

New Large Load Connections Re-opener Submission

January 2024

Classification: Confidential



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Ofgem Requirement

The table below outlines where each chapter of this application relates to Special Condition 3.22 of our Gas Transporter licence as well as Ofgem’s requirements as set out in Special Condition 9.4.

Ofgem requirement	Application chapter
GT licence – Special Condition 3.22 New Large Load Connections Re-opener (NLLRt)	
Circumstances for applying to Ofgem for re-opener (Para 3.22.4)	Chapter 1.0 – Exec Summary Chapter 2.0 – Alignment with our RIIO-GD2 Business Plan, Business Strategies and Future Price Controls Chapter 3.0 – Formal Application
Application requirements (para 3.22.7)	Chapter 3.1 – All Networks – Trigger and needs case Chapter 3.2 – All Networks – Consideration of options Chapter 3.3 – All Networks – Options selection Chapter 3.4 - All Networks – Cost Information Chapter 4.0 – Appendices Chapter 4.1 – Supporting documents Chapter 4.2 – Glossary of terms
Re-opener Guidance and Application Requirements Document (Feb 2023)	
Requirements for the content of re-opener applications: Introduction (para 3.1)	Chapter 1.0 – Exec Summary
Gas Distribution Sector (para 3.6)	Chapter 3.4 – Project Cost Information

Point of Contact

The table below provides a point of contact for this re-opener application should you wish to discuss any elements of it or have further questions. To ensure any correspondence is picked up in a timely manner, should the point of contact be out of office, please also copy in our mailbox referenced below.

Name	Position	Email	Telephone
[Personal Detail Info]	[Personal Info]	Detail [Personal Detail Info]	[Personal Detail Info]

Chapter 1.0

Exec Summary

This paper is Cadent's application to the Authority requesting an adjustment to our RIIO-GD2 allowances under the New Large Load Connections re-opener mechanism. This modification is necessary to support the resilience of Cadent's gas network, reinforcing the network as and where necessary due to a breach of maximum capacity load as a direct consequence of a New Large Load Connection. Cadent are making a re-opener submission under Special Condition 3.22 New Large Load Connections Re-opener, Part A, Para 3.22.4 the opportunity to recover costs for New Large Load Connections.

The New Large Load Connections re-opener is an ongoing re-opener from RIIO-GD1 which addresses the uncertainty around the need to reinforce our network to accommodate new large load connections. This work is largely reactive, and the re-opener provides a mechanism to recover efficient costs that have not been recovered directly from the customer through the Connection Charge.

To comply with our internal policies and HSE (Health and Safety Executive) obligations, our Gas Transporter Licence (Standard Special Conditions A9 and A17) requires us to ensure proportionate and timely investment in infrastructure to support our commitment to provide a reliable service to customers and enable economic growth.

Where a customer/developer seeks to connect a large load to our network, we may need to reinforce the network to ensure that we can meet our pressure compliance requirement and maintain security of supply across the network.

All New Large Load Connections required for the purpose of taking gas from the Distribution Network have a maximum offtake capacity in excess of 1,500 standard cubic metres per hour (scm/h) and have been subject to and passed an economic test. Due to the annual quantity of gas these sites take it is very rare that these tests fail and the customer does not contribute towards the reinforcement

The re-opener can only be triggered if the additional costs we incur exceed the materiality threshold set for this re-opener for each network. Our **Eastern Network** and **North West** Network have exceeded this threshold and therefore we are applying for a revenue adjustment through this re-opener application.

To manage Stakeholder expectations all new requests to reinforce our network are analysed before a decision is made on the most efficient option. This analysis includes ascertaining the amount of new load required, location of the connection,

pipe length, etc. to determine whether a reinforcement is required or if the existing network can meet the new request. If it is determined that a reinforcement is required, we assess our options to deliver the reinforcement in the most effective and efficient way, balancing safety, cost, and risk.

The New Large Load Connection request will be passed through the appropriate governance channels and engineering review for approval of design works to commence. Where a New Large Load Connection has met the required scope, assessment has been completed and it has passed the economic test (i.e., costs can be socialised), Cadent will carry out the reinforcement.

Cadent will always look at the available options for each request and use the most efficient option to reinforce the network. We will always try to utilise other options such as pressure increases, laying parallel mains to our current infrastructure or rebuild/install additional governors to boost capacity.

Our funding request is detailed in the table below. These are costs we have incurred or expect to incur in scope of the re-opener beyond baseline allowances.

Network	21/22	22/23	23/24	24/25	25/26	Total (£m)	Materiality Threshold (£m)	Requested Value (£m)
Eastern	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]
North West	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]
Cadent	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

Figure 1. Table indicating spend for NLLC through RIIO-GD2 by Cadent Network against materiality threshold

The table includes costs for completed and ongoing projects for which details of each are set out in more detail later in the application, and a forecast for projects that we expect to materialise in the later years based on historic experience.

The forecast cost is based on historic run rates and input from local area experts, excluding any bespoke specific projects. We cannot account for any significant New large load connection requests without significantly increasing the forecast cost.

Cadent have produced this forecast with the best possible information we have, however it is impossible for us to accurately predict significant customer driven

works such as [cost & security sensitive info] without including a substantial cost risk into the application. We are requesting that projects not named in this reopener are revisited at close out of RIIO-GD2 to protect consumers and Cadent from any unexpected cost variations.

Chapter 2.0

Alignment with our RIIO-GD2 business plan, business strategies and future price controls

At the heart of our New Large Load Connection work is our RIIO-GD2 Business plan outcome, “to maintain a safe and resilient network”. Making way for new connections on to our network, allowing growth for our customers, whilst ensuring safety and resilience remain our key focus.

Our networks strive to provide world class levels of performance to our customers, and this has been underpinned by our focus on the safety and wellbeing of our customers, employees, contractors, and members of the public. We continue to increase network resilience through ongoing reinforcement works and managing customer connection requests competently and efficiently. We have also replaced several of our gas regulators as part of our standard maintenance programme, contributing to our network reliability.

We are building future capacity into our plans with upsizing of regulators, for example replacing 4” regulators with 6” regulators.

Our relationships with local authorities have matured and we are always working with them to understand future growth and the potential for increased demand on our network. This has helped shape our plans on which areas of the network to reinforce and when.

Although these won't directly impact future customer large load requests, we are always considering future load growth and working to minimise its impact.

Given the reactive nature of this work, varying customer requirements and complexity of some of the sites it has not been possible to plan this work in advance.

The costs included within this application reflect the additional cost beyond the baseline allowance for reinforcements. Our full reinforcement allowance will be used for general and specific reinforcements that are not considered to be for New Large Load.

New Large Load Connections vary in delivery timescales depending on existing land agreements, where we can connect to the network and contractor availability through the tender process.

We aim to deliver them in the most efficient timescale, to meet consumer expectations and needs.

Chapter 3.0

Formal Application

Chapter 3.1– Scope, triggers and needs case

We must respond to changes in demand on our network, to maintain the security of supply that our customers expect and as is set in our Licence.

Our Gas Transporter Licence (Standard Special Conditions A9 and A17) requires us to ensure proportionate and timely investment in infrastructure to support our commitment to provide a reliable service to customers and enable economic growth.

Where there is growth in demand or where a customer/developer seeks to connect a large load to our network, we may need to reinforce the network to ensure that we can continue to meet this requirement. If this cannot be done through network management, then we would need to undertake reinforcement work to maintain pressure and capacity across our network, considering all options and ensuring the most efficient option is taken.

The nature of UK growth is hard to predict and has impacted our network in different ways depending on local conditions. New housing estates, power generation or industrial processes cannot be forecast and are dealt with reactively upon new requests coming in.

Although it is possible to model gas demand on a regional scale, it is difficult to assess how this will change locally, how that change will impact on the local network, and what reinforcement work we must undertake.

- The specific reinforcement must be upstream of the Connection Charging Point not chargeable to the new load i.e. has passed the Economic Test and cannot be recovered through the connection charge

- Must represent the most efficient method i.e., could not have been resolved through network management

These reinforcements not only increase capacity but ensure we are maintaining a resilient and reliable network, fulfilling the expectations of our Stakeholders (including consumers).

On receipt of a new request, initial analysis is completed by the Connections Team and if the request meets the required scope, it is then added to the Reinforcement Database.

These requests are then picked up by the Network Leads for further assessment and review before a set of design options are considered with the local engineering community to drive the most efficient and viable option.

Additional checks completed by the Networks include:

- Model validation checks
- Actual pressures vs model pressures
- If there are any planned works that would mitigate the request (upsizing of regulator etc)

Before reinforcement works commence a risk assessment is completed to determine the level of failure. Many of our completed connections are parallel lays, meaning the new connection is laid parallel to the existing main within the network. The existing main, if through assessment is deemed to not pose a risk, will not be removed as this would incur a cost and would not be the most efficient option, instead the new connection is laid next to the main to minimise the impact to both consumer and our operating network.

If the consumer requesting the connection can be given a partial load, for example for a new housing development, then they will receive a partial load whilst works for the New Large Load Connection are ongoing. The majority however will have no load or connection method until the works are complete and tested before turning on.

As with all major excavation works there is an incident risk during excavation if the correct processes and safety measures are not observed, this risk is extremely minimal as all engineers must have passed the relevant training and qualifications before work on site can be undertaken.

There have been very few known issues post excavation due to Cadent's stringent design process. All reinforcement designs are created to be right first time.

Due to the complex and reactive nature of this work, it is difficult for us to resource internally and allows our focus to remain on other projects for example MRP (Mains Replacement Programme), by going out to market, it widens the available resource pool.

Our direct labour workforce covers a number of activities (escapes, diversions, reinforcements, repair activities). This can make it difficult to plan larger and more complex works that some of these works may represent, whereas a third party could be tendered and contracted within a month, providing a much quicker turn around and cost-effective solution for the consumer.

In line with procurement requirements, a NLLC will be subject to a competitive tender event which is then reviewed by the Cadent Commercial team to ensure the contract is awarded to the contractor who can meet both Cadent's and the consumers requirements for the connection. Please see Appendix 4 Reinforcement works tender process for the process steps taken when reinforcements go out to tender.

Overall delivery of New Large Load Connections has several variables, these include;

- The option selected to reinforce the network
- The area in which the works are being completed (subject to lane closures etc)
- The level of load required
- Existing infrastructure
- Available resource (Contractor availability)

We aim to deliver all New Large Load Connections within a 12-month period depending on the size and scale of the reinforcement. Most pipe lays can be achieved in under a year; however, some large length schemes may take longer, and governor installs can take up to 2 years due to complexity with securing land, long lead times on procuring specialist equipment, etc.

Whilst there are different methods/options to reinforce, we have consistent processes in place for delivering these. This consistent process is also followed by the contractors delivering the works on site.

Below are Cadent's process steps when looking to include any New Large Load Connection within the re-opener;

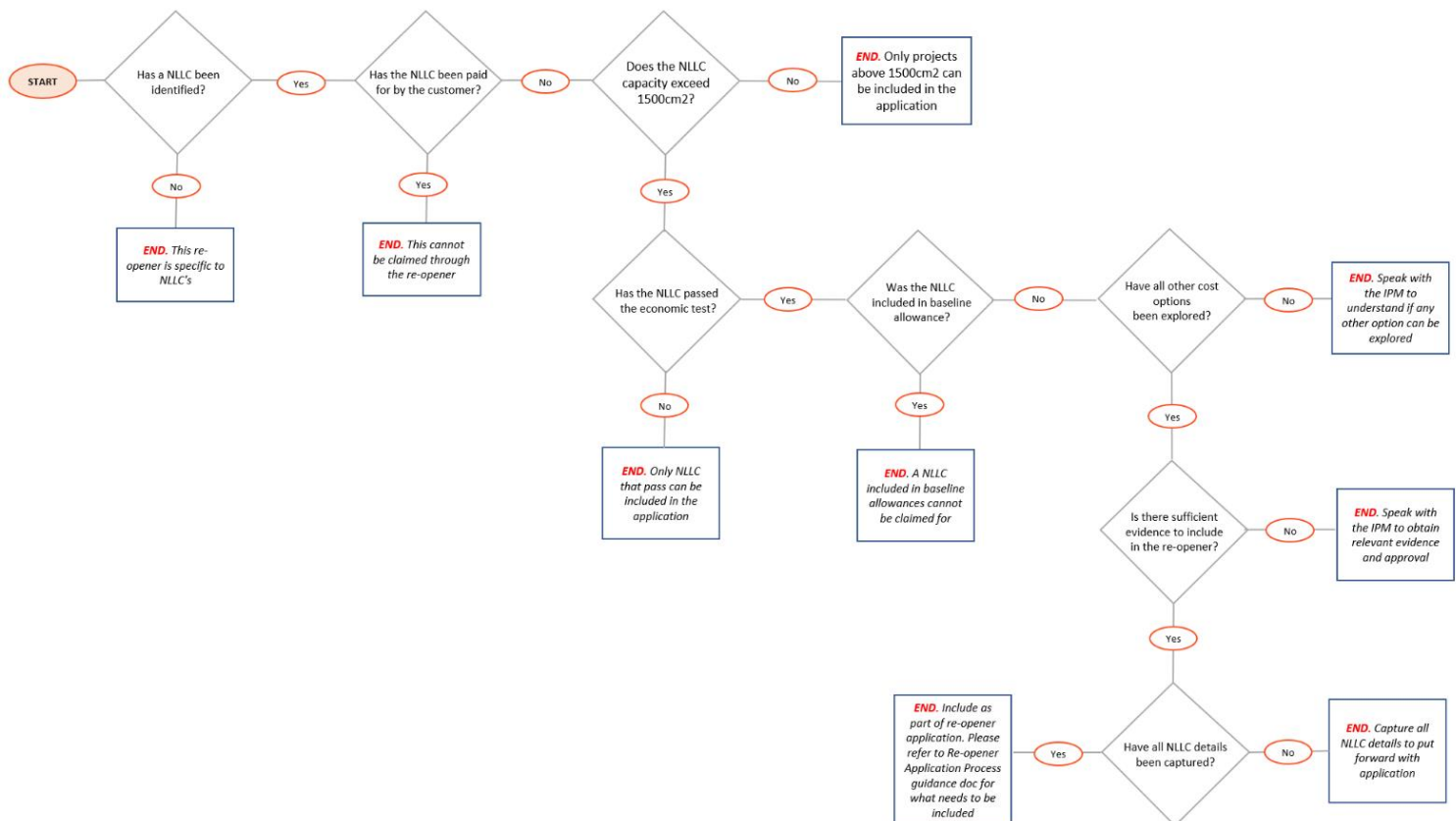


Figure 2. New Large Load Connection re-opener process steps

See Appendix 3.0 for full process steps document.

What is the economic test?

The Economic Test is a financial assessment tool that is designed to ensure Cadent meets its Gas Act obligations to develop and maintain an efficient and economical pipeline system for the conveyance of gas (Gas Act, section 9(1)(a)) and to comply with any reasonable request to connect to its system any premises or any pipeline system operated by an authorised transporter (Gas Act, section 9(1)(b)).

The Economic test is used to prevent existing customers on the distribution network subsidising new loads, where the investment required to supply a site is deemed uneconomical, and the onus of cost is placed back up on the requesting customer.

The Economic Test compares the cost of network reinforcement specific to the requested load and additional operating costs of accommodating the new load over an agreed appraisal period (45 years for loads with an annual quantity

<58.6Gwh and 25 years >58.6Gwh), with the additional distribution transportation revenue from the load.

Where the cost to provide the additional capacity and the capitalised operating cost is greater than the capitalised transportation revenue, the required rate of return will not be met.

To avoid this deficit being recovered by increased charges to other existing customers, the requesting customer is required to pay a contribution towards the cost of the reinforcement. This contribution will be equal to the excess of the costs associated with the new load over the capitalised transportation revenue.

Where the rate of return is met, the DN will deliver the works at their cost, the requesting customer will not pay/ contribute towards the reinforcement works.

All New Large Load Connections included in this application have passed the economic test with no customer contribution required.

Please see Appendix 06 New Large Load economic test results for full details.

Chapter 3.2 – Consideration of options

As part of our optioneering process, we identified ten options that are considered when we receive a New Large Load Connection request that requires reinforcement. The following methodology is used when determining the positives and negatives for each option:

- Does the option deliver business outcomes?
- What change impact does the option cause?
- How difficult is it to implement?
- Time to deliver and realise benefits.
- Overall impact of option.

Reinforcement of our network to meet the needs of customers can be achieved in many ways and this is dependent on both the requirements and the existing structure of the network. The below are the options considered when reinforcing.

- 1) Do not reinforce.
- 2) Change in connection point for new sites – Where possible the customer will be offered an alternative connection point, deeper into the network or on a higher-pressure tier, with spare capacity to meet the demand.
- 3) Pressure increases on clocked/fixed systems – If the demand can be met through pressure increases this would be considered as it is one of the lowest cost solutions in meeting demand.

- 4) Low point install for optimised pressure increase – For profiling systems the network can sometimes be reconfigured around a new low point to raise pressures only when required. This is another low-cost solution but is usually only suitable for LP connections.
- 5) Contiguous mains lay – New mains laid from a point upstream to the customer’s connection point (typically parallel to an existing main), classed as contiguous mains lay reinforcements. If there is a significant pressure drop along a specific leg on the upstream network, a parallel pipe can be the most practical and efficient solution.
- 6) Non-contiguous mains lay – Either parallel to existing mains, or if additional capacity is available in an adjacent network or network section of the same pressure tier, a road crossing or other connection between the sections can bolster entire areas of a network and can be relatively short in nature. Sometimes these can also serve more than just a single connection and are classed as non-contiguous mains lay reinforcements.
- 7) Replacement scheme adjustment – If a customer is connecting near a planned inserted main, this can be the cause or a contributing factor to the lack of available capacity. Increasing the proposed insertion size (e.g., from 63mm in 4inch to 90mm in 4inch), or even changing the lay method from insertion to open cut to enable an even larger diameter main to be installed, can be an efficient and cost-effective way to provide the requested capacity.
- 8) Create an isolated system and increase pressures – Sometimes all-plastic LP systems can be created through isolation from the main network and pressures raised to 70mb. In some instances, a similar approach can be taken on an MP network, where isolating a section enables a pressure elevation that would not be feasible if the network remained integrated.
- 9) Governor / PRS rebuild - If a capacity restriction on the influencing governor is the cause of the predicted network failure, it may be possible to replace some of the components of that governor to remove the restriction. This option relies on the replacement components fitting inside the footprint of the existing governor site.
- 10) New governor / PRS installation – Usually the last option considered. If the required capacity is available in a nearby higher-pressure tier network, and a suitable location within a reasonable distance of both networks can be found, then connecting the two through a new pressure reduction installation may be a viable option.

In some case a combination of methods can be used to maximise efficiency and minimise cost. For example, a pressure elevation alone may not be enough to resolve the issue completely but if used in addition to a man lay option it can reduce the length of new main required, this reducing the overall cost of delivery.

Option 1 – Do not reinforce

Positives

- No spend required.
- No need to engage Contractors for the tender process.
- No change required to the network.

Negatives

- Reputational damage.
- Non-compliance with our licence obligations.
- Not meeting the needs and requirements of our consumers.

Option 2 - Change in connection point for new sites

Positives

- No requirement for extra internal resources.
- Puts control of delivery into the customers hands.
- Likely to be a shorter lay so works can be completed in less time.
- Customer may already have relevant notices raised, shortening timescales.

Negatives

- Limited/no scope for additional efficiencies as we expand reinforcements to allow for future growth to the network.
- Removes ability to tender works for best price.
- This option can be restrictive as it only available when additional capacity exists in the network local to the new connection.
- Relies on the customer agreeing to expand the scope of their works.
- This is often not viable as the new connection point is too far from the requested one.

Option 3 - Pressure increase on clogged/fixed systems

Positives

- No new lay of pipeline required meaning a potential to complete request sooner.
- One of the lower cost solutions in meeting demand.
- One of the least invasive approaches.

Negatives

- Puts extra strain on our network.
- Is not a viable option where we are near maximum capacity.
- Increased leakage on mixed material networks.
- Could potentially have a negative impact on other assets in the area if not monitored correctly.

Option 4 - Low point install for optimised pressure increase

Positives

- Can be good when used for a load that follows the domestic demand pattern.
- A fairly low-cost solution relative to other options.
- A minimal excavation option as no pipe lay required.
- Minimises pressure increase.

Negatives

- Only relevant to connections made to LP mains.
- Would not be an option for loads with usage patterns that differ too much from the domestic pattern.

Option 5 – Contiguous mains lay

Positives

- Possibility to be laid directly next to existing main utilising existing permissions.
- Increases the efficiency of the network.
- Is a long-term solution.
- Reinforces a larger area.

Negatives

- Can be rather costly compared to some of the options and would only be considered if others are not viable.
- In many cases this would be a large excavation meaning a bigger requirement for TM, mobile plant hire etc.
- These jobs take longer to complete due to the complexity of the work.
- Can be a localised solution dependent on capacity availability.
- Can be disruptive to local traffic.
- Road space may be limited by existing utilities.

Option 6 - Non-contiguous mains lay

Positives

- Can serve more than just a single connection.
- Relatively short in nature reducing time to complete the job.
- Less consideration needed for other assets as not a huge lay.
- Increases the overall integrity of our network.
- Is a long-term solution.
- In most cases this would be a large excavation meaning a bigger requirement for TM, mobile plant hire etc.
- Reinforces a larger area.

Negatives

- Can be rather costly compared to some of the options and would only be considered if others are not viable.

- These jobs take longer to complete due to the complexity of the work.
- Can cross several other assets so planning can take more time.

Option 7 - Insertion sizing increase

Positives

- Can be combined with existing planned works.
- Works can commence quickly if combined with planned works.
- Not as costly as other options.

Negatives

- Limited to areas that are planned for inserted mains.
- Quite often the demand cannot be met.

Option 8 - Isolate system and increase pressures

Positives

- May require minimal works (cut and cap or valve installation) if network in area is all PE.
- Just a setting and spring elevation required for the governor.

Negatives

- This is network dependent and, in some cases, could require a governor rebuild.
- There may be a requirement to replace steel services due to the increased risk of leakage.
- New Large Load Connections onto LP mains are very rare so in most cases this option cannot be pursued.

Option 9 – Governor / PRS rebuild

Positives

- Minimal disruption to the network as work can be completed on a per stream basis enabling the governor to remain in use.
- Less costly than a new governor installation.
- Avoids the need for Land agreements or issues with land deeds.

Negatives

- Lead times on components can be extensive.
- Not all sites would allow a governor to rebuild due to upsize components requiring more space than is available.
- Increase in governor capacity doesn't always resolve predicted failure.

Option 10 – Governor / PRS install

Positives

- A long-term solution to reinforce a large area.
- Could increase the demand by a large amount meaning less need for reinforcement in the future.

Negatives

- Can take a long time to complete if land agreements need to be sought.
- The costliest option in most cases.
- A greater risk of disruption to our customers as works would take longer to complete.
- A suitable location cannot always be found.

At this stage our forecast costs are based on the existing workstack of proposed developments and future trends, therefore there has been limited optioneering.

However, where we have identified a large load reinforcement (i.e. it's location, load, and other requirements), we have evaluated the relevant pros and cons and determined the optimum solution.

The projects for each network are detailed in Chapter 3.3, including the preferred option selected for each.

A market-based option was not viable with the work being so niche. To meet such load increases our only option is to reinforce and all reinforcement options have been through optioneering analysis as demonstrated above.

On receipt and completed analysis of a New Large Load Connection request, a group of SMEs are gathered including a Network Design Lead, Asset Investment Engineer, Engineering Lead, and Capex and Repex Leads. All options are discussed, including impact to network, delivery timescales, any future planned works that could mitigate the problem and availability of resource and materials.

An agreement is then made between those in attendance as to which the best delivery option would be, and this is documented within the project approval pack.

This re-opener includes actual spend against those projects already completed and forecast for any projects which are ongoing.

A forecast has been made for years 4 and 5 based on spend incurred in years 1 and 2, known projects for year 3 and historical volume/cost of requests which has then been reviewed by network leads.

	#1 Do not reinforce	#2 Change in connection point for new sites	#3 Pressure increase on clocked/fixed systems	#4 Low point install for optimised pressure increase	#5 Contiguous mains lay	#6 Non-contiguous mains lay	#7 Insertion sizing increase	#8 Isolate system and increase pressures	#9 Governor / PRS rebuild	#10 Governor / PRS Install
Delivers business outcomes	Major	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
Change impact	None	Moderate	Minimal	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Major
Effort to implement	None	Minimal	Minimal	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Major
Time to deliver and realise benefits	No benefits are realised	< 6 months	< 6 months	6-12 months	6-12 months	6-12 months	6-12 months	< 6 months	6-12 months (Assuming no supplier constraints)	12 months + (if land agreements in place)
Overall impact	Inadequate - This would not meet our customer demands or licence obligations	Adequate – This option puts the control in the customers hands and can be delivered quickly	Adequate – No new pipe lay required, meaning a lower cost and better delivery timescale for the customer	Adequate – A good option when reinforcement is required to increase hourly load	Adequate – Can be used to serve more than one connection and increases overall integrity of network	Adequate – Can be used to serve more than one connection and increases overall integrity of network	Adequate – Can be combined with planned works, less costly than other options	Adequate – Requires minimal works but is network dependent. Often is not an option as requests to connect to LP mains are limited	Adequate – Addresses capacity issues, less costly than new install but not all sites can accommodate a rebuild	Adequate – This is only explored as a last resort due to complexities of work and cost implication

Figure 3. New Large Load Connections optioneering matrix

As above an assessment is made on each connection before an approach to reinforce is then agreed and designed.

The options for each connection considered are outlined in Chapter 3.3.

Chapter 3.3 – Options selection

Below is a summary of each New Large Load Connection Cadent has completed, is ongoing or is planned to undertake shortly that has not been recovered through the connection charge. Each project breakdown includes the following:

- Background to connection.
- Status of Connection.
- Options considered.
- Preferred option.
- Evidence to justify.
- A table of spend broken down by reporting year.
- Forecast costs (where job is ongoing).

When considering reinforcement options, we avoid private land as much as possible due to land agreements that could potentially delay the commencement of works.

We would only look at a new governor as a last resort as this almost always needs to be on new land with existing agreements in place and can therefore be an extremely drawn out and costly option.

Due to how long a governor delivery takes, if no other option is available the request is made almost immediately to avoid further delays.

We have not completed stakeholder engagement wider than that with the consumer requesting the connection and the relevant local authorities or 3rd parties that are required as part of engineering due diligence. Our stringent delivery plans ensure we are communicating regularly with the consumer, delivery challenges due to land easements/ agreements are managed locally with both landowners and consumers.

Given how niche New Large Load Connections are there is no requirement to assess whole system opportunities as these works are assessed on an individual basis and a one solution suits all approach therefore cannot be adopted.

North West

Our funding request for the North West Network is set out in the following table and includes costs we have incurred or expect to incur in scope of the re-opener beyond baseline allowances:

North West	21/22	22/23	23/24	24/25	25/26	Total (£m)	Materiality Threshold (£m)	Requested Value (£m)
Completed/ongoing projects	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]		[cost data]
Future forecast	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]		[cost data]
Total	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

The table includes costs for completed and ongoing projects for which details of each are set out below, and a forecast for projects that we expect to materialise in the later years based on historic experience.

The forecast cost is based on historic run rates and input from local area experts, excluding any bespoke specific projects. We cannot account for any significant New large load connection requests without significantly increasing the forecast cost.

Cadent have produced this forecast with the best possible information we have, however it is impossible for us to accurately predict significant customer driven works such as [cost & security sensitive info] without including a substantial cost risk into the application.

We are requesting that projects not named in this reopener are revisited at close out of RIIO-GD2 to protect consumers and Cadent from any unexpected cost variations.

[security sensitive info]

A customer request for a new supply to an industrial [power generation] site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load Connection.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be a contiguous mains lay, combined with a minor pressure elevation to be delivered separately. The mains lay element would consist of 550m x 355mm medium pressure main, part of which is parallel with the existing 180mm PE medium pressure main.

This ensured the demand could be met and that there was no capacity risk to the existing infrastructure.

This was a significant lay alongside the pressure elevation, however due to the customers connection point position close to an extremity of the network, reinforcement works have ensured further capacity has now been provided for future loads visible on our 5-year planning models (actual modelled capacity requests)

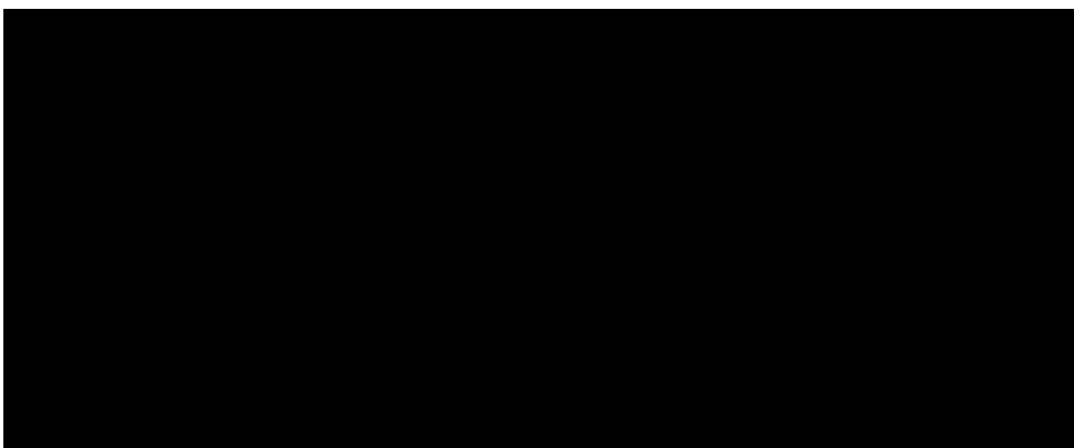
This request came in originally to understand the possibility of connection and implications on our network. The customer did not come back to us for some time as planning had to be pursued leading to a delay in commencement of works.

Reinforcement works for [security sensitive info] are complete and were carried out by [third-party].

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous mains lay	#5 Non-contiguous mains lay	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected - No suitable alternative available	Minor - elevation to be delivered separately (costs to be absorbed by Cadent)	Rejected – Connecting to MP network	Accepted – Lay 550m x 355mm main, partially parallel to existing 180mm main	Rejected – contiguous lay the more efficient option	Rejected – No insertion works planned in vicinity	Rejected – Network configuration not suitable	Rejected – Would be more costly than mains lay	Rejected – Would be more costly, with longer lead times than mains lay

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial [power generation] site was received from [third party]. The maximum load was [security sensitive info] scm/h exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be a non-contiguous lay of 1,300m x 400mm medium pressure main.

This ensured the demand could be met and that there was no capacity risk to the existing infrastructure.

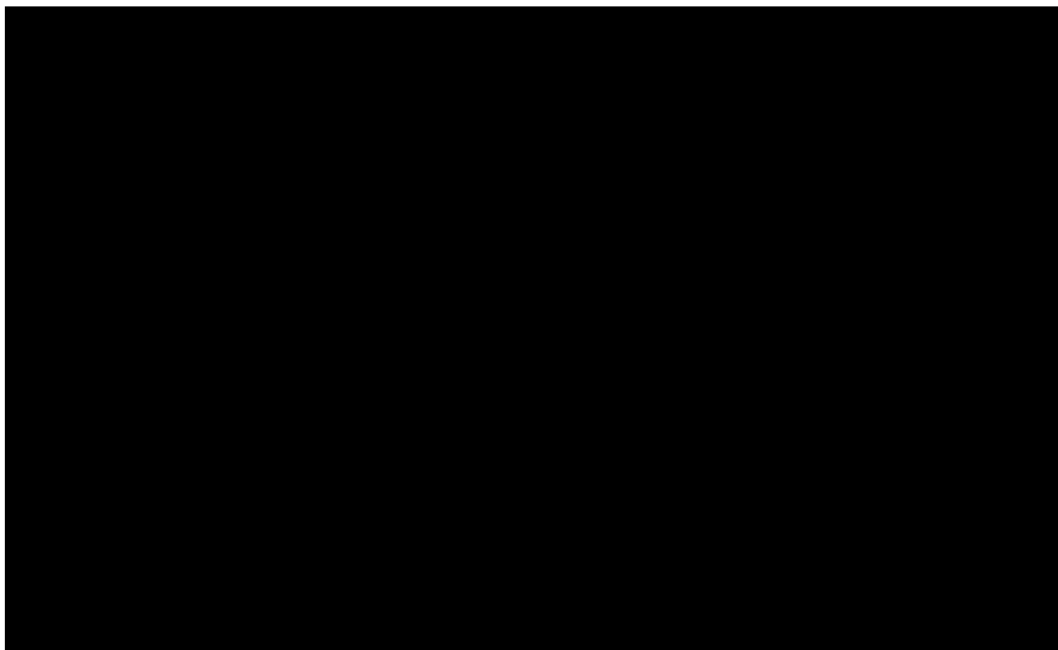
Four years of failed attempts to deliver a reinforcement route in private land with three different landowners contesting, finally led to the requirement to revise the design to a public route. Although customer delivery timescales were impacted it has meant the agreed lay has now been reduced.

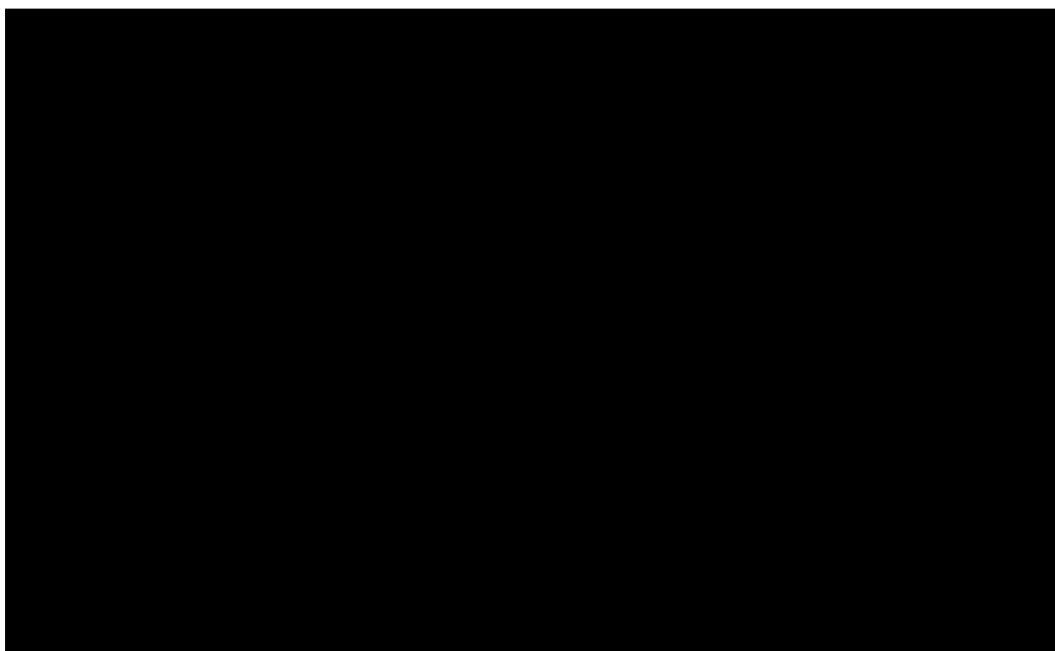
Reinforcement works for [security sensitive info] are now finished and the reinforcement works were completed by [third party].

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]





	#1 Change in connection point for new sites	#2 Pressure increase on clocked / fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous mains lay	#5 Non-contiguous mains lay	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected - No suitable alternative available	Rejected – Demand cannot be met through increase	Rejected – Connecting to MP network	Rejected – more efficient to lay mains away from the connection point	Accepted – Lay 1,300m x 400mm main	Rejected – No insertions locally planned	Rejected – Network configuration not suitable	Rejected – Would be far most costly then a parallel lay	Rejected – Would be far more costly and with longer lead times than mains lay

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be a non-contiguous lay of 240m x 250mm PE medium pressure main parallel to the existing main.

Due to the close proximity of sites [security sensitive info] this was the only option available due to route constraints, river crossings and diameter restrictions.
 Cadent Confidential Page 22 of 58

Pressures to the east of the network were unable to provide required demand at requested connection points.

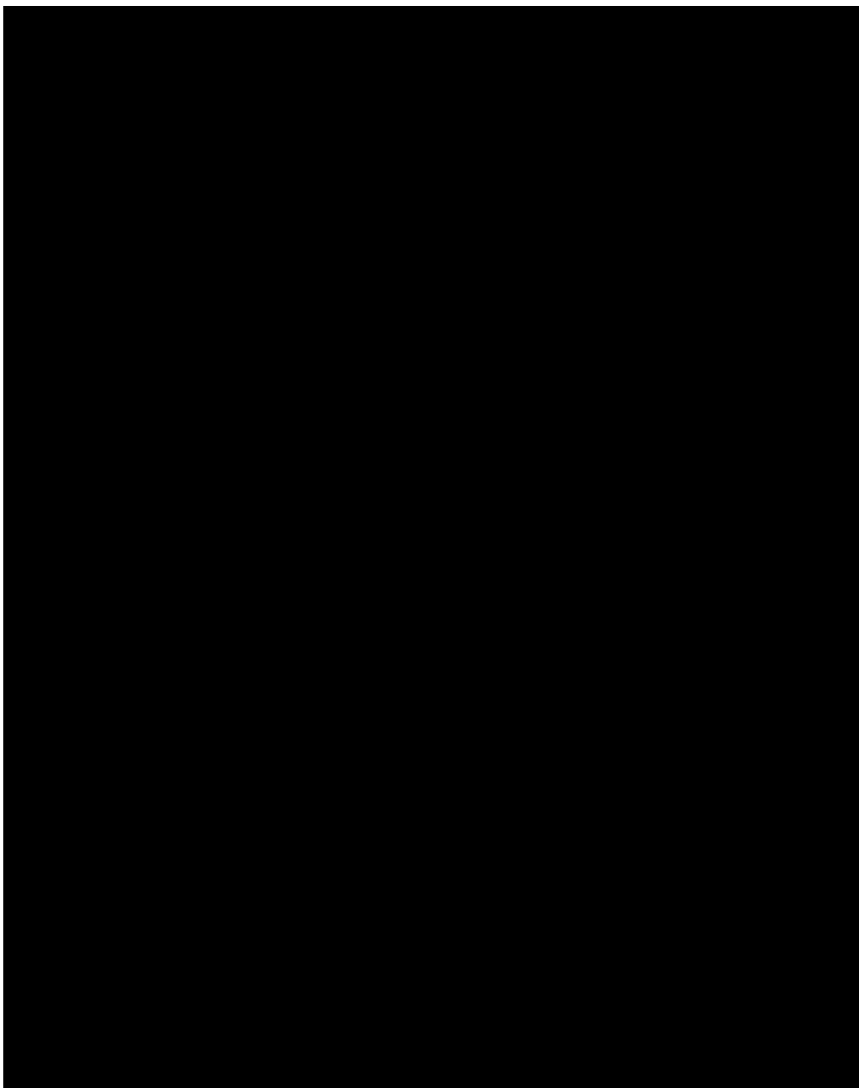
Although this was a significant lay, we have been able to lay larger diameter in the public highway, providing further growth and development to the area.

Reinforcement works for [security sensitive info] are now complete.

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixe systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected - No alternative available	Pressure elevation to be delivered separately (costs to be absorbed by Cadent)	Rejected – Connecting to MP main	Rejected – More efficient to connect away from customer's connection point	Accepted – Lay 240m x 250mm main	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Rejected – Would be far most costly then a parallel lay	Rejected – Would be far most costly then a parallel lay

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to install a larger capacity IP-MP governor upstream with associated inlet and outlet mains of 50m of 250mm steel IP inlet main and 2km of 315mm PE MP outlet main.

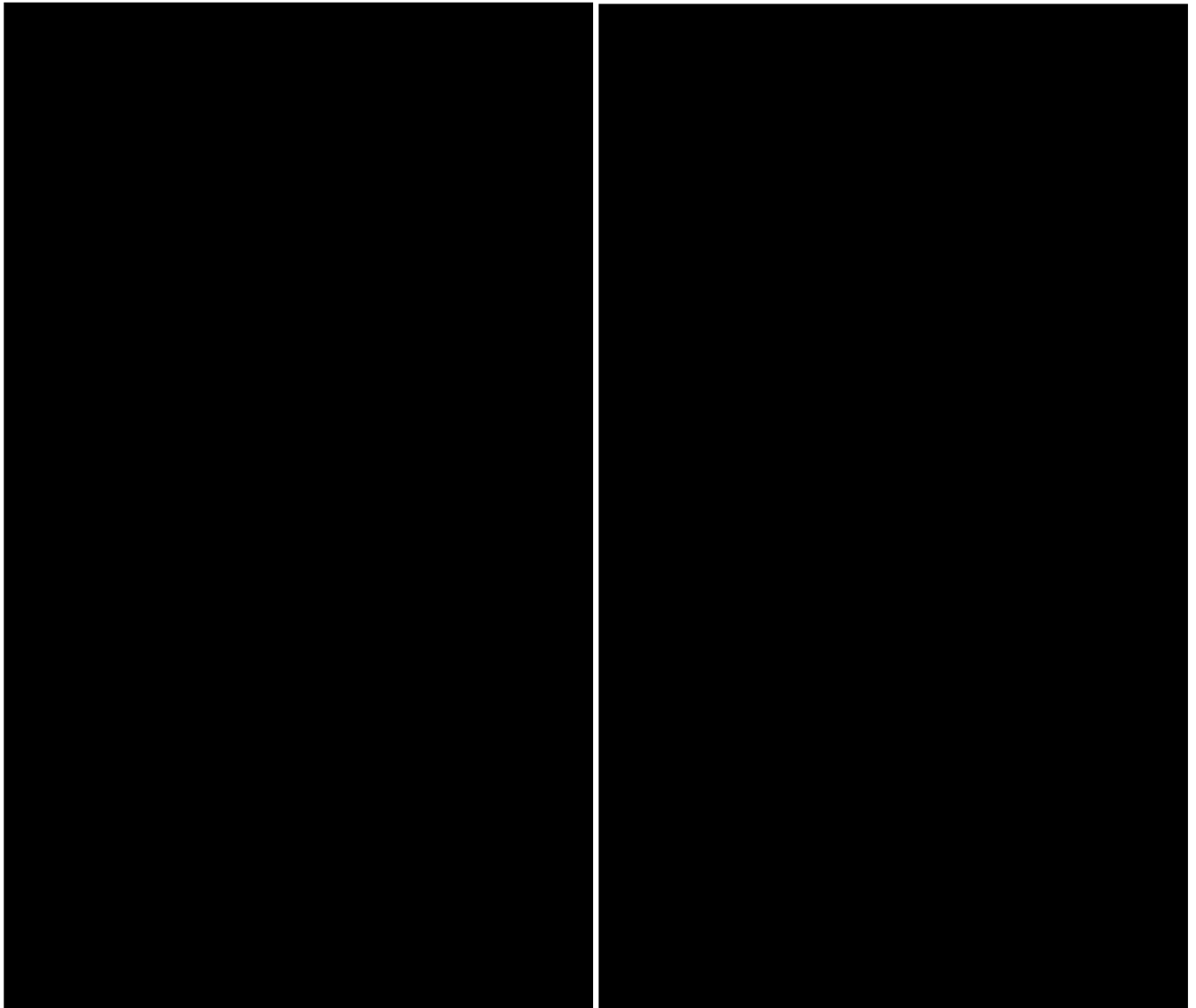
Design optimised MP lay in PE, rather than considerably more expensive Steel IP lay throughout bringing a benefit to overall costs, timescales, and customer impact.

Works are ongoing for [security sensitive info], although most of the spend has been incurred, the works are expected to complete in February 2024. Further spend is expected and included within the projected total as the remaining works are quantifiable and able to be costed with a degree of confidence.

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – No suitable alternative connection point available	Rejected – Required capacity not available in existing PRS	Rejected – Connection to MP network	Rejected – Required capacity not available in existing PRS	Rejected – Required capacity not available in existing PRS	Rejected – No planned insertion in affected area	Rejected – Required capacity not available in existing PRS	Rejected – Existing location not suitable for regulator size required	Accepted – New PRS and associate inlet & outlet mains to be installed

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request to connect a [security sensitive info] site to our MP network was received from [third party]. The maximum load was [security sensitive data] exceeding the 1,500 scm/h needed to classify as a New Large Load.

It was determined the best option was a lay of 1560m of non-contiguous 355mm PE main to reinforce the network.

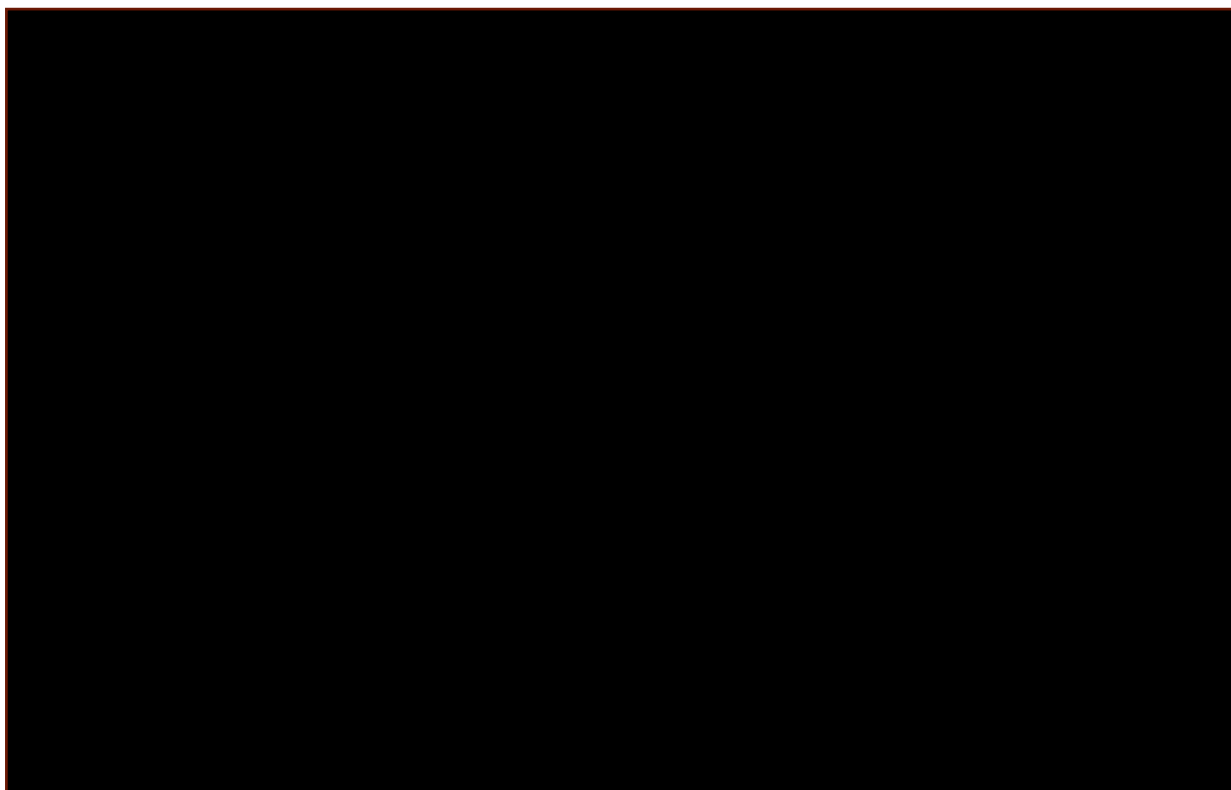
This was a significant lay; however, we were able to lay a larger diameter pipeline in the public highway.

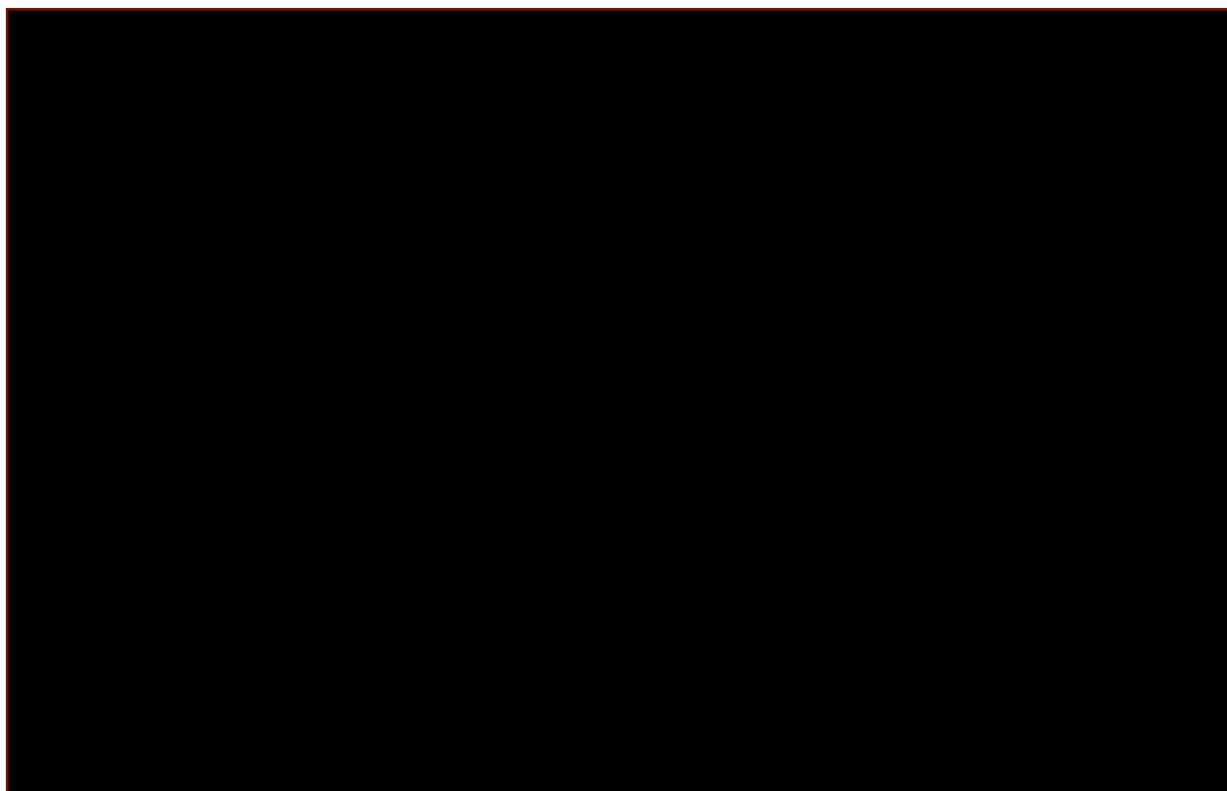
Reinforcement works for [security sensitive info] are now complete.

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]





	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – mains lay reinforcement would be required due to DIMP	Rejected – Demand cannot be met through increase	Rejected – Connecting to MP main	Accepted – Lay new 355mm PE MP main	Rejected – Limited space in tow path would reduce size of new main	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Rejected – Would be far most costly then a parallel lay	Rejected – Would be far most costly then a parallel lay

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to deliver the works in multiple parts.

This project is to upsize the existing governor's regulators, components and outlet pipework, which is in fairly close proximity.

A full site rebuild was considered but costs to deliver this would've been in the millions. Site upgrades and up-sizing at the [security sensitive info] site were undertaken to reduce costs, timescales and deliverability.

There is also a requirement for downstream reinforcement due to standard dimension ratio issues (restricting flow) on the inlets to the LP/MP district governors. This additional work is to be delivered under a separate project, [security sensitive info].

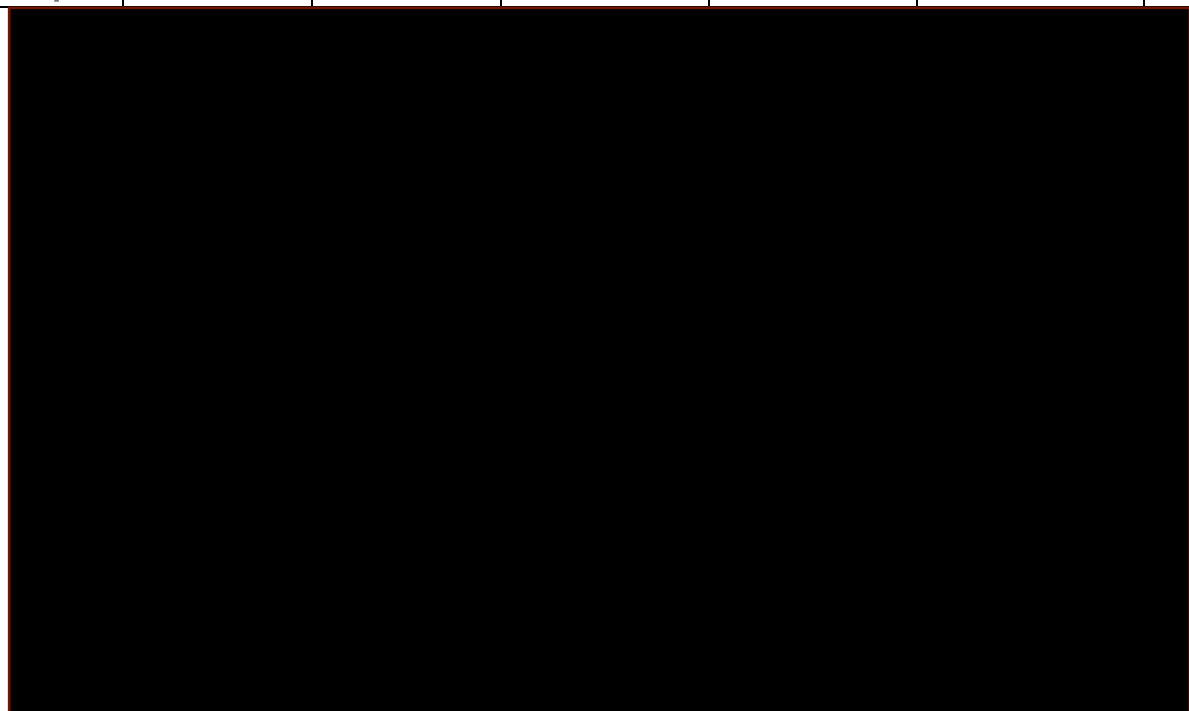
By splitting the reinforcement in to two parts, we were able to offer a more cost effective and efficient solution. Works could be started sooner with less design difficulties or need to go into private land.

Works are now complete at [security sensitive info]; we are awaiting Commercial sign off.

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – no suitable location and localised pressure drop	Rejected – Increase would not be enough	Rejected – no suitable location and localised pressure drop	Rejected – no suitable location and localised pressure drop	Accepted – Governor main outlet in close proximity that can be upsized	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Rejected – No suitable location	Rejected – No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to deliver the works in two parts. This part is to lay 1110m x 355mm PE MP parallel to existing mains on the downstream MP network due to flow restrictions downstream. There is also a requirement to upsize the existing governor, this additional work is to be delivered under a separate project. [security sensitive info] as above.

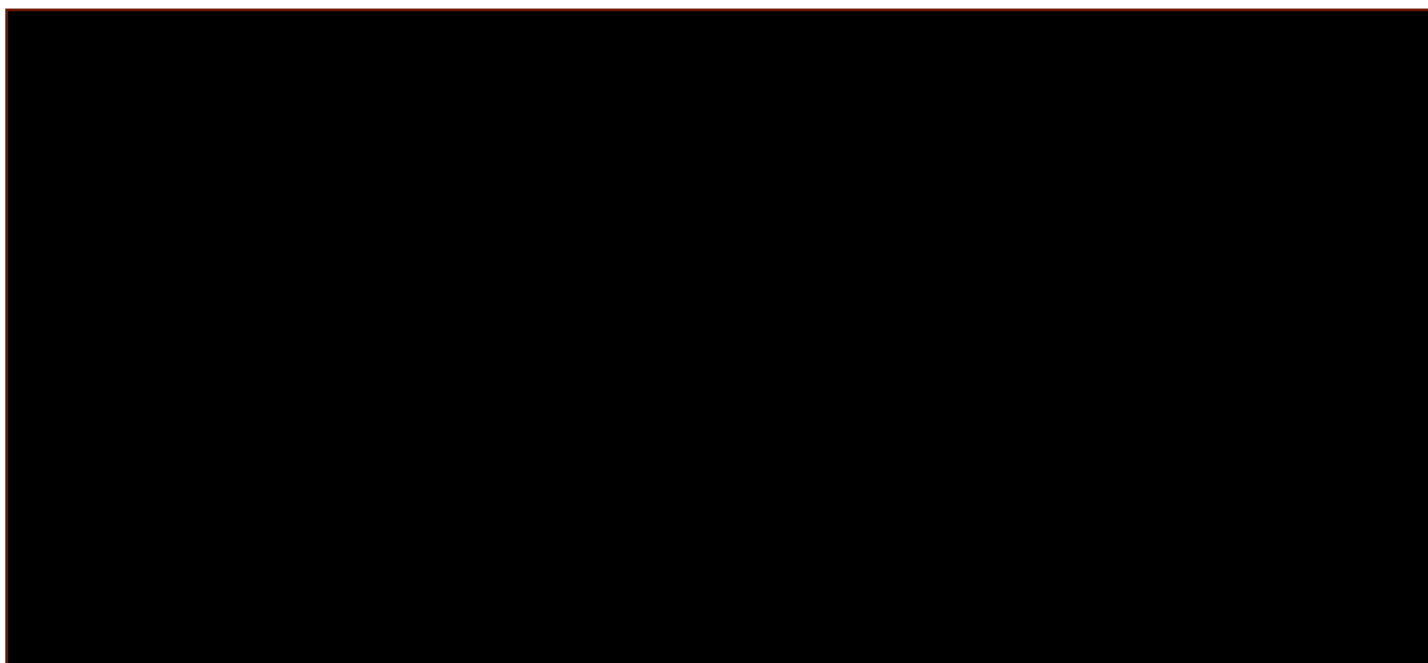
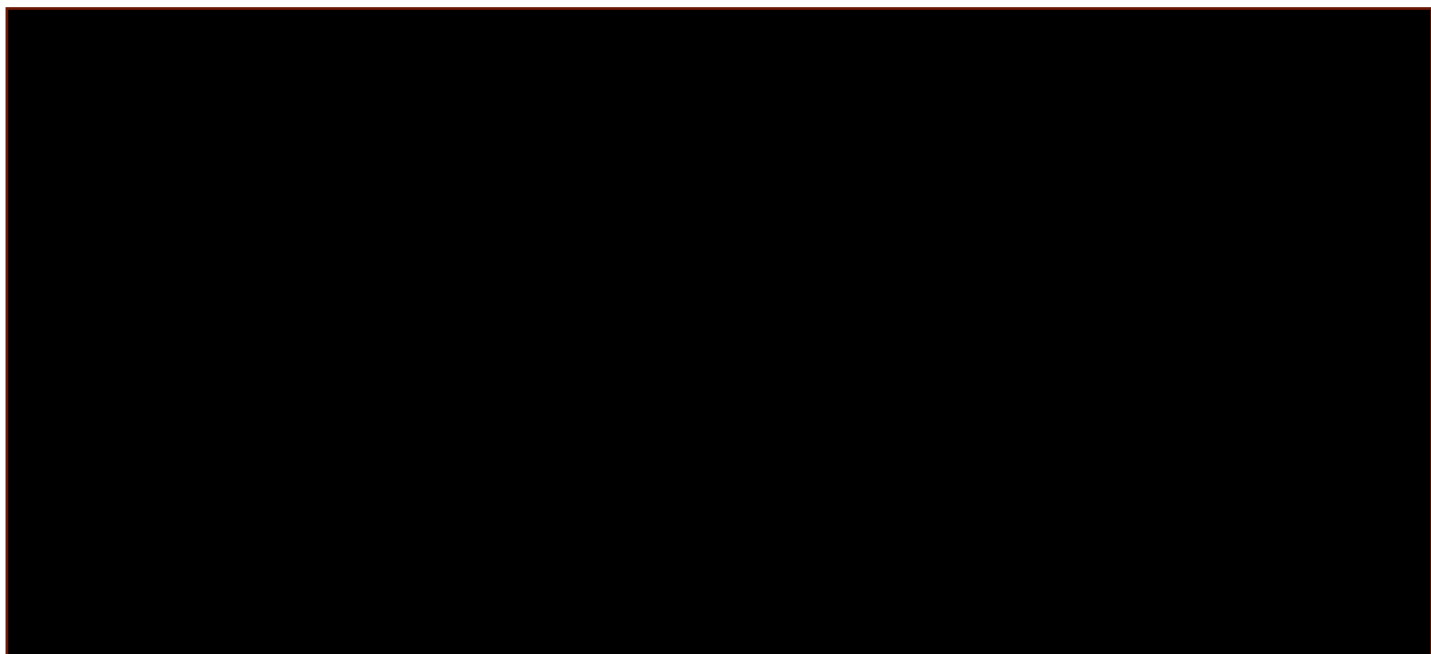
This significant length of lay (and the site upgrades/up-sizing) were considerably lower in cost than the alternative solution, which was to rebuild [security sensitive info] an IP/HP fed site with considerable engineering and location challenges.

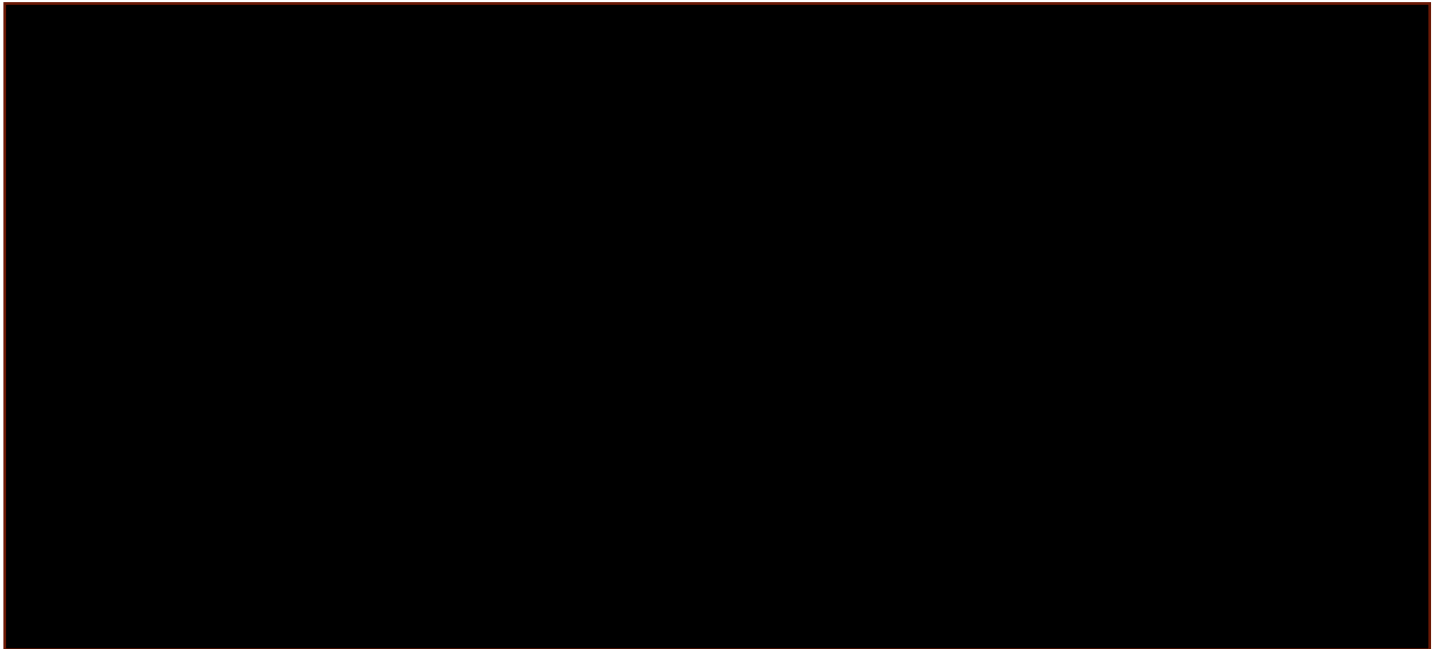
Reinforcement works for [security sensitive info] are ongoing and are expected to complete in the next 3 months.

Forecast costs for this scheme have been based on the C4 design estimate and the awarded contract. An additional 20% has been added to cover additional spend (materials, traffic management etc) – this approach is consistent with our forecasting approach for similar scope works.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]





	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – no suitable location and localised pressure drop	Rejected – Increase would not be enough	Rejected – no suitable location and localised pressure drop	Rejected – no suitable location and localised pressure drop	Accepted – 1110m x 355mm PE MP lay	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Rejected – No suitable location	Rejected – No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to provide the customer with an alternative connection point, downstream of the outlet to the [security sensitive info] (this is to prevent fluctuation of the high demand within proximity of the AGI).

The primary alternative connection offer would entail circa 1000m of 315mm MP PE. There is a secondary option of a connection to the IP system, which feeds into [security sensitive info] – In terms of network resilience this would be the preferred option, however based on ongoing projects the cost of laying new steel and connecting to existing steel would be significantly higher due to material costs and specialist welding requirements.

There is an ongoing project to rebuild the site at [security sensitive info], this potentially may slip into the next regulatory period, therefore, to meet the customer requirements once approved, we are likely to proceed with the MP alternative connection as the primary option.

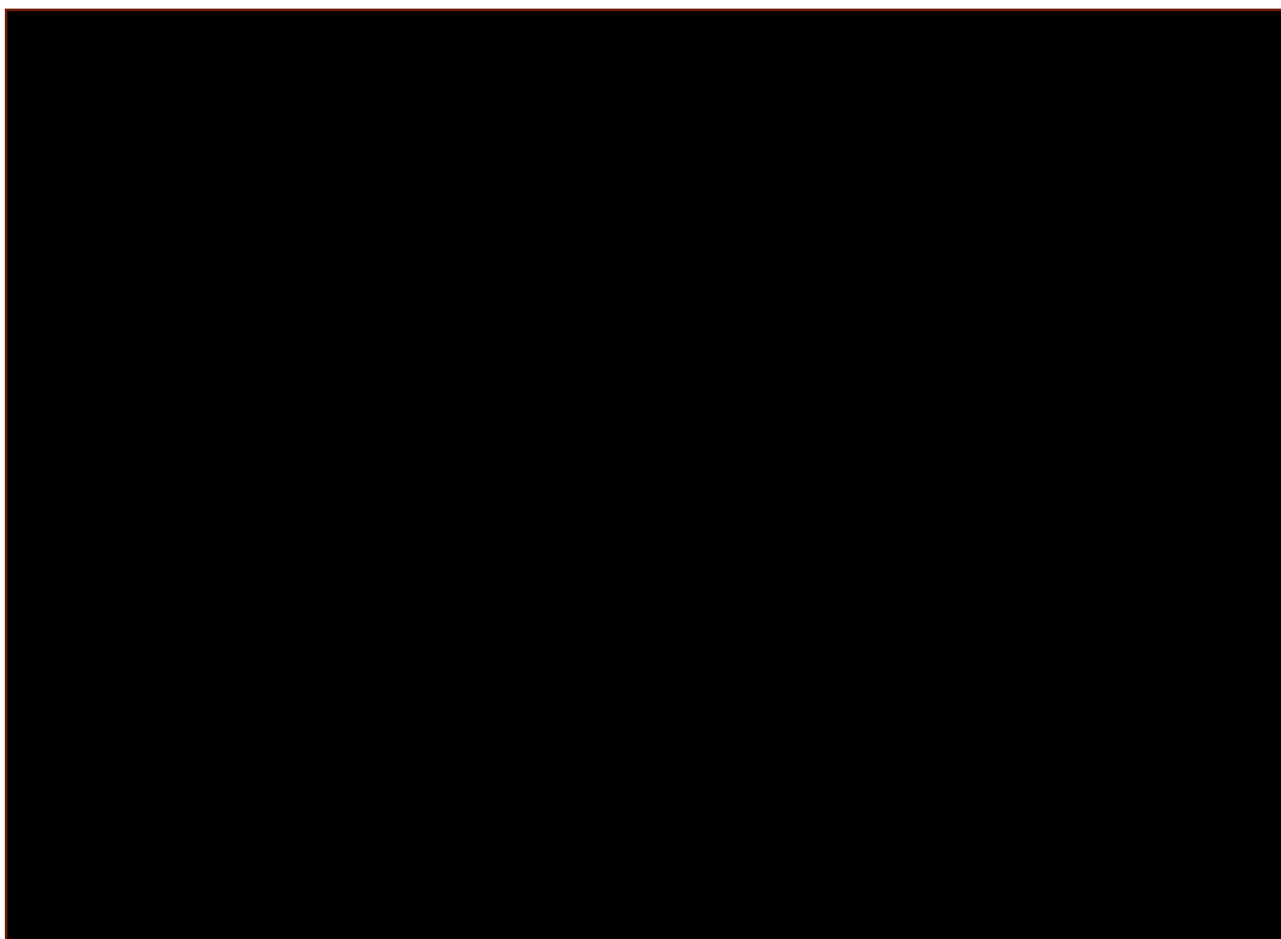
We are awaiting a proposed gas on date from the customer, which will allow us to progress and provide timeframes for the proposed reinforcement.

We have based forecast costs on a job of similar scope and reinforcement requirements completed on [security sensitive info].

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov Your Gas Commission finalised
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]





	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Accepted - Alternative Connection point circa 1000m away from outlet section of [security sensitive info] AGI (1000m x 315mm MP lay required)	Rejected – out of capacity needs a further 5000scm/h	Rejected – MP network	Rejected - Requested connection too close to outlet section of [security sensitive info]AGI	Rejected – Connection preferable to be distanced away from [security sensitive info]AGI reducing the high demand in proximity	Rejected - No insertion currently planned for this section	Rejected – Not affecting LP assets	Rejected - due to extensive costs to rebuild [security sensitive info]AGI	Rejected – out of capacity needs a further 5000scm/h

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

Due to this being an isolated network there were only a limited number of options available (see optioneering box below), and it was agreed the best reinforcement approach would be to complete a new lay. The primary proposal is to lay approx. 1200m x 315mm PE MP to link this system with another MP system which has significantly more capacity to accept the load for the proposed Power Generation site. Currently the site feeding into the isolated system does not have a large enough capacity to meet the demand of the proposed site.

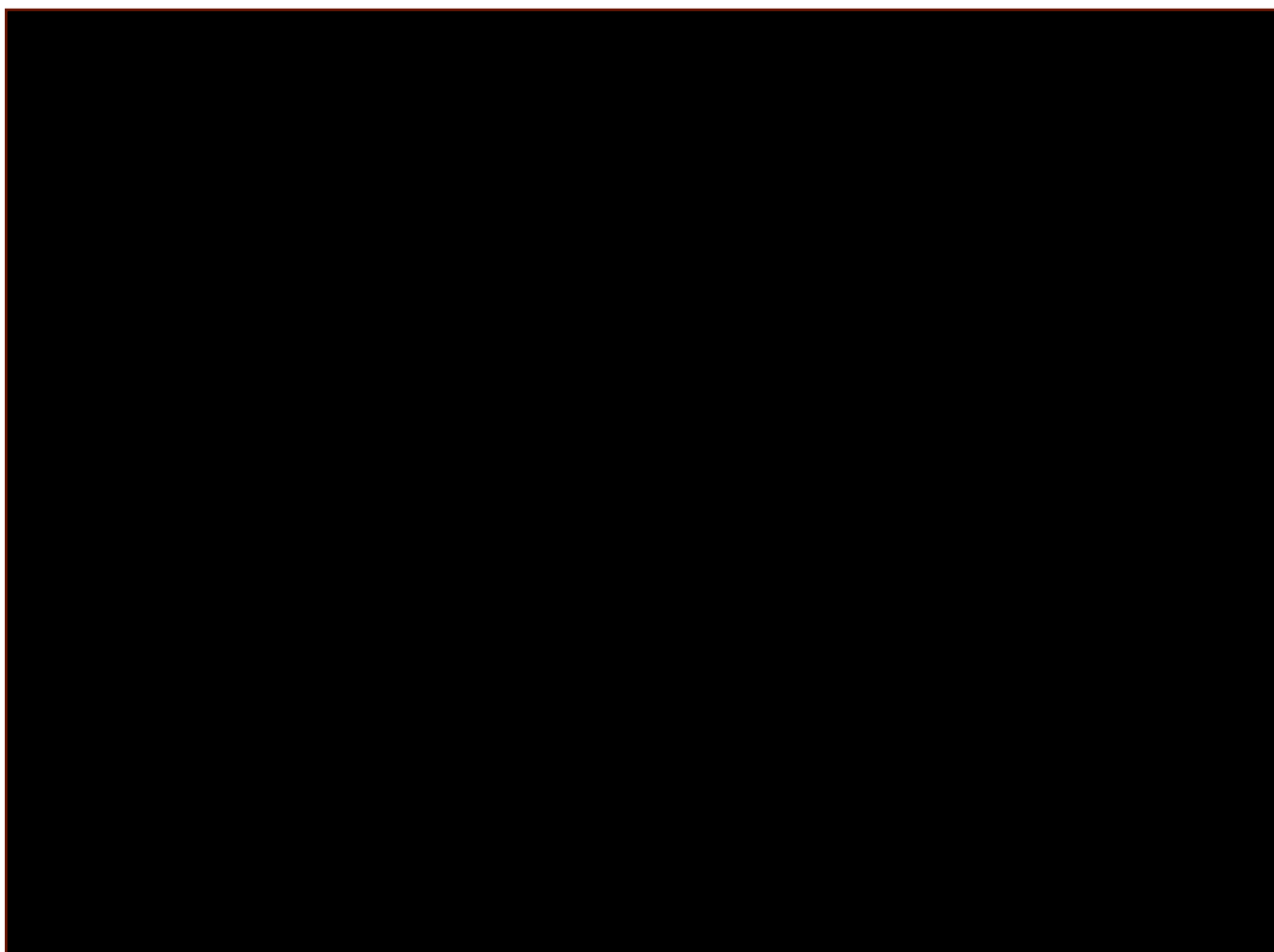
A full site rebuild was considered but costs to deliver this would've been in the millions. We therefore opted with new lay to link up the isolated system as the acceptable alternative as it would be significantly cheaper and much more time effective and efficient than completing a full site rebuild.

The high-level scope for the design has been reviewed and is still in the final approval stage, we will be looking to complete in the next financial year.

We have based forecast costs on [security sensitive info] (included in projects above) as this is a similar scope and reinforcement requirement. With this just materialising it has not yet reached final design stage.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections Acceptance	Design Finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixe systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected - No suitable location and localised pressure drop	Rejected - Insufficient capacity in the isolated system	Rejected - Insufficient capacity in the isolated system	Rejected - No suitable location and localised pressure drop	Accepted - 1200m x315mm PE MP Lay	Rejected - No insertion locally planned and Insufficient capacity in current network	Rejected - Network currently isolated and insufficient capacity to meet demand	Rejected - Timescales and likely cost too high	Rejected - No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

Eastern

Our funding request for the Eastern Network is set out in the following table and includes costs we have incurred or expect to incur in scope of the re-opener beyond baseline allowances:

Eastern	21/22	22/23	23/24	24/25	25/26	Total (£m)	Materiality Threshold (£m)	Requested Value (£m)
Completed/ongoing projects	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]		[cost data]
Future forecast	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]		[cost data]
Total	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

The table includes costs for completed and ongoing projects for which details of each are set out below, and a forecast for projects that we expect to materialise in the later years based on historic experience.

The forecast cost is based on historic run rates and input from local area experts, excluding any bespoke specific projects. We cannot account for any significant New large load connection requests without significantly increasing the forecast cost.

Cadent have produced this forecast with the best possible information we have, however it is impossible for us to accurately predict significant customer driven works without including a substantial cost risk into the application. We are requesting that projects not named in this reopener are revisited at close out of RIIO-GD2 to protect consumers and Cadent from any unexpected cost variations.

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be a non-contiguous lay of 3.5km of 355mm PE medium pressure main starting at existing 400mm DI main to existing 355mm PE main.

This ensured the demand could be met and that there was no capacity risk to the existing infrastructure.

This job was awarded to [third party].

The non-contiguous option of 3.5km of lay was selected as it was fit for purpose and met the customers' requirements, but also provided a significant increase in resilience across the wider network. A parallel lay option would have met the customers' requirement but would have been a similar length and provided less benefit to the wider network.

Several smaller customers were also connecting in the area and this chosen option combined with the [security sensitive info] (separate reinforcement included below) ensured their requests could be met. Using these reinforcement options has also meant we are maintaining a resilient network and creating a gateway for future demand growth.

This option satisfies customer load and provides additional network resilience overall.

Reinforcement works for [security sensitive info] are now complete.

The overall cost for [security sensitive info] was [cost data], however only the [cost data] was incurred within this price control, therefore we are including a request for the latter amount only.

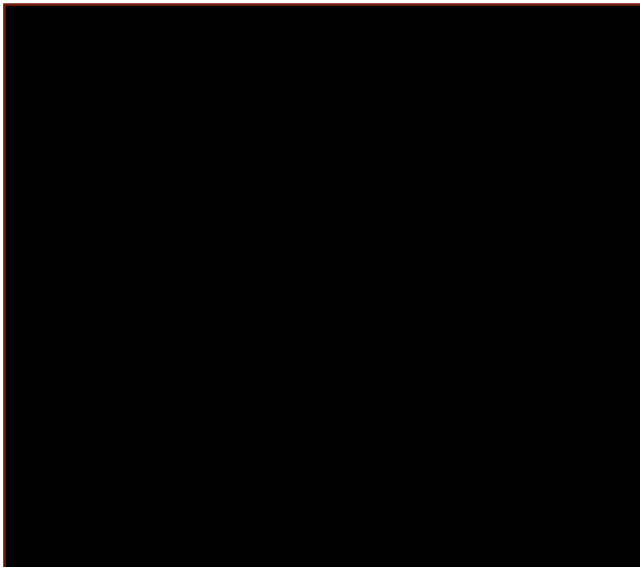
The costs included are actuals extracted from [software] in November 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]

Design Drawings 3.5km of 355 PE





	#1 Change in connection point for new sites	#2 Pressure increase on clocked/ fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – No alternate connection available	Rejected – Demand cannot be met through increase system already at MOP	Rejected – Connecting to MP main	Rejected - Similar length required to non-contiguous option, with no wider benefit to network	Accepted – Lay 3.5km of 355mm PE from 400mm DI main to 355mm PE main	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Rejected – No suitable location	Rejected – No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	Total (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

The [security sensitive info] rebuild was a project raised after receiving six customer acceptances, all in proximity to the [security sensitive info]. Of these six requests, four requests were over the threshold of 1,500 scm/h. The most significant of these acceptances was for a new supply to an industrial site, received from [third party]. The other significant of the six was for [security sensitive info] , included separately within this application and to which a second reinforcement option has been pursued to ensure all six requests can be met and the integrity of our network is upheld.

It is the cumulative effect of all six specific loads that drove the need to reinforce the system. When the loads associated with the six schemes are combined, Cadent's Economic test gives an allowable investment of [cost sensitive info] before any customer contribution is required. If the cost associated with [security sensitive info] are combined, the joint costs pass the combined investment figure for allowable Cadent funded specific reinforcement.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be a rebuild of the existing governor. Other reinforcement options were considered but discounted as the [security sensitive info] was analysed to be out of capacity once the customer loads went live.

With the PRS being the main feed for this area our network models predicted widespread failure and loss of supply under 1:20 conditions, none of which could have been resolved without upgrading the capacity of the site. The rebuild of the site will remove the risk of the site reaching its capacity and create room for the sites to develop to their full loads without issues. Once the [security sensitive info] rebuild has been completed all the customer loads in the area (as well as all other demand growth on the downstream LP) will be satisfied without risk to security of supply. The additional capacity from [security sensitive info] will provide additional network resilience and help to negate or lessening the need for further reinforcement in the future.

Reinforcement works for [security sensitive info] are currently in the detailed design phase, so the reinforcement works are yet to be contracted out. Works are due to commence in August 2024. Forecast costs included for [security sensitive info] are based on the quote we have had back from [third party] who will be completing the reinforcement on Cadent's behalf. We have included costs for option 1 as the scope of the connection will only require one PRS upgrade.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]

	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor rebuild	#9 Governor install
[security sensitive info]	As described above, rebuilding the governor was the only option available to secure supply across the network. Laying mains would have had no impact with the governor failing to supply enough gas to satisfy customer demand. There was no option to elevate sites nearby to assist [security sensitive info] due to it being the predominant feed for the area							Accepted – Governor to be rebuilt	Rejected – Governor to be rebuilt as less costly

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to a CNG filling station was received from [third party]. The maximum load is [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be a non-contiguous lay of 4.34km of 315mm PE to connect two ends of the medium pressure system. Our Operational colleagues confirmed that no further infrastructure could be laid down [security sensitive info], and as such alternative options needed to be explored.

The above satisfies the customer load and was the most efficient option once additional infrastructure down the main road was ruled out.

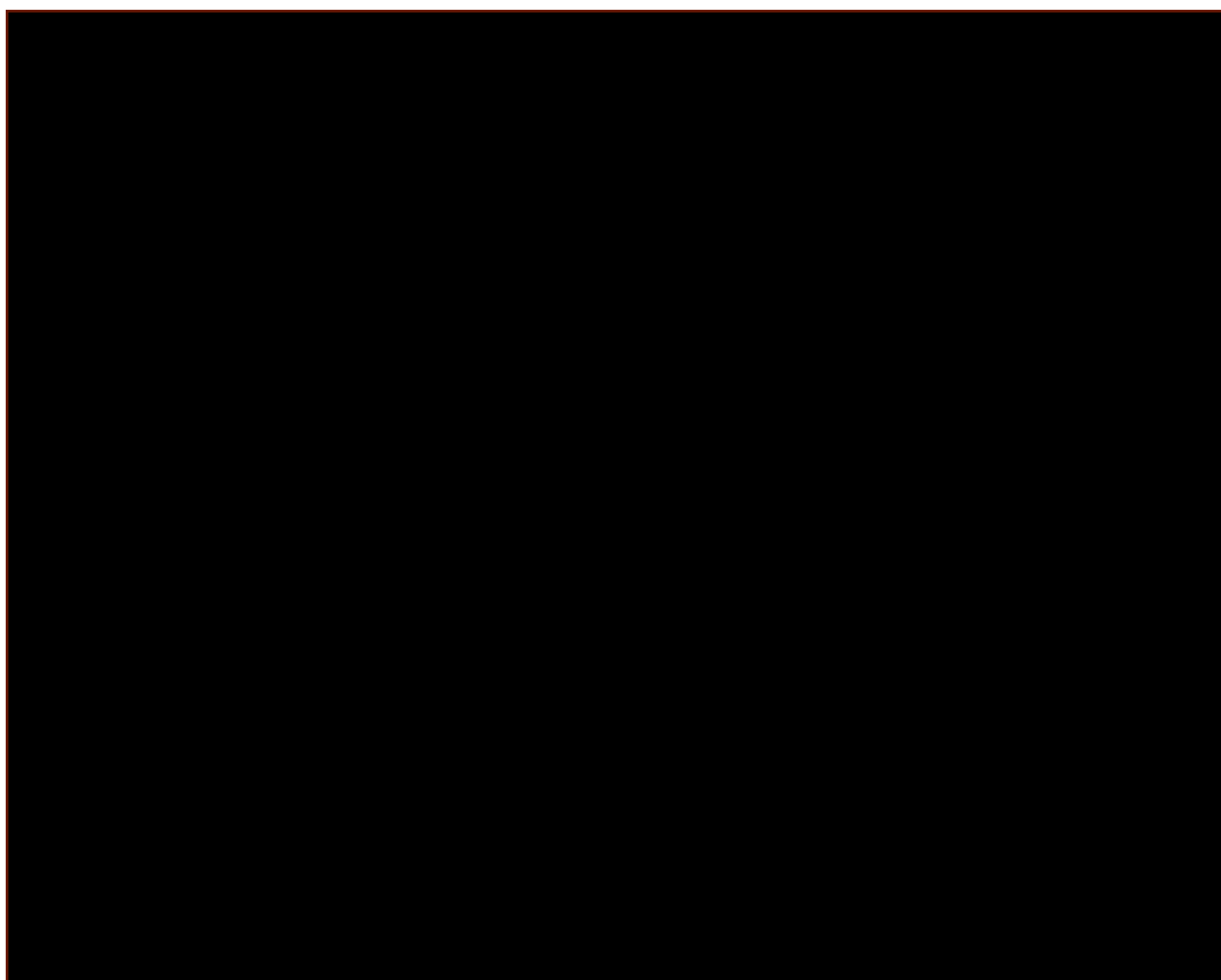
This job will be constructed by the [third party] - currently awaiting sanction/approval. Works are expected to begin in the Autumn of 2024.

Once the reinforcement has been constructed the customers load will be satisfied without risk to security of supply and keeping velocities/dust issues in the network under control.

Forecast costs for [security sensitive info] are based on the estimate created by the Design Team. As this has just materialised it is yet to go out for tender.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixe systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – No alternate connection available	Rejected – Demand cannot be met through increase system already at MOP	Rejected – Connecting to MP main	Rejected – no room in road for additional pipe	Accepted – Lay 4.34km of 315mm to mitigate engineering difficulties	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Rejected – No suitable location	Rejected – No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

On first analysis it was noted that it was a sensitive area of network as there are two 2" Steel mains in the vicinity with low pressures seen historically to the north of the proposed connection, during times of peak demand.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to complete a non-contiguous lay of 330m of 125mm MP PE main from existing 125mm PE main to existing 2" MP ST main.

Reinforcement from the north was excluded due to longer length required and river crossing.

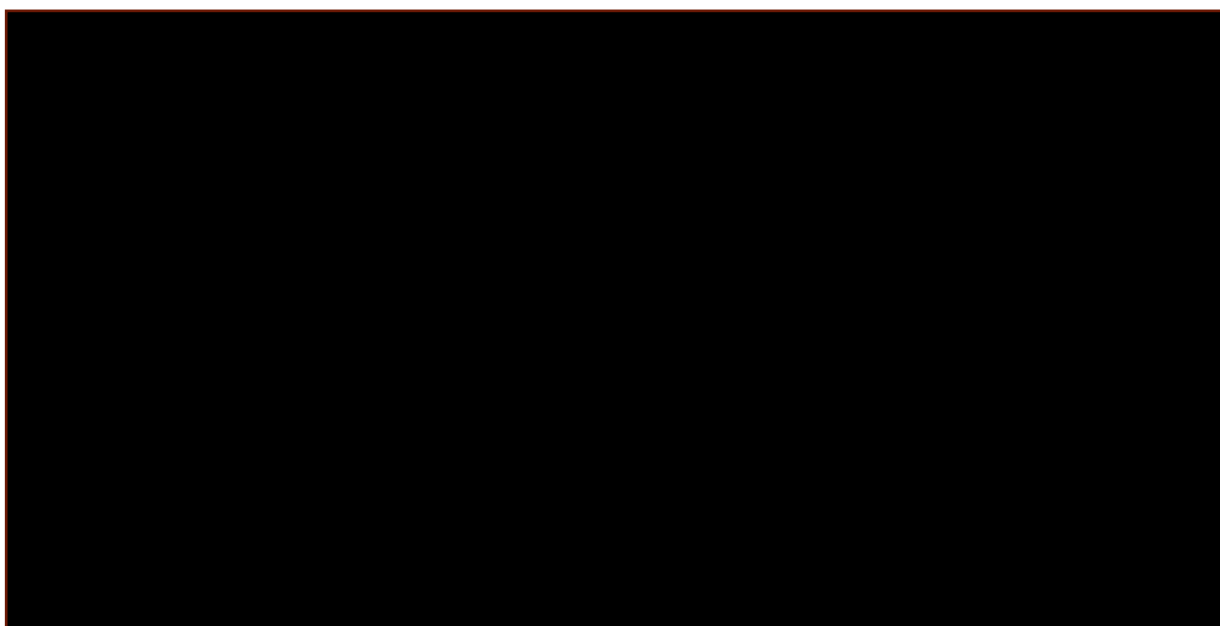
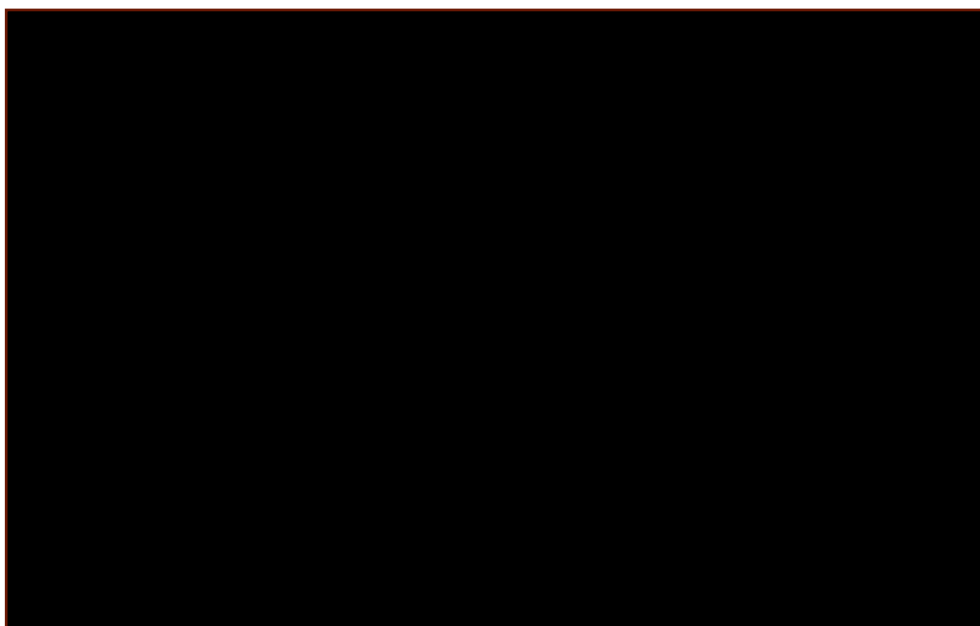
Mains lay ensures contracted pressure achieved at connection point and design minimum pressure (DMP) at the extremity of the network.

Reinforcement works for [security sensitive info] are now complete but awaiting the updated customer gas on date.

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild
[security sensitive info]	Rejected – would not meet demand	Rejected – due to sensitivity of network better kept as a contingency	Rejected – MP network	Rejected – Non-contiguous a more efficient option	Accepted – lay 330km of 125mm MP PE main	Rejected – no planned replex works	Rejected – Not affecting LP assets	Rejected – not the most efficient option

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

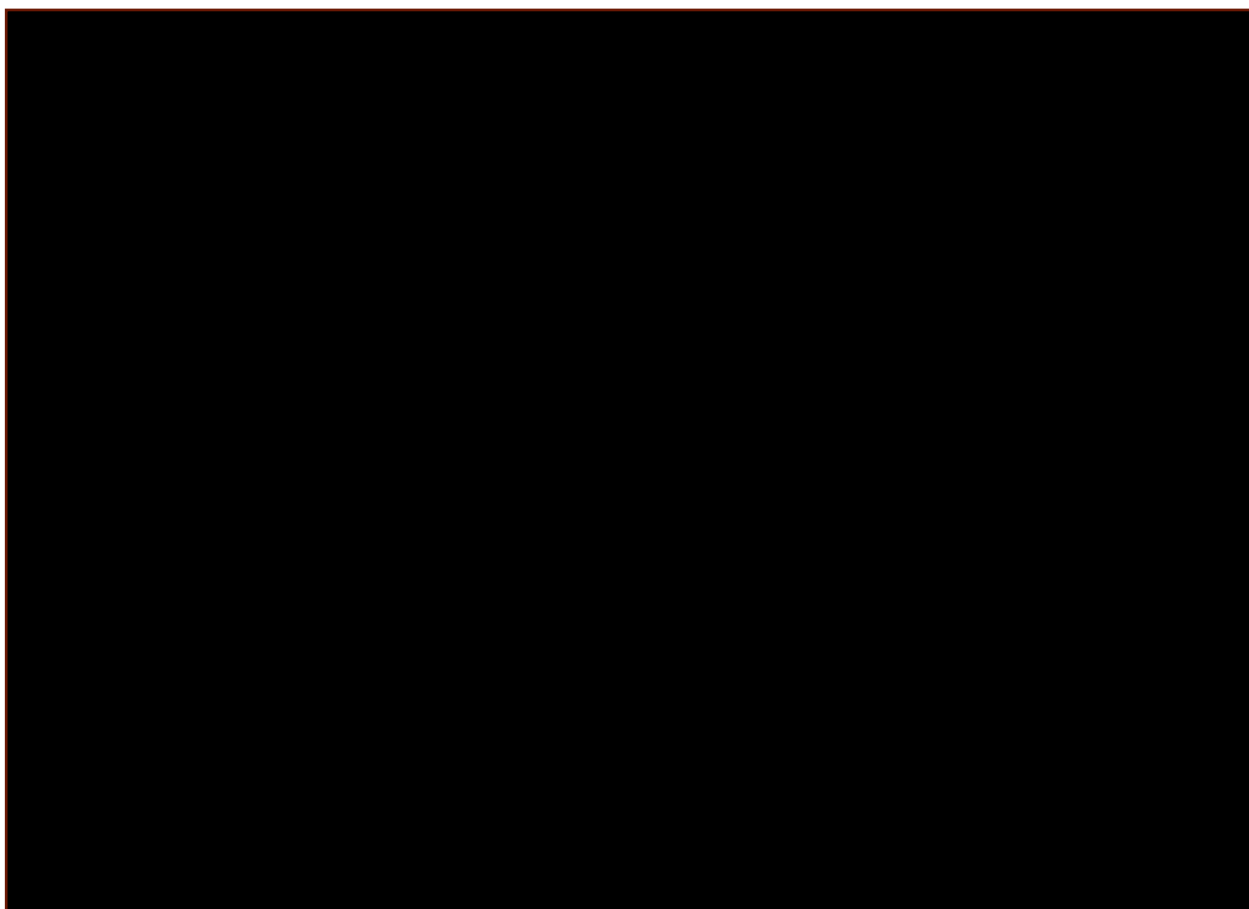
A customer request for a new supply to an industrial site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to complete a non-contiguous lay of 1624m of 355mm MP PE main. Other lay routes were discounted due to engineering difficulties. Mains lay ensures contracted pressure achieved at connection point and DMP at the extremity of the network. Reinforcement works are now complete, and the customer is connected with gas on.

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixe d systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor install
[security sensitive info]	Rejected – no alternative connection available	Rejected – demand could not be achieved through increase	Rejected – MP network	Rejected - Customer to adopt the pipework	Accepted Lay approx. 1624m of 355mm PE MP	Rejected – no planned replex works	Rejected – Not affecting LP assets	Rejected – not the most efficient option

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for an alteration to an existing industrial load was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to complete a non-contiguous lay approx. 475m of 250mm PE from existing 180mm PE main.

No other options suitable as the power generation site are connecting to a single fed MP leg.

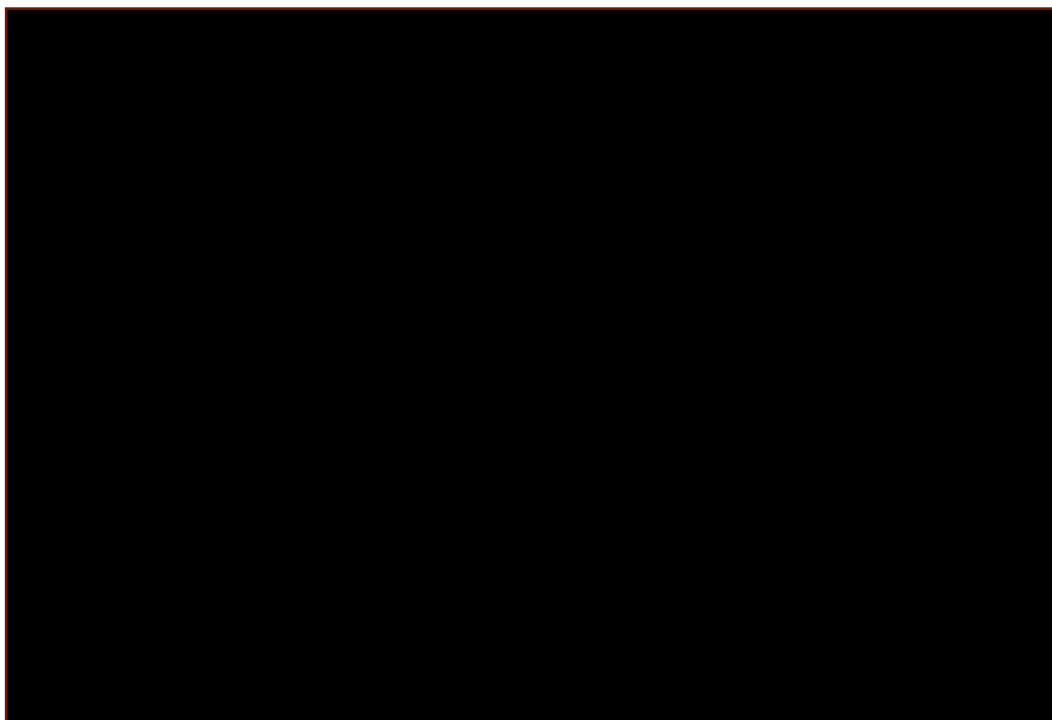
Mains lay ensures contracted pressure achieved at connection point and DMP at the extremity of the network.

Reinforcement works have finished and were completed by [third party].

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – no alternative connection available	Rejected – demand could not be achieved through increase	Rejected – MP network	Accepted Lay approx. 475m of 250mm PE MP	Rejected – We are adopting the pipework	Rejected – no planned repex works	Rejected – Not affecting LP assets	Rejected – not the most efficient option	Rejected – not the most efficient option

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for an industrial connection was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500 scm/h needed to classify as a New Large Load.

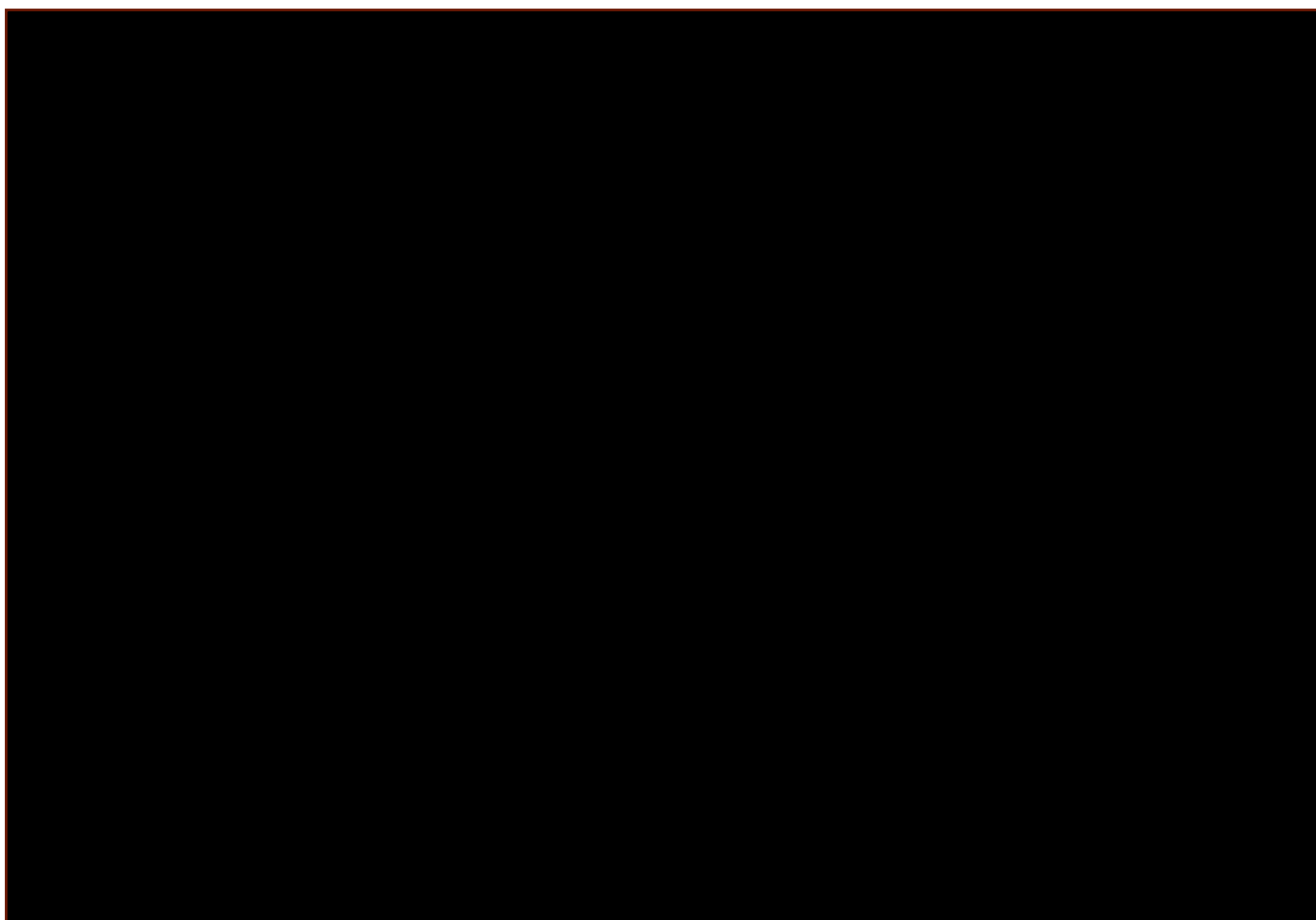
All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to elevate the governor from 1900 to 2 bar.

Reinforcement works at [security sensitive info] are now complete.

The costs included are actuals extracted from [software] in December 2023.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – no alternative connection available	Rejected – Pressure increase wouldn't meet demand	Rejected – MP network	Rejected – Elevating load more efficient option	Rejected – Elevating load more efficient option	Rejected – no planned repex works	Rejected – Not affecting LP assets	Accepted – Elevate governor from 1900 to 2bar	Rejected – not the most efficient option

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive data]

A customer request for a load increase to accommodate 18 new non-domestic connections was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500scm/h needed to classify as a New Large Load. Cadent had previously increased capacity but due to further connections the existing capacity would not be sufficient.

Given the large load to the network, reinforcement was required, and all options were considered (see optioneering box below). It was agreed the best reinforcement approach would be to upgrade 22.7m of 180mm MP PE main to 250mm MP PE main and to rebuild the district governor as it required a further 5000scm/h to meet the demand. There were engineering difficulties as we were not allowed to cross [security sensitive info] due to authority regulations, meaning new lays were not really an option so increasing the size of the existing main was the best option.

This not only ensured the demand could be met and that there was no capacity risk to the existing infrastructure but also provided a large capacity increase to account for future load growth.

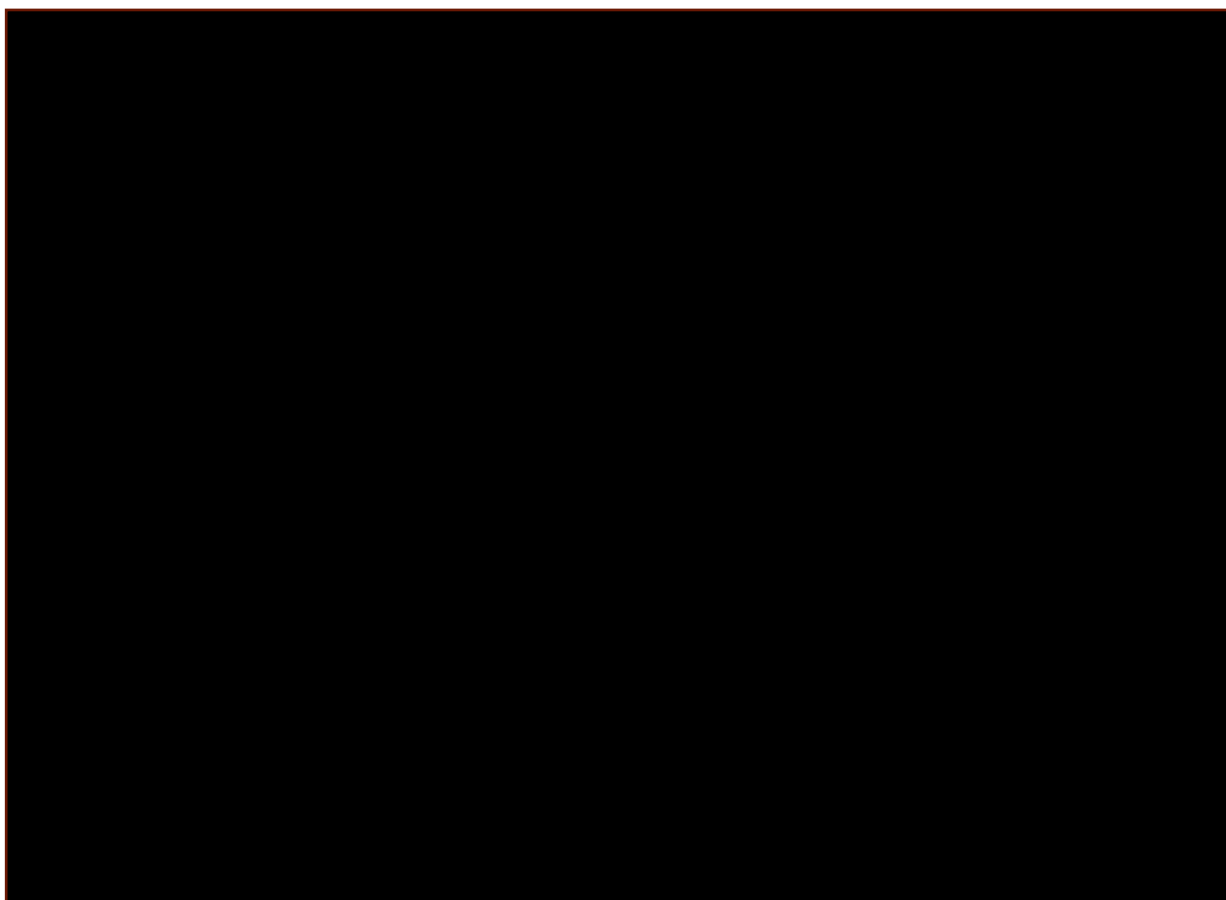
There is potential the scope may change, and we are in contact with the customer to understand if and what their new connection requirements are.

Providing the scope remains unchanged, works will be due to commence March 2024. We have faced challenges around land agreements which has meant some delay in commencement of works.

We have forecast the costs based on the original sanction paper but given there is a potential for the scope to change we have reduced the cost to allow for this should it happen.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – No alternate connection available	Rejected – Demand cannot be met through increase system already at MOP	Rejected – Connecting to MP main	Rejected – no room in road for additional pipe	Accepted – Upgrade 22.7m of 180mm MP main to 250mm MP main	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Accepted – Rebuild as requires 5000scm/h load increase	Rejected – No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive data]

A customer request for an alteration to an existing industrial load was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to complete a non-contiguous lay of approx. 304m of 180mm PE MP.

No other options are suitable as MP network already at 2bar.

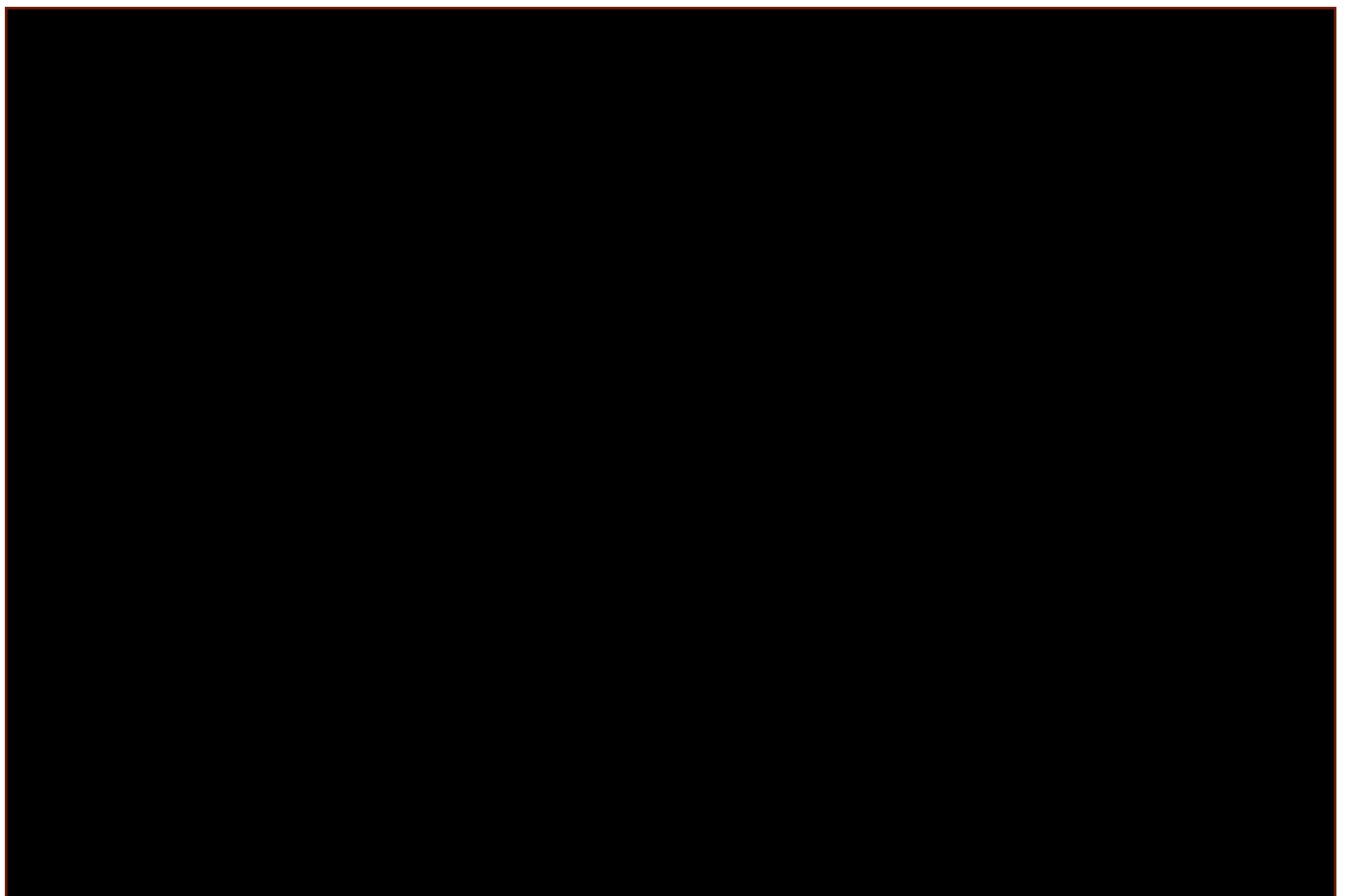
Mains lay ensures contracted pressure achieved at connection point and DMP at the extremity of the network.

This project has only just materialised so forecast costs have been based on similar reinforcements already completed within the network.

This is currently at the design stage.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – No alternate connection available	Rejected – Demand cannot be met through increase system already at MOP	Rejected – Connecting to MP main	Rejected – no room in road for additional pipe	Accepted – Upgrade 22.7m of 180mm MP main to 250mm MP main	Rejected – No insertions locally planned	Rejected – Not affecting LP assets	Rejected – not the most efficient option	Rejected – No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

[security sensitive info]

A customer request for a powergen site was received from [third party]. The maximum load was [security sensitive info] exceeding the 1,500scm/h needed to classify as a New Large Load.

All options were considered (see optioneering box below), and it was agreed the best reinforcement approach would be to complete a contiguous lay of approx. 900 metres of 250mm MP PE main to connect 125mm with 250mm from the south.

This not only satisfies the customer load, but mains lay ensures contracted pressure achieved at connection point and assures the integrity of the network going forwards.

This is currently at the design stage.

Forecast costs for [security sensitive info] are based on the estimate created by the Design Team. As this has just materialised it is yet to go out for tender.

For full breakdown see Appendix 05 WS NLLC Financial Tracker.

	Enquiry received	Connections acceptance	Design finalised	On site commencement	On site completion	Gov commissioned
[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]	[security sensitive info]



	#1 Change in connection point for new sites	#2 Pressure increase on clocked/fixed systems	#3 Low point install for optimised pressure increase	#4 Contiguous	#5 Non-contiguous	#6 Insertion sizing increase	#7 Isolate system and increase pressures	#8 Governor / PRS rebuild	#9 Governor / PRS install
[security sensitive info]	Rejected – No alternate connection network available	Rejected – Demand cannot be met through increase system already at MOP	Rejected – Connecting to MP main	Accepted – New lay 900m 250mm PE to connect 125mm CP main with 250mm network to the south	Rejected – No Non-Contiguous option	Rejected – No insertions locally planned (Tier 2 network)	Rejected – Not affecting LP assets	Rejected – Not the most efficient option	Rejected – No suitable location

Costs incurred	21/22	22/23	23/24	24/25	25/26	TOTAL (£m)
[security sensitive info]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]	[cost data]

A summary of our project delivery status is demonstrated in the table below:

KEY	Planned	Ongoing	Complete	Customer connected	
	Completion status	Completion date	Design	Onsite status	Planned delivery status
North West Projects					
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
Eastern Projects					
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			
[security sensitive info]		[security sensitive info]			

Figure 4. Project delivery status

Chapter 3.4 - Cost Information

The costs included within this application reflect the additional cost beyond the baseline allowance for reinforcements. Our full reinforcement allowance will be used for general and specific reinforcements that do not meet the scope for New Large Load.

What cost methodology is used for New Large Load Connections?

For New Large Load Connections that meet the scope of this re-opener we have split our costs into three separate categories:

- Actual costs – costs incurred on a completed or ongoing project.
- Estimated costs – costs that have been estimated by business experts following optioneering and engineering review.
- Forecast costs – future costs that have a degree of uncertainty.

Where actual costs have been incurred, these have been extracted from [software], our core system. Each scheme will have a set of project codes within the system that captures actual spend against cost categories which are included within the project trackers on a monthly basis.

Where a project has been completed, the costs included within the application reflect the actual costs incurred on the scheme and reported within [software].

For projects that are ongoing (not yet completed), spend to date has been extracted from [software] (as above) and a forecast has been included for the remaining spend based on the design estimate, where appropriate, or using spend of similar reinforcements within each network and/or cost agreed on material cost per metre and multiplied by length to be laid (for new lay pipe reinforcements).

Our forecast costs have been based on C3/C4 design estimates (except where stated), the breakdown of what these estimates include is highlighted below:

C3 (initial design and budget estimates): initial budget cost estimation is created along with preliminary project designs. This includes the extent of the proposed works with potential connection points indicated for existing apparatus and budget estimates of the measures (as assessed at preliminary design stage).

C4 (detailed design and estimates): detailed estimates are created including final design details of the proposed project, working drawings and an outline programme. Stage C4 is a very important stage as it establishes in detail what the necessary utility mitigation measures are.

We have included a forecast cost in years 4 and 5 to cover costs that will arise due to new projects materialising. To arrive at this figure, we have used historic run

rates and input from local area experts, removing any bespoke project specific costs.

We cannot account for any significant New large load connection requests without significantly increasing the forecast cost.

Cadent have produced this forecast with the best possible information we have, however it is impossible for us to accurately predict significant customer driven works such as [security & cost sensitive info] without including a substantial cost risk into the application. We are requesting that projects not named in this reopener are revisited at close out of RIIO-GD2 to protect consumers and Cadent from any unexpected cost variations.

Cost efficiencies are considered throughout the project from the point of application through to delivery of the preferred option. All new requests to reinforce our network are analysed before a decision is made on the most efficient option.

This analysis includes ascertaining the amount of new load required, location of the connection, pipe length, etc. to determine whether a reinforcement is required or if the existing network can meet the new request.

If it is determined that a reinforcement is required, we assess our options to deliver the reinforcement in the most effective and efficient way, balancing safety, cost, and risk. Cadent will always look at the available options for each request and use the most efficient option to reinforce the networks. We will always try to utilise other options such as pressure increases, laying parallel mains to current infrastructure or re-build/install additional governors to boost capacity.

To ensure that the chosen solution is delivered efficiently, whilst balancing safety, cost, and risk, the scheme will be subject to a competitive tender event (in line with procurement requirements) which is then reviewed by the Cadent Commercial team to ensure the contract is awarded to the contractor who can meet both Cadent's and the consumers requirements for the connection. A check against what was reported in RRP was made and the differences justified.

A full breakdown of the costs associated with New Large Load projects included in this application can be found in Appendix 05 WS NLLC Financial Tracker.

Chapter 4.0

Appendices

Chapter 4.1 Supporting Documents

- Appendix 01: Appendix 01 UMC_CDT_10.08_Reinforcements
- Appendix 02: UMC_CDT_10.11_Connections
- Appendix 03: New Large Load Connections process steps
- Appendix 04: Reinforcement works tender process
- Appendix 05: WS NLLC Financial Tracker
- Appendix 06: New large Load eco test results

Chapter 4.2 – Glossary of Terms and definitions

Acronym	Description
AGI	Above Ground Installations
BAU	Business As Usual
CMO	Construction Management Organisation
CNI	Critical National Infrastructure
COO	Chief Operating Officer
FTE	Full Time Employee
HSE	Health & Safety Executive
NLLC	New Large Load Connections
PMO	Project Management Office
PRS	Pressure Regulating Station
LP	Low Pressure
MP	Medium Pressure
IP	Intermediate Pressure
HP	High Pressure
LDP	Local Delivery Partners
TM	Traffic Management
DMP	Design Minimum Pressure
SME	Subject Matter Expert