GDNs to request clarification(s) and to aid the consultation review outcomes.

The consultation review volume determination categories set by the Ofgem Cost Assessment team remained the same, and fell into just 1 of 5 defined categories:





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

- Reject
- Accept with no modifications to volumes
- Accept with modified volumes
- Accept with modified volumes & uncertainty mechanism
- Uncertainty mechanism/reopener & indefinite outcomes

To ensure manageable control and reporting of both the consultation response review process and document version control, QEMS set up a 'virtual' cloud-based environment for the review team to operate within. The consultation responses and all related Ofgem documentation was uploaded to a bespoke and secure Microsoft Team and SharePoint platform, and the designated Lead / Peer reviewers given unique access to their allocated document folders. All reviews were carried out online in this virtual data room.

Once all procedural preparations were in place, an online kick-off meeting was held on 28th Jul 2020 with all QEMS/ARV management and reviewers in attendance.

Thereafter, the consultation response reviews commenced from Wednesday 29th Jul 2020.

4.2. Execution

The execution of the reviews followed the Ofgem process and a weekly review call was convened for the duration of the works by the Engineering Hub, with the Ofgem Cost Assessment team and QEMS & ARV management to monitor and assess progress, costs, programme and issues/conflicts.

The SQP's generated by the consultation review process were captured in a register and issued to the Ofgem SQP Manager. Responses from the networks were uploaded to Huddle within the stipulated 5 day response period and then mapped by QEMS/ARV back to the original to allow ease of look-up.

A parallel weekly call was also convened by QEMS/ARV to assemble all reviewer resources and share knowledge / feedback to ensure consistency of approach. The outputs from the weekly Ofgem calls and SQP Manager were also shared with the QEMS/ARV team weekly.

The consultation review work followed this weekly routine for the duration of the programme, but importantly was punctuated by a series bilateral 'virtual' meetings with each of the 4 GDN companies.

The series of bilateral meetings undertaken were scheduled as below:

Network	Bilateral #1	Bilateral #2	Bilateral #3
Cadent	12 th Aug	21 st Aug	22 nd Sep
SGN	11 th Aug	21 st Aug	21 st Sep
Northern Gas Networks	12 th Aug	1 st Oct	
Wales & West Utilities	18 th Aug	25 th Sep	



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

The high level discussion focus for these bilateral meetings were heavily influenced by Ofgem following the initial reviews of the consultation responses, and afforded QEMS/ARV and the Engineering Hub the opportunity to discuss priority aspects of the responses directly with the GDN representatives and to challenge and seek clarifications raised in the ongoing DDQ and SQP processes. The detailed agendas were proposed by the network companies.

As with the earlier Draft Determination reviews, the consultation response reviews were accompanied, where appropriate, by cost 'observations' by the review team and captured on the QEMS/ARV review template.

Where any aspect of doubt remained, in selected cases, direct interaction with the GDN (as appropriate) was sanctioned by Ofgem where clarifications were sought. In each case, those conversations were captured by the SQP process retrospectively.

The following sections of this report summarise the reviews of all consultation response allocated to QEMS/ARV.



5. Cadent

The 10 Cadent consultation responses allocated to QEMS/ARV by the Engineering Hub for review are categorised below:

Network	Response to Capex EJP finding	Response to Repex EJP Finding	New Deep Dive	New EJP
Cadent	2	3	2	3

5.1. New EJPs

The following documents were submitted during consultation period by Cadent as 3 new EJPs, and which had not undergone review leading up to the Draft Determination. Each was allocated to QEMS/ARV by the Engineering Hub for FD review:

5.1.1. Lowestoft Harbour

Approximately 100m of 200mm steel pipe to be installed in an existing tunnel at a cost of £2.266m in GD2. The EJP attempted to make the needs case to meet security of supply requirements and address HSE concerns regarding removal of existing 'temporary' HDPE pipes in tunnel. The project is to undergo detailed design in 20/21 to finalise the design and allow long lead item purchase in GD2, circa £200k. Initially rejected due to lack of firm data or justification, Cadent provided additional information via the SQP process which engineers have reviewed and approved the needs case, subject to cost assessment review.

FD Outcome: Accepted with no modification to volume.

5.1.2. HP Valves

The definition of a Critical Valve in this EJP was too broad although the volumes proposed seemed reasonable as a proportion of the Cadent valve fleet.

FD Outcome: Accepted with no modification to volume.

5.1.3. HyNet Pre-Construction

This new EJP, issued at the end of the FD process, presumes that hydrogen will be a key element of the solution to decarbonising the NW industrial cluster and that funding for such a 'Net Zero' project is permissible as a normal part of this price control. The engineering review of the EJP is independent of these assumptions and assesses the scope and volumes proposed, should the HyNet project be executed. The project needs case was deemed acceptable (in isolation of the above) although the requested costs were questioned in two areas. A dedicated call was undertaken with Cadent to review the Cadent project management cost and the cost confidence. An SQP was raised with an improved response.

FD Outcome: Accepted with no modification to volume
(Red flag on cost assessment relating to FEED design cost and Cadent PM cost)

5.2. Repex

The Ofgem Engineering Hub allocated consultation responses to QEMS/ARV for review for the following Cadent Repex related EJPs:

5.2.1. Distribution Mains and Associated Services (Iron, PE, Steel & Other)

The four categories (complete EJP) were recommended to be subject to an Uncertainty Mechanism/Reopener at DD...

- Mandated IMRRP mains
- Non-Iron Safety Mains (PAST)
- CBA Driven mains
- Services associated with mains replacement.

This took account of the proposed revised approach to mains replacement in this EJP which was NOT, at that time, agreed with the HSE. On this basis, as agreement with HSE is still not finalised the FD recommendation remains unchanged.

Additional information/justification was provided for review for Dynamic Growth Mains, PAST Mains and North London services. Dynamic Growth (Included in IMRRP) engineering needs case accepted at DD and FD, although is disallowed by Ofgem at DD. PAST Engineering needs case accepted at DD and FD. FD volumes proposed by Cadent are different to DD volumes based on alternative approach to CBA by Cadent. North London Services engineering needs case accepted at DD and FD. Cadent recalculated service density in response.

DD Outcome: Uncertainty Mechanism/Reopener

FD Outcome: Uncertainty Mechanism/Reopener

5.2.2. Services Not Associated with Mains Replacement

No Change as only reviewed DDQ 34 in respect of PE Services - No change is recommended to the initial recommendation of a reduction of 8000 services across the Cadent networks.

Following consideration of the detail in the Response and the discussions at the Engineering Bi-Lateral Meetings no further engineering of technical evidence has been provided to change the recommendation. Although some evidence may be provided following the Bi-Lateral meeting held on 22nd September 2020 to articulate the underpinning reasons for workload volume. This may assist in a subsequent Engineering/Technical Review.

DD Outcome: Accept (Modify Volume) & Uncertainty Mech

FD Outcome: Accept (Modify Volume) & Uncertainty Mech

5.2.3. London Medium Pressure

The original recommendation following the EJP review, provided by the QEMS/ARV Engineering Team was to support the work volumes although to seek further detail in respect of the planning





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

and phasing of the Sections. Ofgem also sought to better understand cost compilation and certainty.

The Response has provided a much greater level of detail to allow a more in-depth assessment of the work Engineering and Technical content, the work plan and the phasing of the work. The engineering content of the Sections and challenges associated with the RIIO2 Plan are well explained. The work plan and associated phasing covers the revised and Cadent reduced number of Sections to be undertaken in RIIO2. This is intended to provide a deliverable project within the period with an increased level of cost certainty.

Proactive Stakeholder management is evidenced in the response. Studying the level of detail documented in the Response a much greater level of confidence is provided that the work scope can be delivered in RIIO2. The QEMS/ARV Engineering Team are supportive of the engineering and technical aspects of the Response and would support the reduced volumes proposed by Cadent going ahead on this basis.

DD Outcome: Uncertainty Mechanism / Re-opener

FD Outcome: Accept (Modify Volume)

5.3. Capex

The Ofgem Engineering Hub allocated consultation responses for review to QEMS/ARV for the following Cadent Capex related EJPs:

5.3.1. Cathodic Protection

The additional information provided in pages 115-117 of the Cadent consultation response addresses the original issues raised in response to DDQ_31 of the volumes of intervention type and associated costs being based on a forecast from one year of accelerated high workload (2019) to achieve compliance.

The engineering needs case is met, the revised costs proposed are more in line with those needed to maintain a steady state compliance of CP in HP/IP and MP/LP based on historic Cadent spends and interventions (though higher than other GDNs).

DD Outcome: Accept (Modify Volume) & Uncertainty Mech

FD Outcome: Accept (Modify Volume)

5.3.2. Reduced Depth of Cover

The engineering needs case is met and particular issues with the soil types and predominantly arable land use in East Anglia and East Midlands have been demonstrated. There is still likely to be uncertainty over the types and cost of individual remedial schemes which sometimes require lengthy legal arguments to agree.

DD Outcome: Accept (Modify Volume) & Uncertainty Mech

FD Outcome: Accept (Modify Volume) & Uncertainty Mech





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

5.4. Deep Dives

Indirect costs and overheads were assessed separately by the Ofgem Cost Assessment team. The following EJPs were subjected to further deep dive assessment by QEMS/ARV following responses from Cadent during consultation:

5.4.1. Capacity Upgrades - >7 bar reinforcements (AGI) - Base case

The deep dive focused on risk, contingency and direct company costs for the programme of upgrades. A review was also undertaken of main contractors' costs which includes project management and materials. The costs for Dawley had shown to increase due to additional engineering design and site investigation, although following the consultation period, Cadent had reduced risk & contingencies across the sites to more reasonable levels. Direct Costs had also reduced across all of the projects. These were deemed reasonable.

5.4.2. Offtakes & PRS Metering Systems

Cadent removed the contingency values in this EJP as a response to the deep dive undertaken during the Draft Determination. The Draft Determination had highlighted that Cadent had not taken account of any economy of scale, instead choosing to retain the approach of bespoke and individual designs for all 18 sites. As such, the FD deep dive repeated its views from the DD and recommended a further cost reduction.



6. SGN

The 29 SGN consultation responses allocated to QEMS/ARV by the Engineering Hub for review are categorised below:

Network	Response to Capex EJP finding	Response to Repex EJP Finding	New Deep Dive	New EJP
SGN	11	8	10	0

6.1. New EJPs

None.

6.2. Repex

The Ofgem Engineering Hub allocated consultation responses to QEMS/ARV for review for the following SGN Repex related EJPs:

6.2.1. Tier 2B Iron Mains and associated services – Southern

The network has significantly cut back the volume of pipes they are seeking to replace. They make a strong case to continue to seek funding for the T2B mains that can no longer be repaired, and we would support that. We note the removal of other CBA T2B pipes from the networks submission and have no issues with this from an engineering viewpoint. We also note that SGN have removed T2B pipes associated with T1 projects from their submission. We agree with the network that this is not the most efficient way of completing their programme of works. We are concerned that this may lead to stranded T2 pipe assets, which could be very expensive to replace in the future.

DD Outcome: Accept (Modify Volume) & Uncertainty Mech

FD Outcome: Accept (Modify Volume)

6.2.2. Iron Pipes >30m and Steel Pipes Including Associated Services Southern

Pipe categories in EJP considered as separate responses.

Steel - The initial needs case was met based on the engineering and technical information presented in the EJP and subsequent SQ responses. On this basis the revised workload, as it is a subset of the larger initial volume is supported for mains. Volumes reduced by SGN to meet the CBA requirement.

Services - The volume has increased although the mains volumes have decreased therefore, we do not support this change as no additional evidence has been provided.

Other Policy & Condition Mains - No change to volume following the review of the EJP(s) based on the additional information presented and considered.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

DD Outcome: Accept (No Mods to Volume)
FD Outcome: Steel Mains - Accept (Modify Volume)
Services – Reject
Other P&C Mains - Accept (No Mods to Volume)

6.2.3. Tier 2B Iron Mains and associated services – Scotland

The network has significantly cut back the volume of pipes they are seeking to replace. They make a strong case to continue to seek funding for the T2B mains that can no longer be repaired, and we would support that. We note the removal of other CBA T2B pipes from the networks submission and have no issues with this from an engineering viewpoint. We also note that SGN have removed T2B pipes associated with T1 projects from their submission. We agree with the network that this is not the most efficient way of completing their programme of works. We are concerned that this may lead to stranded T2 pipe assets, which could be very expensive to replace in the future.

DD Outcome: Accept (Modify Volume) & Uncertainty Mech

FD Outcome: Accept (Modify Volume)

6.2.4. Iron Pipes >30m and Steel Pipes Including Associated Services Scotland

Pipe categories in EJP considered as separate responses.

Steel - The initial needs case was met based on the engineering and technical information presented in the EJP and subsequent SQ responses. On this basis the revised workload, as it is a subset of the larger initial volume is supported for mains. Volumes reduced by SGN to meet the CBA requirement

Services - The volume has increased although the mains volumes have decreased therefore, we do not support this change as no additional evidence has been provided.

Other Policy & Condition Mains - No change to volume following the review of the EJP(s) based on the additional information presented and considered.

DD Outcome: Accept (No Mods to Volume)

FD Outcome: Steel Mains - Accept (Modify Volume)
Services – Reject
Other P&C Mains - Accept (No Mods to Volume)

6.2.5. Tier 3 Iron Mains and associated services – Scotland

The network has significantly cut back the volume of pipes they are seeking to replace. They make a strong case to continue to seek funding for the T3 mains that can no longer be repaired, and we would support that. We note that SGN have removed T3 pipes associated with T1 projects from their submission. We have no engineering concerns about this.

DD Outcome: Accept (No Mods to Volume)

FD Outcome: Accept (Mods to Volume)



6.2.6. Tier 3 Iron Mains and associated services – Southern

The network states that they were allowed the Tier 3 work for their Southern Network in the DD. See page 1 in the reference document. Therefore, the review finds no change.

DD Outcome: Accept (No Mods to Volume)

FD Outcome: Accept (No Mods to Volume)

6.2.7. Cams Hall Tunnel

The network wants to replace this IP steel crossing as they cannot establish its condition inside the sealed tunnel it is installed in. This pipe has had one leak recorded on it in 2015, a failed isolation joint which was cut out. There has been no other leakage. The CP system has been stabilised which should protect the pipe. The network also stated at a bilateral call that it had concerns whether the existing pipeline would be safe with future hydrogen blends and that the proposed new steel pipeline would be “future proof”. No further supporting engineering information has been provided. However, in the Embedding the consumer voice document page 85 they mention that riverbank erosion was also explained in the EJP. A check of the EJP finds no reference to riverbank erosion. More information is required before we could consider moving away from our initial reject recommendation.

DD Outcome: Reject

FD Outcome: Reject

6.2.8. IP Services - Reconfiguration

The engineering needs case remains met. This is a commercial issue about which this activity gets funded from which pool of funds. Engineering defers this to the Ofgem Cost Assessment team.

DD Outcome: Accept (No Mods to Volume)

FD Outcome: Accept (No Mods to Volume)

6.3. Capex

The Ofgem Engineering Hub allocated consultation responses for review to QEMS/ARV for the following SGN Capex related EJPs:

6.3.1. Battle 2

SGN produced a Technical Assessment during consultation demonstrating the needs case is met, although there is potential overlap in the delivery of the projects on site. The response to SQ 471 suggests there may be some minor cost saving through packing the projects (Battle 1 and 2) together which is reflected in the funding request. The delivery schedule for the EJPs (inc E&I Upgrade) has parts of the onsite works running concurrently, cost efficiencies in general project management and the project management for the main works contractor should be considered.





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

DD Outcome: Reject

FD Outcome: Accept (Modify Volume)

6.3.2. Westerham 2

SGN produced a Technical Assessment during consultation demonstrating the needs case is met, although there is potential overlap in the delivery of the projects on site. Some savings have been shown in the estimates to allow for this, such as one mobilisation and demobilisation. The delivery schedule for the EJPs has parts of the onsite works running concurrently, cost efficiencies in general project management and the project management for the main works contractor should be considered.

DD Outcome: Reject

FD Outcome: Accept (Modify Volume)

6.3.3. St Mary's Cray

This EJP is a financial proposal from the network that can only be assessed / justified based on the cost of the proposed asset intervention verses the potential income from the electricity generated. The Engineering Hub sees no needs case but defers this review to the Ofgem Cost Assessment team for further analysis.

DD Outcome: Reject

FD Outcome: Reject

6.3.4. Georgetown

SGN produced a technical assessment during consultation accepting Ofgem's DD proposal that instead of a full site rebuild at Georgetown PRS, the current system can be maintained. As such, the revised scope at Georgetown programme to only deliver (1) Lineguard / slam-shut replacement and (2) pipework refurbishment, at a cost of £0.94m, is accepted.

DD Outcome: Reject

FD Outcome: Accept (Modify Volume)

6.3.5. Brackley

SGN produced a Technical Assessment during consultation. The network has provided some significant information in the DD response such as why replacing the DI is not an option. The network has now provided significant information regarding when their network analysis models are validated. SGN have stated that by gaining interruption customers they may be able to delay the reinforcement for 2 years (but it is still required in GD2). They have not explored, that by gaining of such interruption, it may (or may not) mean a smaller length of reinforcement would be required during GD2. The needs case has now been proved that some reinforcement will be required if the proposed developments go ahead therefore, we can remove our original recommendation to reject. However, there is still some uncertainty of how much and when the reinforcement will be required.





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

DD Outcome: Reject

FD Outcome: Uncertainty Mechanism / Re-opener

6.3.6. Marden

SGN produced a Technical Assessment during consultation. The network has provided a significant additional piece of information in that the low point will see 106mbar by 2025/26, if all the forecast loads are connected. This proves the network is very sensitive to additional loads, as this has dropped pressures from a predicted 347mbar in 2022/23 with the addition of 102 cubic metres being connected. It is due to this sensitivity of the additional load that we required information about the date of the last network validation. The network has now provided a clear response to our concerns regarding network validation and the accuracy of their model. Therefore, with the new information provided the needs case has been proved and we can remove our original recommendation to reject. The timing and volumes are an uncertainty due to the nature of when the new developments will be built.

DD Outcome: Reject

FD Outcome: Uncertainty Mechanism / Re-opener

6.3.7. Wivelsfield

SGN produced a Technical Assessment during consultation. The network has provided some significant information in the DD response regarding ductile iron pipe in the network and why they ruled the replacement of this pipe out as an option. They have ruled this option out on financial grounds but no other justification than that was given. No CBA analysis was mentioned. We would have liked to see more details of this option. The network has now provided significant information regarding when their network analysis models are validated. Therefore, with the new information provided the needs case has been proved and we can remove our original recommendation to reject. The timing and volumes are an uncertainty due to the nature of when the new developments will be built.

DD Outcome: Reject

FD Outcome: Uncertainty Mechanism / Re-opener

6.3.8. E&I Minor Works Repair Programme

SGN produced a Technical Assessment during consultation. It is acknowledged there is a requirement for an E&I Minor Works Programme, but do not agree that all the costs included in the programme are justified as minor repairs (batteries for Scotland at £100,000 & in Southern at £132,120) & would question the inclusion of the turbo expander UPS at £125,000 as detailed above. As a result, we believe the amount allowed should be reduced to reflect this.

DD Outcome: Reject

FD Outcome: Accept (Modify Volume)



6.3.9. Campbeltown Ambient Vaporiser

SGN produced a Technical Assessment during consultation, which did not advance the needs case. There have been no faults from the ambient vaporisers at Campbeltown proposed for replacement. There is no POF analysis or reliability assessment for the ambient vaporisers provided in the absence of any failures.

Full replacement is the only option presented apart from the base case (do nothing). The paper states that the ambient vaporisers have been assessed as obsolete but has not explained how.

The option to reverse engineer spare parts has been dismissed as not possible without proper explanation. This option needs to be developed, costed and the CBA assessed. The NPV for recommended option of total replacement is lower than that of the base case with a payback beyond 50 years. SGN have stated that the hot water vaporisers could pick up 100% of the throughput so there is no impact on security of supply in the highly unlikely scenario of the total failure of all four banks of the ambient vaporisers.

DD Outcome: Reject

FD Outcome: Reject

6.3.10. Responsible Demolition

These costs are not unique to SGN and the assumption should be made that other networks had elected to leave similar redundant structures in place and are managing the ongoing risk. The SGN approach is better practice. The EJP was accepted at DD although the costs were subsequently assessed as part of Ofgem's regression cost modelling.

DD Outcome: Accept (No Mods to Volume)

FD Outcome: Accept (No Mods to Volume)

6.3.11. Process Safety

Separate Scotland and Southern papers were supplied for review during consultation. These costs are not unique to SGN and assumption should be made that these risks can be managed with GDN baselines.

DD Outcome: Reject

FD Outcome: Reject

6.4. Deep Dives

Indirect costs and overheads were assessed separately by the Ofgem Cost Assessment team. The following EJPs were subjected to further deep dive assessment by QEMS/ARV following responses from SGN during consultation:

6.4.1. R02 Pipeline – Replacement Local to Dunkeld/ Transmission

The reductions proposed at DD in design and contingency costs were accepted by SGN during consultation, although the proposed reduction in project management was not.

Bringing projects together

This remains high and is recommended be reduced. Indirect costs and overheads were assessed separately by Ofgem Costs Assessment team.

6.4.2. LTS Capacity Works Programme Transmission

The only component raised during the deep dive at the DD period by the Engineering Hub was the Dregghorn PRS Risk component, which the review proposed was halved. This was not accepted by SGN during consultation. A 50% reduction remains the recommendation for this site.

6.4.3. Provan PRS Full Site Rebuild and AGI Pipework Rationalisation/Transmission

Pressure reduction module (PRM) material components seemed high during the DD deep dive as was the declared overall project uncertainty percentage. Additional information was provided by SGN during consultation addressing materials which was accepted. However, based on additional information in the SGN consultation response, the uncertainty component is still too high. The justification for the PRM costs stated they were benchmarked against similar units and also stated that there is uncertainty for PRM's included.

6.4.4. Ulysses Telemetry Replacement Programme

An overall 10% reduction was proposed by the DD deep dive, although no additional information (apart from high level arguments on overheads and contingency) was provided during consultation. The FD view remains as per the DD in that although the work is required & costs are based on 40 sites in RIIO-GD1, additional savings will be possible due to the overall volume (165 sites) of work. Also, discussions with SGN may be beneficial to understand the continued use of UHF radios & hilltop radio sites.

6.4.5. Winkfield South East Offtake

The original DD deep dive for the proposed pre-heating and volumetric/pressure control system replacements at this site, concluded that there was significant overlap / double counting within the EJP budget figures. Also, the SGN budgeting based on other schemes was considerably higher than the costs provided by SGN's third party. The third party costs were deemed more applicable to this scheme and hence more likely to be accurate. Additional information was provided during consultation that clarified the perceived double counting, and was accepted, although no further justification was provided for pricing of the 'Miscellaneous' roles when which were deemed included in other budgeted management roles / overhead allowances. These should be removed.

6.4.6. Newton Mearns PRS & Waterfoot PRS Rationalisation/ Transmission

The Direct Company Costs for this project were questioned at the DD deep dive period. An SQP and call was raised with SGN where evidence was given that this was for the labour associated with mains laying of the two new pipelines. This was accepted.

6.4.7. Electrical, Instrumentation & Control Upgrade Programme

Reductions were proposed across the majority of components for this EJP during the DD deep dive, stating much of the work on each of the sites will be similar (there is a package of 34 sites to complete) and it should be expected that costs would reduce significantly when work was tendered. Also, buying power for materials for 34 sites should generate savings. An overlap of costing was also identified with the Battle PRS EJP.

The Battle overlap was acknowledged and removed in the SGN consultation response. However, SGN provided assurances that reductions of £1.59m were already included in the budget. The FD deep dive believes that further savings can be made, including that contained in other SGN EJP's, when bundled together. A further saving of 5.0% on the SGN request for £7.99m could not be achieved.

6.4.8. Winkfield South Offtake

As with the Winkfield South East EJP, the original DD deep dive for the proposed pre-heating and volumetric/pressure control system replacements at this site, concluded that there was significant overlap / double counting within the EJP budget figures. Also, the SGN budgeting based on other schemes was considerably higher than the costs provided by SGN's third party. The third party costs were deemed more applicable to this scheme and hence more likely to be accurate. Additional information was provided during consultation that clarified the perceived double counting, and was accepted, although no further justification was provided for pricing of the 'Miscellaneous' roles when which were deemed included in other budgeted management roles / overhead allowances. These should be removed.

6.4.9. Industrial & Commercial AMR Equipment Replacement Programme

The 1688 data loggers proposed represented a high unit cost per data logger. SGN raised concerns regarding the installation costs but the DD review believed this cost could be significantly reduced. SGN did not adequately show the expected cost of the actual data logger & then justify in detail any additional installation & project management costs. Regarding the software, the SGN response to SQ93 suggested that there is centralised system covering both Southern and Scotland networks and so a reduction was proposed.

SGN provided information in the consultation response re: software costs, although which still appear high. Approval/appraisal costs are also high (could be a generic design approach), as is installation where installs could be done instead of annual maintenance (Opex costs already budgeted) and it should not take a day to install a datalogger. Reductions in approval, appraisal, install and software are still recommended.

6.4.10. Mappowder NTS Offtake

The DD deep dive noted that Materials had been costed separately to the MWC costs although the MWC breakdown provided at DD showed the materials priced right down to footpaths, concrete bases, boiler house, instrument posts, etc... As such the assessor removed all materials from the MWC pricing and left only labour and consumables.





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

SGN provided a build up of costs to demonstrate the MWC cost during consultation, stating that they felt the assessor had overlooked some items. The MWC cost provided during consultation was significantly lower than provided at DD and was accepted.



7. Wales & West Utilities

The single WWU consultation response allocated to QEMS/ARV by the Engineering Hub for review is categorised below:

Network	Response to Capex finding	Response to Repex EJP Finding	New Deep Dive	New EJP
Wales & West Utilities	0	1	0	0

7.1. New EJPs

None.

7.2. Repex

The Ofgem Engineering Hub allocated consultation responses to QEMS/ARV for review for the following WWU Repex related EJPs:

7.2.1. Mains

During the initial review process the needs case was technically supported, but the SQ responses were not conclusive re: the questions raised over a lack of clarity on volumes, hence the DD outcome to Accept (Modify Volume). Since no further information was submitted with regard to volumes the conclusion remains.

During consultation, a revised CBA for Tier 2B and a CBA for iron >30m was provided, these categories are still considered technically justified. A separate paper "Repex Cost Justification" identifies lost efficiencies, increasing unit costs and additional Opex if replacement of Tier 2B and iron >30m is disallowed.

In summary there was no change to the Engineering DD, the workload is technically supported. Tier 2B and iron>30m should be accepted based upon Ofgem acceptance of the revised/new CBAs.

DD Outcome: Accept (Modify Volume)

FD Outcome: Accept (Modify Volume)

Footnote: Concerning Services, nothing was submitted during consultation for engineering review, however if the mains lengths are adjusted then there will be an impact on service numbers accordingly.

7.3. Capex

No consultation responses allocated to QEMS/ARV by the Engineering Hub for review.

7.4. Deep Dives

No consultation responses allocated to QEMS/ARV by the Engineering Hub for review.

8. Northern Gas Networks

The 2 NGN consultation responses allocated to QEMS/ARV by the Engineering Hub for review are categorised below:

Network	Response to Capex EJP finding	Response to Repex EJP Finding	New Deep Dive	New EJP
Northern Gas Networks	0	2	0	0

8.1. New EJPs

None.

8.2. Repex

The Ofgem Engineering Hub allocated consultation responses to QEMS/ARV for review for the following NGN Repex related EJPs:

8.2.1. Mandatory Repex

NGN provided additional information on T1 stubs during the consultation process. It is acknowledged that there needs to be some funding for T1 stubs until the HSE formally come to a view on what action is required to deal with them. T1 stubs are still T1 pipes until the HSE formally makes a change, therefore the T1 workload as a minimum should be: (Remaining T1 length + T1 Stub length)/ Years remaining of T1 programme, which will address any claims that insufficient length has been allowed for in the T1 iron (including stubs) programme until the proposed reopener in 2022.

Everything else in this EJP was unchanged.

DD Outcome: Uncertainty Mechanism / Re-opener

FD Outcome: Tier 1 - Accept No Mods to Volume

<2" Steel - Accept to Mods to Volume

Non Standard Materials - Accept No Mods to Volume

Tier 2A - Uncertainty Mechanism / Re-opener

Tier 1 Stubs - Uncertainty Mechanism / Re-opener

8.2.2. Non Mandatory Repex

The single DD finding applied to multiple asset categories. Greater granularity was provided during consultation, including the PE Mains case where volumes are now supported. All are now accepted, with these two exceptions:

Phoenix Lined Mains - Decision unchanged. The data supplied during consultation did not provide new insight regarding the risks of pipe failure to justify the investment.

Risers - Decision unchanged. No new data supplied.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

DD Outcome: Accept (Modify Volume)

FD Outcome: Tier 3 Mains - Accept (No Mods to Volume)
Steel >2" Mains - Accept (No Mods to Volume)
Zero Scoring Mains - Accept (No Mods to Volume)
Asbestos Mains - Accept (No Mods to Volume)
Phoenix Lined Mains - Reject
Repex Overcrossings - Accept (No Mods to Volume)
PE Mains - Accept (No Mods to Volume)
Diversions - Accept (No Mods to Volume)
Risers - Accept (Modify Volume)

8.3. Capex

No consultation responses allocated to QEMS/ARV by the Engineering Hub for review.

8.4. Deep Dives

No consultation responses allocated to QEMS/ARV by the Engineering Hub for review.





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Appendix 1 – EJP Review Outcomes Detail

The following tables in Appendix 1 give the detailed Final Determination review findings following the consultation document review, including narratives for each of the 162 papers reviewed. These reviews are independent and not influenced by Ofgem and are the opinion(s) of the relevant QEMS/ARV team reviewer for that asset category. Where a CBA review or Deep Dive was requested by Ofgem and undertaken by QEMS/ARV, a note is indicated against the relevant EJP review.

The following tables indicate for each EJP:

- Type (Major Project, Asset Health, Enhanced EJP)
- EJP Name
- Draft Determination
- Final Determination
- Reviewer Comments





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Appendix 1.1 – Cadent

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Enhanced EJP	Distribution Mains and Associated Services (Iron, PE, Steel & Other)	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	<p>The four categories (complete EJP) were recommended to be subject to an Uncertainty Mechanism/Reopener at DD...</p> <ol style="list-style-type: none">1. Mandated IMRRP mains2. Non-Iron Safety Mains (PAST)3. CBA Driven mains4. Services associated with mains replacement. <p>This took account of the proposed revised approach to Mains Replacement in this EJP which was NOT agreed with HSE.</p> <p>On this basis, as agreement with HSE is still not finalised the EJP FD recommendation remains unchanged - Uncertainty Mechanism/Reopener.</p> <p>Additional information/justification was provided for review for Dynamic Growth Mains, PAST Mains and North London services</p> <p>Dynamic Growth (Included in IMRRP) engineering needs case accepted at DD and FD, although was disallowed by Ofgem at DD.</p> <p>PAST Engineering needs case accepted at DD and FD. FD volumes proposed by Network are different to DD volumes based on alternative approach to CBA by Cadent.</p> <p>North London Services engineering needs case accepted at DD and FD. Cadent recalculated service density in response.</p>



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Enhanced EJP	Transforming the Experience for Multiple Occupancy Building Customer Risers	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Services Not Associated with Mains Replacement	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	<p>No Change as only reviewed DDQ 34 in respect of PE Services - No change is recommended to the initial recommendation of a reduction of 8000 services across the Cadent networks.</p> <p>Following consideration of the detail in the Response and the discussions at the Engineering Bi-Lateral Meetings no further engineering of technical evidence has been provided to change the recommendation. Although some evidence may be provided following the Bi-Lateral meeting held on 22nd September 2020 to articulate the underpinning reasons for workload volume. This may assist in a subsequent Engineering/Technical Review.</p>
Major Project	Connections Base Case	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Major Project	London Medium Pressure	Uncertainty Mechanism / Re-opener	Accept (Modify Volume)	<p>The original recommendation following the EJP review, provided by the QEMS/ARV Engineering Team was to support the work volumes although to seek further detail in respect of the planning and phasing of the Sections. Ofgem also sought to better understand the cost compilation and certainty.</p> <p>The Response has provided a much greater level of detail to allow a more in-depth assessment of the work Engineering and Technical content, the work plan and the phasing of the work.</p> <p>The engineering content of the Sections and challenges associated with the RIIO2 Plan are well explained.</p> <p>The work plan and associated phasing covers the revised and Cadent reduced number of Sections to be undertaken in RIIO2. This is intended to provide a deliverable project within the period with an increased level of cost certainty.</p> <p>Proactive Stakeholder management is evidenced in the Response.</p> <p>Studying the level of detail documented in the Response a much greater level of confidence is provided that the work scope can be delivered in RIIO2.</p> <p>The QEM Engineering Team are supportive of the engineering and technical aspects of the Response and would support the reduced volumes proposed by Cadent going ahead on this basis.</p>



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Cathodic Protection	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume)	<p>The additional information provided in pages 115-117 addresses the original issues raised in response to DDQ_31 of the volumes of intervention type and associated costs being based on a forecast from one year of accelerated high workload (2019) to achieve compliance.</p> <p>The engineering needs case is met, the revised costs proposed are more in line with those needed to maintain a steady state compliance of CP in HP/IP and MP/LP based on historic Cadent spends and interventions. (Though higher than other GDNs).</p>
Asset Health	Pipeline Reinforcement - Base Case	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Offtake & PRS Pre-Heating	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Pipeline Crossings	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Reduced Depth of Cover > 7 bar	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	The engineering needs case is met and particular issues with the soil types and predominantly arable land use in East Anglia and East Midlands have been demonstrated. There is still likely to be uncertainty over the types and cost of individual remedial schemes which sometimes require lengthy legal arguments to agree.
Asset Health	Valves (IP/MP valves)	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	Capacity Upgrades - >7 bar reinforcements (AGI) - Base case	Accept (No Mods to Volume)	Accept (No Mods to Volume)	<p>No technical changes, as nothing re: new volumes submitted to QEM to review following DD</p> <p>Further Deep Dive undertaken with Cost Assessment Team</p>



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Major Project	HyNet De-carbonisation Project – Pre-Construction Phase		Accept (No Mods to Volume)	<p>This new EJP, issued at the end of the FD process, presumes that hydrogen will be a key element of the solution to decarbonising the NW industrial cluster and that funding for such a 'Net Zero' project is permissible as a normal part of this price control. The engineering review of the EJP is independent of these assumptions and assesses the scope and volumes proposed, should the HyNet project be executed.</p> <p>Given the late submission of this EJP, no time for SQP's was afforded nor the chance to undertake a deep dive on the proposed costs, which seem high in certain aspects.</p>
Asset Health	Offtakes & PRS Metering Systems	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	<p>No technical changes, as nothing re: new volumes submitted to QEM to review following DD. Cadent should review alternative metering options, together with third party metering experts, to determine their suitability and viability.</p> <p>Further Deep Dive undertaken with Cost Assessment Team</p>
Major Project	Security Interventions Cat2a	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	HP Pipeline Isolation Valves (>7bar)		Accept (No Mods to Volume)	New EJP (not submitted at DD). Definition of a Critical Valve in this EJP was too broad although the volumes proposed seemed reasonable as a proportion of the Cadent valve fleet.
Asset Health	Offtakes & PRS Slam Shut Regulators	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Pipeline Sleeves	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	LTS Pipelines (Piggable and Non Piggable)	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Governors (District, I&C and Service)	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Pipelines/ Mains Diversions - Chargeable > 7 & < 7bar - Base Case	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Offtakes & PRS Filters	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	Category 3 And Above Mandated National Security Upgrades	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Lowestoft Harbour	Reject	Accept (No Mods to Volume)	Cadent have since provided additional information which engineers have reviewed and approved the needs case - subject to cost assessment review.
Asset Health	Pipelines/ Mains Diversions - Non-Chargeable > 7 & < 7bar - Base Case	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	Holford Salt Cavity E&I	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	Brunel Bridge Crossing	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	Winnington Lane Crossing Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	Mersey Tunnel Access Refurbishment	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Offtakes & PRS Odourisation Systems	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Appendix 1.2 – SGN

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Tier 1 Iron Mains and associated services – Southern	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No Change as not requested to review following DD. Recommend a volume of dynamic growth is allowed.
Asset Health	Tier 1 Iron Mains and associated services – Scotland	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No Change to Engineering Draft Determination. Recommend a volume of dynamic growth is allowed.
Asset Health	Network Risers - Southern	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No Change to Engineering Draft Determination
Asset Health	Tier 2B Iron Mains and associated services – Southern	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume)	The network has significantly cut back the volume of pipes they are seeking to replace. They make a strong case to continue to seek funding for the T2b mains that can no longer be repaired, and we would support that. We note the removal of other CBA T2b pipes from the networks submission and have no issues with this from an engineering viewpoint. We also note that SGN have removed T2b pipes associated with T1 projects from their submission. We agree with the network that this is not the most efficient way of completing their programme of works. We are concerned that this may lead to stranded T2 pipe assets, which could be very expensive to replace in the future.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Iron Pipes >30m and Steel Pipes Including Associated Services Southern Network	Accept (No Mods to Volume)	Steel Mains - Accept (Modify Volume) Services - Reject Other P&C Mains - Accept (No Mods to Volume)	Pipe categories in EJP considered as separate Responses. Steel - The initial needs case was met based on the engineering and technical information presented in the EJP and subsequent SQ responses. On this basis the revised workload, as it is a subset of the larger initial volume is supported for mains. Volumes reduced by SGN to meet the CBA requirement Services - The volume has increased although the mains volumes have decreased therefore, we do not support this change as no additional evidence has been provided. Other Policy & Condition Mains - No change to volume following the review of the EJP(s) based on the additional information presented and considered.
Asset Health	Compliance Transmission Scotland and Southern Networks	Reject	Reject	Separate Sc (£19.72m) and So (£24.02) papers were supplied for review during consultation. These costs are not unique to SGN and assumption should be made that these risks can be managed with GDN baselines.
Asset Health	Tier 3 Iron Mains and associated services – Southern	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No Change. The network state that they were allowed the tier 3 work for their Southern Network in the DD. See page 1 in the reference document. Therefore, there is no need to review.
Major Project	R02 Pipeline – Replacement Local to Dunkeld/ Transmission - Scotland Network	Accept (Modify Volume)	Accept (Modify Volume)	No technical changes, as nothing re: new volumes submitted to QEM to review following DD Further Deep Dive undertaken with Cost Assessment Team



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	LTS Capacity Works Programme Transmission Scotland and Southern Networks	Accept (Modify Volume)	Accept (Modify Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD Further Deep Dive undertaken with Cost Assessment Team
Asset Health	Network Risers - Scotland	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Tier 2B Iron Mains and associated services – Scotland	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume)	The network has significantly cut back the volume of pipes they are seeking to replace. They make a strong case to continue to seek funding for the T2b mains that can no longer be repaired, and we would support that. We note the removal of other CBA T2b pipes from the networks submission and have no issues with this from an engineering viewpoint. We also note that SGN have removed T2b pipes associated with T1 projects from their submission. We agree with the network that this is not the most efficient way of completing their programme of works. We are concerned that this may lead to stranded T2 pipe assets, which could be very expensive to replace in the future.
Asset Health	Provan PRS Full Site Rebuild and Above Ground Pipework Rationalisation/Transmission Scotland Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD Further Deep Dive undertaken with Cost Assessment Team



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Iron Pipes >30m and Steel Pipes Including Associated Services Scotland Network	Accept (No Mods to Volume)	Steel Mains - Accept (Modify Volume) Services - Reject Other P&C Mains - Accept (No Mods to Volume)	Pipe categories in EJP considered as separate Responses. Steel - The initial needs case was met based on the engineering and technical information presented in the EJP and subsequent SQ responses. On this basis the revised workload, as it is a subset of the larger initial volume is supported for mains. Volumes reduced by SGN to meet the CBA requirement Services - The volume has increased although the mains volumes have decreased therefore, we do not support this change as no additional evidence has been provided. Other Policy & Condition Mains - No change to volume following the review of the EJP(s) based on the additional information presented and considered.
Asset Health	Industrial and Commercial Governor Replacement - Scotland	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Tier 3 Iron Mains and associated services – Scotland	Accept (No Mods to Volume)	Accept (Modify Volume)	The network has significantly cut back the volume of pipes they are seeking to replace. They make a strong case to continue to seek funding for the T3 mains that can no longer be repaired, and we would support that. We note that SGN have removed T3 pipes associated with T1 projects from their submission. We have no engineering concerns about this.
Asset Health	Ulysses Telemetry Replacement Programme	Accept (Modify Volume)	Accept (Modify Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD. Further Deep Dive undertaken with Cost Assessment Team
Asset Health	Industrial and Commercial Governor Replacement - Southern	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Winkfield South East Offtake Pre-heating and Volumetric/Pressure Control system replacements	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD. Further Deep Dive undertaken with Cost Assessment Team
Asset Health	Newton Mearns PRS & Waterfoot PRS Rationalisation/ Transmission – Scotland Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD. Further Deep Dive undertaken with Cost Assessment Team
Asset Health	Electrical, Instrumentation & Control Upgrade Programme	Accept (Modify Volume)	Accept (Modify Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD. Further Deep Dive undertaken with Cost Assessment Team
Asset Health	Winkfield South Off take - Pre-heating and Volumetric/Pressure Control system replacements	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD. Further Deep Dive undertaken with Cost Assessment Team
Asset Health	Industrial & Commercial Automated Meter Reading Equipment Replacement Programme	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD. Further Deep Dive undertaken with Cost Assessment Team
Asset Health	Mappowder NTS Offtake	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No technical changes, as nothing re: new volumes submitted to QEMS/ARV to review following DD. Further Deep Dive undertaken with Cost Assessment Team
Asset Health	The proposed replacement of 15 ERS Gas Control Module PRIs in SGN's Scotland LDZ	Reject	Reject	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM7996 South East Wedge (Edinburgh) Appendix B – Asset Health	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Kingsferry Bridge Phase 1	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Bulk Service Renewal Southern Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	St Mary Cray System 2 Turbo Expander: Pre-Heating System Replacement	Reject	Reject	This EJP is a financial proposal from the network that can only be assessed / justified based on the cost of the proposed asset intervention verses the potential income from the electricity generated. The Engineering Hub sees no needs case but defers this review to the Ofgem Cost Assessment team for further analysis.
Asset Health	Shalford PRS	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Metering Uncertainty Programme	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Domestic Service Governor Replacement - Scotland	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	IP Services - Reconfiguration	Accept (No Mods to Volume)	Accept (No Mods to Volume)	Engineering needs case still met. This is a commercial dispute about which activity gets funded from which pool of funds. We suggest that the OFGEM cost team pick this one up.
Asset Health	The proposed responsible demolition and removal of 13 abandoned in situ exposed pipe crossings in our Scotland Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	These costs are not unique to SGN and the assumption should be made that other networks had elected to leave similar redundant structures in place and are managing the ongoing risk. The SGN approach is better practice.
Asset Health	Reading PRS	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Georgetown PRS Full Site Rebuild/ Transmission Scotland Network	Reject	Accept (Modify Volume)	SGN produced a technical assessment during consultation accepting Ofgem's DD proposal that instead of a full site rebuild at Georgetown PRS, the current system can be maintained. As such, the revised scope at Georgetown programme to only deliver (1) Lineguard / slam-shut replacement and (2) pipework refurbishment, at a cost of £0.94m, is accepted.
Asset Health	Westerham PRS System 1 (HP-IP PRS)- Full System Rebuild	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Distribution Network Valve Remediation - Southern	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM6564 Newbury DPG (Newbury IP)	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Battle PRS System 2 (HP-MP PRS) Full System Rebuild	Reject	Accept (Modify Volume)	SGN produced a Technical Assessment during consultation demonstrating the needs case is met, although there is potential overlap in the delivery of the projects on site. The response to SQ 471 suggests there may be some minor cost saving through packing the projects (Battle 1 and 2) together which is reflected in the funding request. The delivery schedule for the EJPs (inc E&I Upgrade) has parts of the onsite works running concurrently, cost efficiencies in general project management and the project management for the main works contractor should be considered.
Asset Health	Westerham PRS System 2 (HP-MP PRS)- Full System Rebuild	Reject	Accept (Modify Volume)	SGN produced a Technical Assessment during consultation demonstrating the needs case is met, although there is potential overlap in the delivery of the projects on site. Some savings have been shown in the estimates to allow for this, such as one mobilisation and demobilisation. The delivery schedule for the EJPs has parts of the onsite works running concurrently, cost efficiencies in general project management and the project management for the main works contractor should be considered.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Below 7 Bar Cathodic Protection – Southern	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Woking PRS	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	St Andrews PRS Decommissioning /Transmission Scotland - Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Gas Profiler and Logger Systems Southern LDZ	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Bulk Service Renewal Scotland Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Remote Pressure Management Southern Networks	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Lauder & Airth SPRS Full Site Rebuild/ Transmission Scotland - Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Hooley Pipe Bridge Refurbishment	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Solar PV Installation on profiling governor sites - Southern	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Lockerbie Offtake Full Site Rebuild/ Transmission Scotland Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Distribution Network Valve Remediation - Scotland	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Carleith PRS, Craibstone PRS & Granton PRS Boiler Replacements / Transmission Scotland -Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Proposed programme of 90 Governor Refurbishments throughout Scotland Gas Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Hillside PRS	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	E&I Minor Works Repair Programme	Reject	Accept (Modify Volume)	SGN produced a Technical Assessment during consultation. It is acknowledged there is a requirement for an E&I Minor Works Programme, but do not agree that all the costs included in the programme are justified as minor repairs (batteries for Scotland at £100,000 & in Southern at £132,120) & would question the inclusion of the turbo expander UPS at £125,000 as detailed above. As a result, we believe the amount allowed should be reduced to reflect this.
Asset Health	The proposed replacement of 77 ERS Gas Control Module PRIs in SGN's Southern LDZ	Reject	Reject	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Remote Pressure Management South London LP Networks	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	016 CPM4845 Lympne (East Kent IPMP)	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Nitrogen Sleeves	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Fairmilehead PRS Replacement of Pressure Control Systems/ Transmission Scotland - Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Godstone PRS Pre-Heating System Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Hurst Green PRS Pre-Heating System Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM5295 Cliffsend CGS (Thanet IPMP)	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Proposed programme of 95 Governor Refurbishments throughout Southern Gas Network	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Smarden PRS Pre-Heating System Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM7564 Aldermaston (Basingstoke IPMP)	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Box Hill PRS Pre-Heating System Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Oban Vaporiser Replacement	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Shalford Pipe Bridge, Surrey	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Non – Telemetered Sites Work Programme	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM5290 Mitcham Depot CGS (South London IPMP)	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Shatterling PRS Pre-Heating System Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Cams Hall Tunnel	Reject	Reject	The network wants to replace this IP steel crossing as they cannot establish its condition inside the sealed tunnel it is installed in. This pipe has had one leak recorded on it in 2015, a failed isolation joint which was cut out. There has been no other leakage. The CP system has been stabilised which should protect the pipe. The network also stated at a bilateral call that it had concerns whether the existing pipeline would be safe with future hydrogen blends and that the proposed new steel pipeline would be "future proof". No further supporting engineering information has been provided. However, in the Embedding the consumer voice document page 85 they mention that riverbank erosion was also explained in the EJP. A check of the EJP finds no reference to riverbank erosion. More information is required before we could consider moving away from our initial reject recommendation.
Asset Health	CPM7708 Bridgend (Dundee IPMP)	Reject	Reject	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Below 7 Bar Cathodic Protection - Scotland	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Aylesham PRS Pre-Heating System Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Gas Profiler and Logger Systems Scotland LDZ	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM6728 Kingslaw (Tranent IP)	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Solar PV Installation on profiling governor sites - Scotland	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Campbeltown E&I Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	The proposed responsible demolition and removal of 19 abandoned in situ exposed pipe crossings in our Southern Networks	Accept (No Mods to Volume)	Accept (No Mods to Volume)	These costs are not unique to SGN and the assumption should be made that other networks had elected to leave similar redundant structures in place and are managing the ongoing risk. The SGN approach is better practice.
Asset Health	CPM5288 Mitcham Common CGS (South London IPMP)	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Braishfield C PRS	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Campbeltown Vessel Replacement and Repair	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Battle PRS System 1 (HP-HP PRS)- Pre-Heating Replacement	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	MP Governor Replacement - South	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Model Validation Loggers Southern	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Governor Abandonment - South	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM7607 Marden MP (West Kent IPMP)	Reject	Uncertainty Mechanism / Re-opener	SGN produced a Technical Assessment during consultation. The network has provided a significant additional piece of information in that the low point will see 106mbar by 2025/26, if all the forecast loads are connected. This proves the network is very sensitive to additional loads, as this has dropped pressures from a predicted 347mbar in 2022/23 with the addition of 102 cubic metres being connected. It is due to this sensitivity of the additional load that we required information about the date of the last network validation. The network has now provided a clear response to our concerns regarding network validation and the accuracy of their model. Therefore, with the new information provided the needs case has been proved and we can remove our original recommendation to reject. The timing and volumes are an uncertainty due to the nature of when the new developments will be built.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	CPM5070 Luffness Mains (Aberlady-North Berwick MP)	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Campbeltown Ambient Vaporiser Replacement	Reject	Reject	<p>SGN produced a Technical Assessment during consultation, which did not advance the needs case. There have been no faults from the ambient vaporisers at Campbeltown proposed for replacement. There is no POF analysis or reliability assessment for the ambient vaporisers provided in the absence of any failures. Full replacement is the only option presented apart from the base case (do nothing) The paper states that the ambient vaporisers have been assessed as obsolete but has not explained how.</p> <p>The option to reverse engineer spare parts has been dismissed as not possible without proper explanation. This option needs to be developed, costed and the CBA assessed. The NPV for recommended option of total replacement is lower than that of the base case with a payback beyond 50 years. SGN have stated that the hot water vaporisers could pick up 100% of the throughput so there is no impact on security of supply in the highly unlikely scenario of the total failure of all four banks of the ambient vaporisers.</p>
Asset Health	CPM6843 Brackley (North & West Oxfordshire IPMP)	Reject	Uncertainty Mechanism / Re-opener	<p>SGN produced a Technical Assessment during consultation. The network has provided some significant information in the DD response such as why replacing the DI is not an option. The network has now provided significant information regarding when their network analysis models are validated. SGN have stated that by gaining interruption customers they may be able to delay the reinforcement for 2 years (but it is still required in GD2). They have not explored, that by gaining of such interruption, it may (or may not) mean a smaller length of reinforcement would be required during GD2. The needs case has now been proved that some reinforcement will be required if the proposed developments go ahead therefore, we can remove our original recommendation to reject. However, there is still some uncertainty of how much and when the reinforcement will be required.</p>

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	CPM7459 Aberdeen City (Aberdeen – City Gate – Inverurie IPMP) Appendix B – Asset Health	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	IP Marker Posts - Southern	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM7472 Sturry MP (Ashford IPMP)	Reject	Reject	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM6595 Bicester MP (NW Oxfordshire IPMP)	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Coastal Erosion – Scotland	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Model Validation Loggers Scotland	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM5293 Burgess Hill DPG (West Sussex IPMP)	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Coastal Erosion – Southern	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM6944 Wivelsfield (West Sussex IPMP)	Reject	Uncertainty Mechanism / Re-opener	SGN produced a Technical Assessment during consultation. The network has provided some significant information in the DD response regarding ductile iron pipe in the network and why they ruled the replacement of this pipe out as an option. They have ruled this option out on financial grounds but no other justification then that was given. No CBA analysis was mentioned. We would have liked to see more details of this option. The network has now provided significant information regarding when their network analysis models are validated. Therefore, with the new information provided the needs case has been proved and we can remove our original recommendation to reject. The timing and volumes are an uncertainty due to the nature of when the new developments will be built.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	CPM6992 Uckfield (Brighton IPMP)	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	CPM1062 Amisfield Mains (Haddington-Dunbar IP) Appendix B – Asset Health	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Governor Replacement Named Projects - Scotland	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	MP Governor Replacement - Scotland	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Domestic Service Governor Replacement - South	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	IP Marker Posts - Scotland	Accept (Modify Volume)	Accept (Modify Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Governor Replacement Named Projects - Southern	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Below Ground Governor Security	Reject	Reject	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Cathodic Protection Transformer Rectifier Replacement Program	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Governor Abandonment - Scotland	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Temple Tunnel, Glasgow	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Appendix 1.3 - Wales & West Utilities

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Mains	Accept (Modify Volume)	Accept (Modify Volume)	<p>During the initial review process the needs case was technically supported, but the SQ responses were not conclusive re: the questions raised over a lack of clarity on volumes, hence the conclusion "Accept (Modify Volume)". Since no further information was submitted with regard to volumes the conclusion remains - Accept (Modify Volume).</p> <p>During consultation, a revised CBA for Tier 2B and a CBA for iron >30m was provided, these categories are still considered technically justified.</p> <p>A separate paper "Repex Cost Justification" identifies lost efficiencies, increasing unit costs and additional Opex if replacement of Tier 2B and iron >30m is disallowed.</p> <p>In summary no change to Engineering Draft Determination, the workload is technically supported. Tier 2B and iron>30m should be accepted based upon Ofgem acceptance of the revised/new CBAs.</p>
Asset Health	Services	Accept (No Mods to Volume)	Accept (No Mods to Volume)	<p>No change, as nothing submitted to QEMS/ARV to review following DD</p> <p>NB. WWU didn't submit any specific additional information with regard to this EJP, however if the mains lengths are adjusted then there will be an impact on service numbers accordingly.</p>
Asset Health	Pipelines	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	HN039	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Offtakes & PRS	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Risers	Accept (No Mods to Volume)	Accept (No Mods to Volume)	<p>No technical changes, the paper submitted was focused upon WWU challenging the costs used by Ofgem, "based on Cadent's RIIO-GD2 unit costs" as "not justified or accurate because of missing data, incomparable workloads and no thought given to the main cost drivers".</p> <p>In a separate paper "Repex Cost Justification", WWU provide details of contractor bids received after their initial submissions, which are "in excess" of their Business Plan submission.</p>
Asset Health	Governors	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Odorant & Metering	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Appendix 1.4 - Northern Gas Networks

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Mandatory Repex	Uncertainty Mechanism / Re-opener	Tier 1 - Accept No Mods to Volume <2" Steel - Accept no Mods to Volume Non Standard Materials - Accept No Mods to Volume Tier 2A - Uncertainty Mechanism / Re-opener Tier 1 Stubs - Uncertainty Mechanism / Re-opener	<p>The network has provided additional information on T1 stubs during the DD process. There needs to be some funding for T1 stubs until the HSE formally come to a view on what action is required to deal with them.</p> <p>Everything else in this EJP is unchanged.</p> <p>T1 stubs are still T1 pipes until the HSE formally makes a change, therefore the T1 workload as a minimum should be:</p> <p>$(\text{Remaining T1 length} + \text{T1 Stub length}) / \text{Years remaining of T1 programme}$.</p> <p>This will head off any claims that insufficient length has been allowed for in the T1 iron (including stubs) programme until the proposed reopener in 2022.</p>



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Non-Mandatory Repex	Accept (Modify Volume)	<p>Tier 3 Mains</p> <ul style="list-style-type: none">- Accept (No Mods to Volume)Steel >2" Mains- Accept (No Mods to Volume)Zero Scoring Mains- Accept (No Mods to Volume)Asbestos Mains- Accept (No Mods to Volume)Phoenix Lined Mains- RejectRepexOvercrossings- Accept (No Mods to Volume)PE Mains- Accept (No Mods to Volume)Diversions- Accept (No Mods to Volume)Risers- Accept (Modify Volume)	<p>The single Draft Determination applied to multiple asset categories. Greater granularity was provided during consultation, including the PE Mains case where volumes are now supported. All are now accepted, with these two exceptions:</p> <p>Phoenix Lined Mains - Decision unchanged. The data supplied during consultation did not provide new insight regarding the risks of pipe failure to justify the investment.</p> <p>Risers - Decision unchanged. No new data supplied.</p>
Major Project	Connections	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Project Type	EJP Name	QEMS/ARV Draft Determination	QEMS/ARV Final Determination	Comments
Asset Health	Pressure Reduction Stations	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Reinforcement	Accept (Modify Volume) & Uncertainty Mech	Accept (Modify Volume) & Uncertainty Mech	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Offtakes	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Major Project	TransPennine	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Gas Holders	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	District Governors	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Overcrossings	Uncertainty Mechanism / Re-opener	Uncertainty Mechanism / Re-opener	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Pressure Management	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD
Asset Health	Local Transmission System	Accept (No Mods to Volume)	Accept (No Mods to Volume)	No change, as nothing submitted to QEMS/ARV to review following DD



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Appendix 2 – EJP Review Team Biographies

Rob Graham – QEMS: CEO & Project Sponsor

Since 2003 Rob has been the CEO of QEMS, a business providing project services / resources, technical consultancy, management consultancy and software solutions. The QEMS business focusses on consulting on internal business processes, assisting with change management for implementing process efficiencies and consulting on asset management and asset information recording among many other areas. Rob has remained an active consultant in his CEO role routinely working on client commissions in roles as principal consultant addressing risk, QA/QC, procurement and document management systems. Rob's passion is developing client design specifications for software as a service and holds a BSc in Civil and Environmental Engineering.

Tony Voss – ARV Consulting: Project Manager - Local Transmission & PRS

Tony is a Chartered Engineer, consultant, business P&L manager and business development professional with over 30 years of experience in energy transmission and distribution infrastructure projects supporting power generation, industrial & domestic heat, transport and oil/gas production. Tony has held major positions in energy infrastructure and technology businesses in the UK and Canada including Business Unit Director, Director of Operations, Engineering Director, Business Development Manager and senior project execution roles in both the public and private sectors. He holds a First Class BEng (Hons) in Electronic Engineering and is a Fellow of the Institution of Gas Engineers & Managers.

Stuart Elliott – QEMS: Project Coordination - Security Infrastructure

Stuart is a Professional Services Manager specialising in project management, client/associate liaison and account management as well as a Project Manager providing technical expertise and personnel management to various gas industry clients. Stuart has 20 years of experience in the gas industry and holds a first class honours degree in Civil Engineering.

Jeremy Bending – QEMS: Cost Benefit Analysis

Jeremy is a senior executive and former COO of National Grid Gas Distribution, with responsibility for the UK Gas Distribution business. He has extensive experience within the gas and energy sectors and is an industry expert and thought leader in the areas of Asset Management and Process Safety. Jeremy founded his own consultancy, established to advise companies on how to enhance their business performance through the introduction of the latest Asset & Risk Management approaches. He has a BSc Hons in Production Engineering and Management, is a Chartered Engineer and holds a number of non-executive directorships.



Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

John Wilkinson – QEMS: Electrical & Instrumentation

John is an instrumentation, control & electrical project manager with over 40 years of experience in the gas sector. He operates as a management consultant for various clients primarily associated with gas infrastructure projects. He is an Incorporated Engineer and is a longstanding member of IGEM, InstMC and IET.

Mark Danter – QEMS: Pressure Reduction Stations (General)

Mark is a highly qualified, client-focused E&I Project Manager/Director with a proven background in project management, man management and full P&L and BD responsibility. His specialties include: business management, pipelines, G17 Approver, NG Approved HAZOP and HAZID Chairman and he is an NG Approved Design Co-ordinator. Mark has over 30 years of experience in the gas industry, is a Chartered Engineer with a BEng (Hons) in Control Computer Engineering and professional training as Compex11 Assessor, CDM Principal Designer, G17 Approver and NG Safety & Engineering Approved Chairman.

Peter Christie – QEMS: Iron, Steel, PE Mains, Services & Risers

Peter is a Chartered SHEQ engineer with 40 years of experience in gas distribution and transmission engineering across the full pressure range. During the last twenty years he has held several key leadership roles. He now provides engineering advice and training to the gas industry including development of specifications, procedures, training and development of personnel. He holds a BEng, NEBOSH certificate in addition to being a Chartered Engineer.

Simon Lane – QEMS: Iron, Steel, PE Mains, Services & Risers

Simon has over 40 years of experience in the gas distribution business including as a strategy analyst with a proven track record in delivering trend analysis, forecasts and management of mains replacement software and data. He is also a gas distribution planning engineer with experience in the design, construction, replacement and repair of gas distribution networks. Simon has a City & Guilds in Gas Distribution as well as qualifications in pressure control and network analysis.

Adam Sadler – QEMS: Pre-Heating

Adam is a Chartered Building Services Engineer with extensive technical expertise and practical knowledge of engineering services and project management developed from 20 years post-graduate experience as a designer, a site-based project engineer, a project manager, an independent certifier, a contractor and a consultant. He holds a BEng (Hons) in Building Environment Engineering and a Certificate in Building Information Modelling.





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

Bringing projects together

Tim Green – QEMS: Local Transmission and Cathodic Protection

Tim has 38 years of experience in the gas sector, latterly working as a Senior Engineer with extensive experience in managing the operation and maintenance of gas networks, together with their design, construction and modification. He has extensive experience in both gas distribution and transmission from transmission compression to low pressure metering, in particular spending 11 years as the Responsible Engineer managing the integrity of National Grid gas distribution network and gas quality. Most recently Tim has been dealing with the integrity and gas quality challenges of the emerging bio and unconventional gas connection, overseeing the decommissioning of the low-pressure gas holder fleet and above ground high pressure storage installations. He has an HND in Mechanical Engineering and is a member of IGEM.

Paul Howard – QEMS: Industrial, Commercial & Service Governors, Crossings

Paul has close to 45 years of experience in the gas industry. Apprentice trained to City and Guild level initially as a gas governor fitter, he is now a Project Supervisor and Trainer who has worked on all aspects of the gas distribution and transportation network from domestic/non-domestic regulators, district governor networks, holder stations, local transmission sites, national transmission sites. Paul has trained as internal verifier for apprentices and adult trainees in Network Maintenance. In addition, he has experience as a Network Officer, supervising direct and contract labour and holds a BTEC in Gas Utilisation (Building Services Engineering)





Contract Number: QEM-1910
Client: OFGEM
Project Name: GD2 EJP Reviews

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Appendix 3 – [Spare]

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