

NGN Health and Safety Executive Policy Special Condition 3.17 Re-opener Submission

30th September 2024

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1 Executive Summary

This is a funding revision application to Ofgem under the Health and Safety Executive (HSE) Policy Re-opener mechanism Special Condition 3.17. The rationalisation of current costs relating to shift working patterns, which is outlined below, is essential for Northern Gas Networks (NGN) to be able to maintain a safe and reliable gas distribution service to our customer and offer safe working environment for our employees. The introduction of *Managing shift work: Health and safety guidance* (HSG256) in 2006 by the HSE overruled the previous exemption for utility providers to adhere to the shift working system. Therefore, the successful application for additional funding to meeting HSE policy requirements stemming from decisions made since the setting of the RIIO-2 allowances will contribute significantly to both core business requirements and enable our continued ability to meet Health and Safety at Work Act 1974 (HASWA) and HSE legislative obligations. Table 1 below maps out which sections of the application relate to individual requirements as set out in the relevant Re-opener licence condition and Chapter 3 of the Ofgem Re-opener Guidance and Application Requirements Document Version 3.

Table 1 - Relevant Ofgem Guidance and License Condition section for the HSE Policy Re-opener

Document Section	RIIO-2 Re-opener Guidance Document Paragraphs(s)	Re-opener license condition reference
Executive Summary	N/A	Special Condition 3.17 HSE policy Re-opener, 3.17.1 - 3.17.10
Background and Justification	3.8-3.12, 3.22-3.23	
Options Section	3.8-3.15, 3.22-3.23	
Stakeholder Engagement and Whole System Opportunities	3.16-3.18	Special Condition 9.4 Re-opener Guidance and Application Requirements Document
Cost Information	3.19-3.21	
Summary	N/A	

The need for a re-opener

In 2006, the introduction of *Managing shift work: Health and safety guidance* (HSG256) resulted in clause (iv) in exemption 21 of the *Management of Health and Safety at Work Regulations* (1999) was no longer relevant for shift workers in the gas industry. The following requirements have now been set out to NGN for compliance to the HSE legislation with regards to shift workers.

- Adoption of appropriate fatigue management system post exceptional circumstance
- 12 hours maximum shift in a 24 hour period – This is inclusive of standby time spent on a call out, travel time between home and the depot/first call out. It excludes standby time not on call out and exceptional circumstances.

NGN were issued with a letter legal from the HSE in March 2024 requiring NGN to submit a forward plan by the end of September 2024 ensuring that the risks associated with worker fatigue would be adequately addressed. Without additional funding we will be unable to satisfy the above requirements and continue to operate with a higher risk of health and safety incidents because of worker fatigue. Current practise is to put new employees who replace those individuals leaving the business onto more flexible terms to enable scheduled night working. This alone is not sufficient to immediately mediate the HSE requirements, as we have very low employee turnover (on average 2.75% per annum) and this will require a significant timeframe for NGN to become fully compliant to HSE and HASWA legislation.

Table 2 below highlights the Opex, Capex and sum of Totex incurred by NGN for HSE Policy in GD2. Primarily linked to increased resourcing already in place to meet 16hr compliance as well as modelled additional resourcing required to meet 12hr compliance.

This re-opener only seeks additional allowances for those costs associated with additional resources required to meet 16hr and 12hr fatigue compliance and does not include any associated IT, professional services and/or 3rd Party costs associated with development and implementation of fatigue management/compliance.

We have excluded any recovery of prior costs invested in modernisation of workforce pre-GD2 as well as any additional investment made directly by shareholders to transition away from legacy working patterns inherited at acquisition.

Table 2 - Proposed HSE Policy Cost Adjustment (2018/19 Prices)

Cost Area	FY21/22	FY22/23	FY23/24	FY24/25	FY25/26	GD2 Total	
New Resource FTE	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	
(OPEX) New Resource	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
(OPEX) Vehicles – Running Costs & Depreciation	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
(OPEX) Tools & PPE	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
(CAPEX) Vehicles	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
TOTAL	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

OPEX Total	£0.540m	£1.553m	£1.553m	£1.553m	£8.286m	£13.484m	
CAPEX Total	£0.193m	£0.361m	-	-	£2.176m	£2.730m	
TOTEX Total	£0.733m	£1.914m	£1.553m	£1.553m	£10.462m	£16.214m	

Load Related Capex							
Non Load Capex	£0.193m	£0.361m	£0	£0	£2.176m	£2.730m	
Business Support Opex							
Direct Opex	£0.540m	£1.553m	£1.553m	£1.553m	£8.286m	£13.484m	
Repex							
TOTEX Total	£0.733m	£1.914m	£1.639m	£1.639m	£10.462m	£16.214m	

2 The Needs Case

As a Gas Distributor that operates 24/7, Northern Gas Network (NGN) has a duty to maintain a safe and reliable gas supply to our customers. This requires NGN employees to be available to work all day, every day, including at night, otherwise known as shift working. Research has shown that there can be undesirable consequences for those working shifts outside standard daytime hours, particularly those covering the night or with early morning starts. For example, shift work may result in:

- disruption of the internal body clock;
- fatigue;
- sleeping difficulties;
- disturbed appetite and digestion;
- reliance on sedatives and/or stimulants;
- social and domestic problems, which in turn can affect performance, increase the likelihood of errors and accidents at work and might have a negative effect on health.

By nature, humans are active and perform best during the day and need to sleep at night when performance is generally poorer. We follow this innate pattern because of an internal body clock, located in the brain which sets the daily cycle of biological activities. Our internal body clock can change gradually, but for most people it is resistant to the abrupt changes in the sleep/wake cycle that are required by shift-work schedules or flying across time zones. Those regular night workers who change back to daytime routines during rest days will continue to suffer the consequences of a disrupted internal clock, as it attempts to reset to daylight rhythms during days off. A poor balance between the demands of work and the time provided for rest and recovery, resulting for example, from poorly designed shift-work schedules and long working hours is likely to result in chronic fatigue.

This can lead to the decline in mental and/or physical performance with consequences including include reduced alertness or poor/slow perception as well as long-term health implications, including hypertension. Furthermore, a worker who experiences a disrupted social or domestic life may feel isolated, moody or depressed, which can affect their health and performance at work. Shift workers may spend more time with their family or fulfilling their domestic duties at the cost of sleep, further compounding the chronic fatigue. Conversely, it should be remembered that operators may prefer badly designed shift patterns for social reasons (e.g. ones which give long breaks between shifts despite having to work 14-hour shifts) further compounding the issue of bringing in an operational strategy for 24hr resource allocation.

2.1 Background on Legislation

NGN has a statutory obligation to preserve the health and safety of its customers and employees while operating its assets. This is encapsulated in The Health and Safety at Work etc Act 1974. It is the primary piece of legislation covering occupational health and safety in the UK, setting out the general duties which:

- employers have towards employees and members of the public
- employees have to themselves and to each other

More specifically, the following key principles/duties must be adhered to by NGN

1. It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees.
2. Provide and maintain the plant and systems of work that are safe and without risks to health.

3. Provide working standards for ensuring the safety and mitigation of risks to health in connection with the use, handling, storage and transport of articles and substances.
4. Provide information, instruction, training and supervision as is necessary to ensure the health and safety at work for all employees.
5. Ensure the place of work condition is maintained to a safe standard and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks.
6. The provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work.

More recently, NGN has been subjected to the Working Time Regulations (1998). This legislation is centred on the establishment of agreed shift limits, depending on whether they work in the daytime or nighttime. Specifically,

Day Worker

- A worker's working time, including overtime, in any reference period which is applicable in his case shall not exceed an average of 48 hours for each seven days.
- For the purposes of this regulation, a worker's average working time for each seven days during a reference period shall be determined according to the formula—

$$\frac{A + B}{C} \quad ^1$$

Night Worker

- The employer has ensured that the worker will have the opportunity of a free health assessment before he takes up the assignment; or
- The worker had a health assessment before being assigned to work to be undertaken during such periods on an earlier occasion, and the employer has no reason to believe that that assessment is no longer valid, and
- Shall ensure that each night worker employed by him has the opportunity of a free health assessment at regular intervals of whatever duration may be appropriate in his case.
- An adult worker is entitled to a rest period of not less than eleven consecutive hours in each 24-hour period during which he works for his employer.
- A night worker's normal hours of work in any reference period which is applicable in his case shall not exceed an average of eight hours for each 24 hours.
- For the purposes of this regulation, a night worker's average normal hours of work for each 24 hours during a reference period shall be determined according to the formula—

¹ A is the aggregate number of hours comprised in the worker's working time during the course of the reference period; B is the aggregate number of hours comprised in his working time during the course of the period beginning immediately after the end of the reference period and ending when the number of days in that subsequent period on which he has worked equals the number of excluded days during the reference period; and C is the number of weeks in the reference period.

$$\frac{A}{B - C}^2$$

Following WRT (1996) legislation, the Management of Health and Safety at Work Regulations (MHSWR) was introduced in 1999 to establish the framework for H&S risk assessment at the workplace, specifically:

- Assessing the risks to the health and safety of his employees to which they are exposed whilst they are at work.
- Assessing the risks to the health and safety of persons not in his employment arising out of or in connection with the conduct by him of his undertaking.

Due to the nature of NGN’s work, we are exempt from adherence to the above shift worker legislation, as exemption 21 clause (iv) includes “gas, water and electricity production, transmission and distribution, household refuse collection and incineration” However, we still adhere to it as much as is practicable, given our operating environment. NGN has taken aspects from HASWA, WRT, and MHSWR since their inception through the following protocols, setting up and reviewing a company Health & Safety (H&S) policy and setting up a Health and Safety department focused on the identification and management of H&S risks and hazards, the reporting of H&S incidents, and the engagement with employees on H&S awareness.

2.2 Operational Context at NGN

NGN has 36,382km of gas mains across a range of diameters, from band A 16mm diameter to band I 1200mm diameter, with a varying asset condition, and operating pressures, from 23 to 73 bar. We perform a both proactive replacements through our capex programme of works, replacing circa 500km of iron gas mains every year through our repex programme, and reactive repairs, typically around 19,000 annually, through our opex programme of works. Reactive repairs are jobs that are raised due to asset degradation, either by members of the public who may notice a gas leak or during asset condition surveys. By their very nature, they are unpredictable in their occurrence, frequency, and location for NGN to predict. Where the capex programme of works can plan replacement during normal working hours, reactive opex repair cannot.

To ensure the safety of our customers across our 5 geographic service areas, NGN must operate and maintain the network 24/7. Furthermore, a response time of 1hr to an uncontrolled gas and 2hr for a controlled gas incident anywhere within the 5 service areas is the industry standard. NGN have historically had two distinct job roles that operate a shift pattern for managing reactive repair jobs. Firstly, we employ First Call Officer (FCO) that act as the first interaction that a customer will have when flagging a gas leak. Their role is to attend site in the first instance and assess the criticality of the issue. If there is significant works required to rectify the issue, either a repair team or a mechanical network maintenance team will be deployed to the location.

To ensure the health and safety of our employees and customer, we operate two distinct shift patterns for network roles, 7am to 10am and 10pm to 7am, with the daytime shifts requiring the operators to be present and the nighttime shifts requiring operators to be on standby. To ensure that employees will not work longer than 16 hours in a 24-hour period, NGN has set-up a failsafe check where all operators would be required to check in with their line managers if working 11 hours or more continually and ensure their safety.

² A is the number of hours during the reference period which are normal working hours for that worker; B is the number of days during the reference period, and C is the total number of hours during the reference period comprised in rest periods spent by the worker in pursuance of his entitlement under regulation 11, divided by 24.

This operational H&S framework for NGN's shift workers was sufficient for HASWA and Working Time Regulations, until the introduction of Managing shift work: Health and safety guidance (HSG256) in 2006, by the Health and Safety Executive. Their ruling is such that, the exemption by which utility companies qualify is no longer relevant for shift workers in the gas industry. HSG256 defines shift work as follows:

- a work activity scheduled outside standard daytime hours, where there may be a handover of duty from one individual or work group to another;
- a pattern of work where one employee replaces another on the same job within a 24-hour period.

In this document, it is argued that it is not sufficient to rely on the previous legislation, HASWA (1974), WTR (1998) and MHSWR (1999) to ensure that you meet your obligations for health and safety regarding shift-working arrangements. They argue that the research behind the effects of shift working call for a revision to the H&S policies for all GDNs.

2.3 NGN Health and Safety Performance

Below is a list of scenarios that could lead to legislation breaches at NGN;

- A colleague who has multiple call outs in one standby shift that accumulates to excess working hours and disturbed rest.
- A FCO attending a gas escape towards end of normal shift may be required to stay and monitor the situation until a relief/repair team is available to take over.
- A repair team who upon completing their contractual hours are required to stay on and finish the required repair.
- A spike in workload beyond the planned resilience stretching existing resource cover and hours worked, for example due to a prolonged cold spell which results in more leaks reported due to higher system pressures and still air leading to easier detection of leaks.

Previously, they would be argued as being exceptional circumstances due to the priority of maintaining the gas distribution network and public safety taking precedence to the HSE policy of shift working. The GDNs now are in a situation where these occurrences need to be mitigated.

In 2023/24 the following data sets were captured relating to shift workers:

- 0.03% breach of 16 hours - 11 failures in 55000 standby shifts.
- 5% breaches of 12 hours.

This was within the current shift working practices of 41.25hr standard working week over a 17-week average. However, given the 24/7 nature of our service the hours between 2200 and 0700 are not covered by rostered shifts. Instead, these hours are covered by a system of standby and call out which all colleagues are obliged to participate in. As this is not designated as working time until a call out occurs. It is possible under several operation scenarios that hours more than 12 can occur, which increases fatigue and therefore the risk of an incident where fatigue is a contributory factor.

We currently monitor working hours to minimise these occurrences. However, given the requirement to always deliver to 1- and 2-hour standards and maintain safety for all attended jobs across the northern region we are responsible for, we have identified that we require additional resource and skills cover to be able to manage this risk satisfactorily.

Should we continue to operate with our current shift working practises and without additional resource, it is likely that we will incur financial penalties due to non-compliance and increase the likelihood of fatigue-driven health and safety incidents. For example, in relation to the management of gas escapes and management of supply, poor judgement or lack of attention to detail can cause significant injury or death to a colleagues and members of the public in the proximity of a gas explosion or fire. Similarly, poor judgement or assessment and a failure to diagnose an issue could indirectly place members of the public at risk of a gas incident/explosion and or fire.

2.4 Looking Forward

2.4.1 What are the new targets for Shift Working for GDNs?

The following requirements have been set out by NGN for compliance to the HSE policy legislation with regards to shift workers.

1) 12 hours maximum shift in a 24-hour period – This is inclusive of standby time spent out on call and travel time between home and the depot or first call out, and excludes standby time not out on call and exceptional circumstances (e.g. where there is the possibility of any or all the following outcomes:

- Greater than 5-year average workload (at depot level) risk to safeguarding life and property
- Multiple fatalities
- Injuries with irreversible health effects (i.e. permanent disability)
- Major loss of containment resulting in a high-volume gas escape and / or loss of gas to many customers
- Major asset damage
- Large-scale impact on a sensitive environment
- Extensive impact on a non-sensitive environment
- Network incident i.e. >1000 properties,
- Major incident >250 properties or critical unplanned events

2) Adoption of appropriate fatigue management system post exceptional circumstance – (e.g. Where your risk assessment determines the level of an individual is fatigued and predicts the likelihood of an event occurring, as a part of an ongoing cycle of evaluation.

A deadline for enacting these requirements is yet to be established between the GDNs and the HSE directive. A plan to meet these obligations must be submitted by September 2024, complimenting the HSE policy reopener timeline.

2.4.2 What are the consequences?

Below, in figures 1 to 6, are examples of current shift patterns (North Area of the Network) against demand/priority workload for Emergency engineers and Repair Teams. Where the workload demand trendlines in red are above the workforce trendlines in green, resourcing 'gaps' occur. Currently, they exist between 22:00 and 07:00 and are mitigated using additional working hours via standby arrangement. These gaps that require resourcing through 'normal' working hours to achieve full 12hr and 16hr fatigue compliance form the basis of further calculations of full-time employee recruitment.

Figure 1 – Average Weekday Emergency Workload v Resourcing trends in North operational area over 24hr period

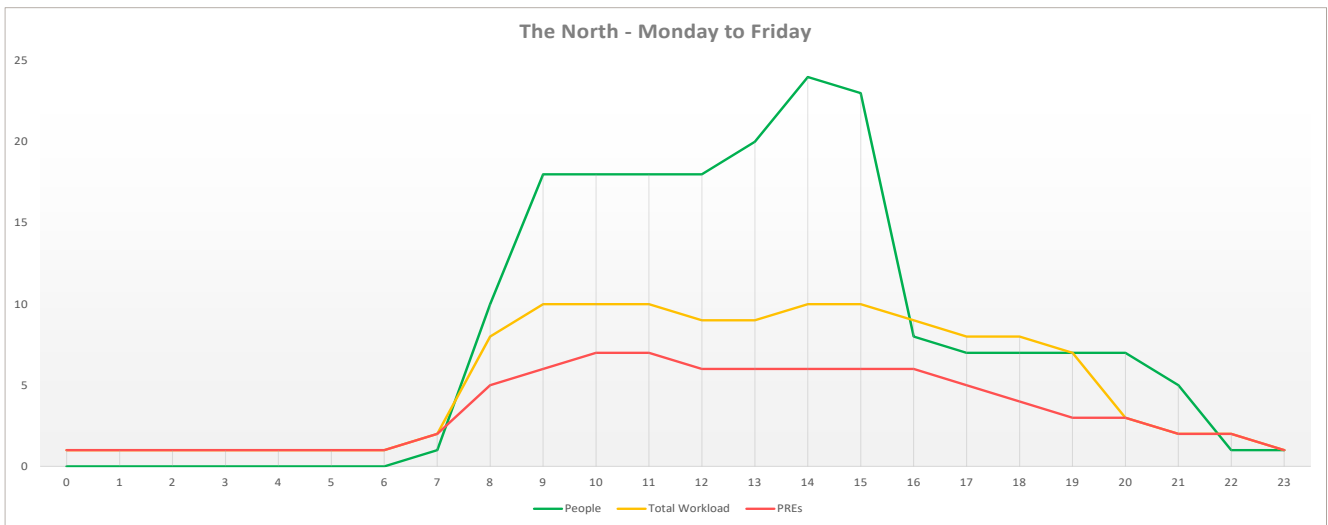


Figure 2 – Average Saturday Emergency Workload v Resourcing trends in North operational area over 24hr period

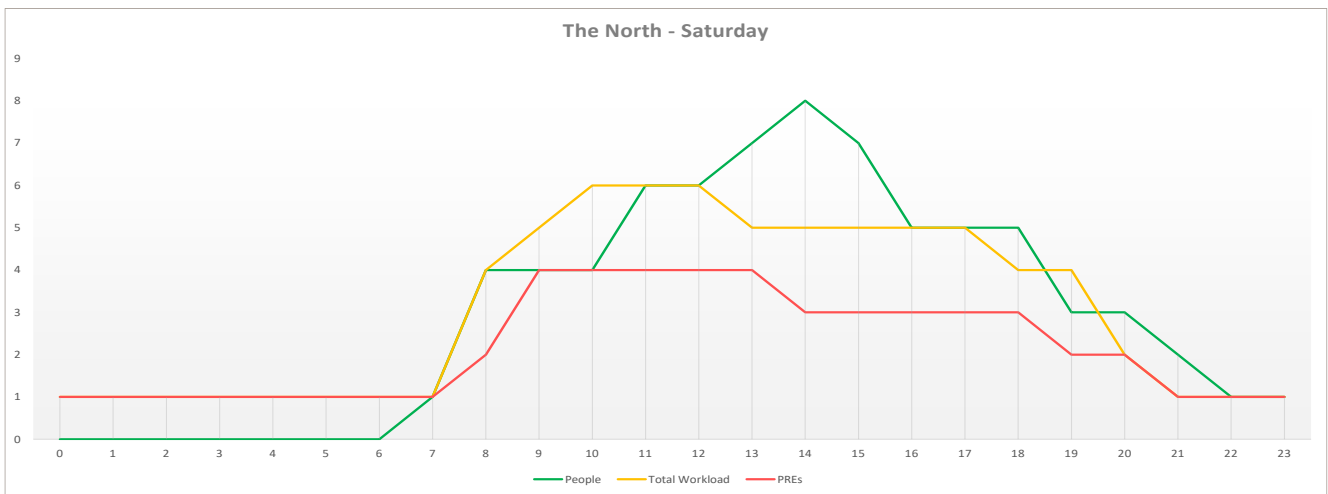


Figure 3 - Average Sunday Emergency Workload v Resourcing trends in North operational area over 24hr period

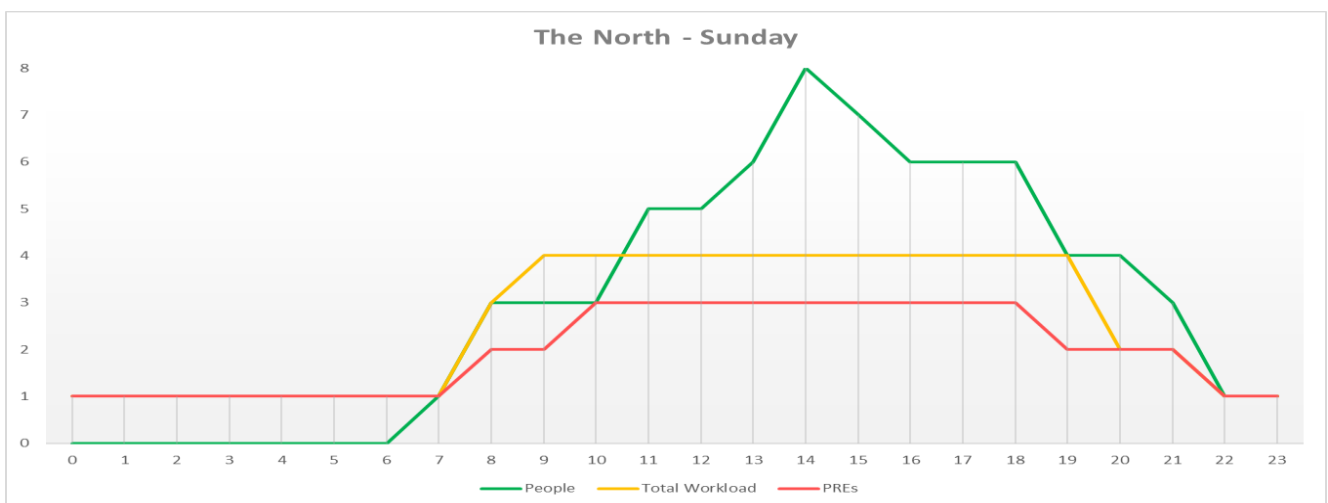


Figure 4 – Average Weekday Repair Workload v Resourcing trends in North operational area over 24hr period

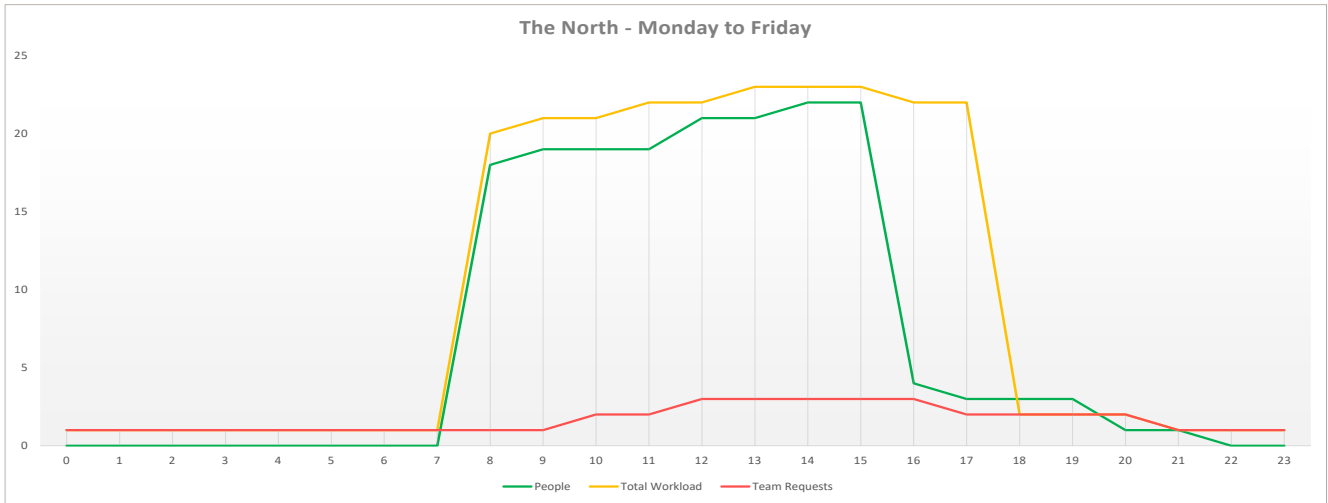


Figure 5 – Average Saturday Repair Workload v Resourcing trends in North operational area over 24hr period

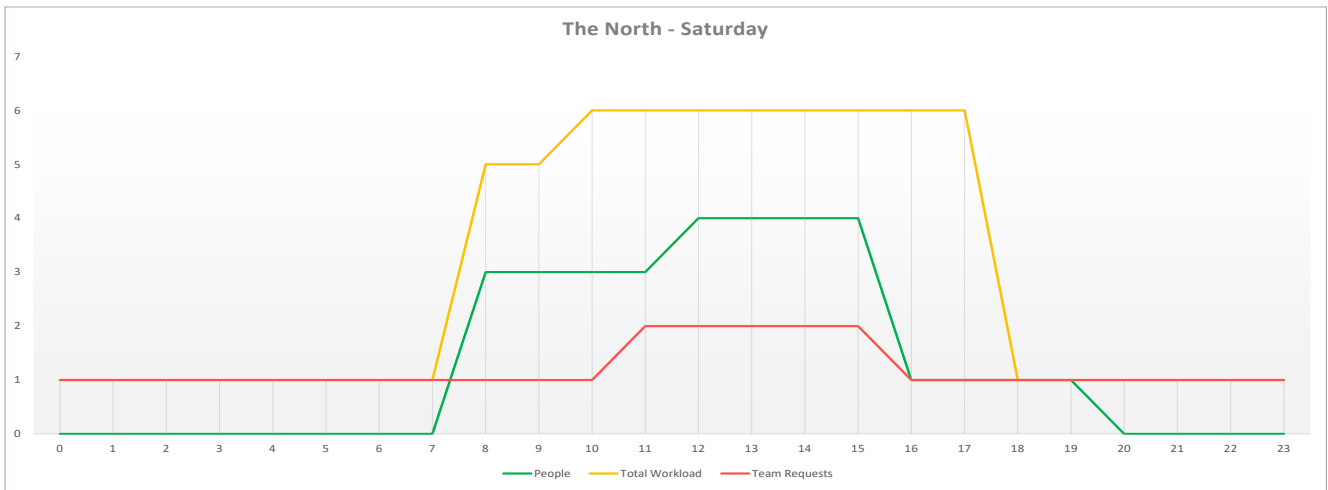
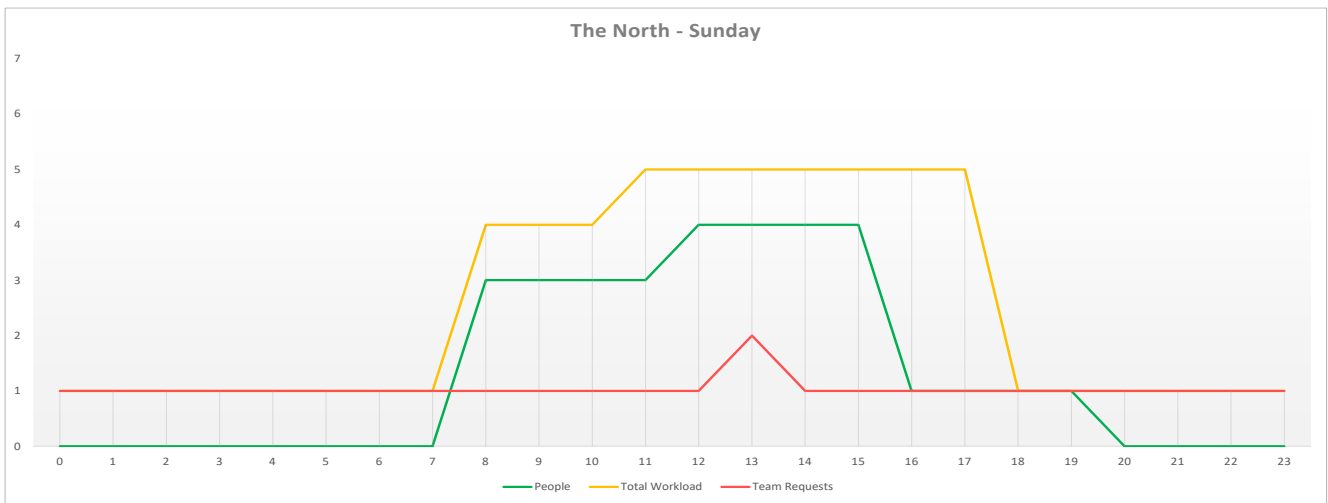


Figure 6 – Average Sunday Repair Workload v Resourcing trends in North operational area over 24hr period



We explored meeting the requirements of HSE fatigue management efficiently via attrition and putting new colleagues on new terms and conditions for 24/7 shift pattern working. However, from table 3 below it is evident that relying solely on employee turnover to adhere to the HSE legislative requirements is not sufficient, as it is very low (average 2.75% per annum) and will require a significant timeframe for NGN to become fully compliant with HSE and HASWA legislation. Therefore, this submission contains costings for additional colleagues to meet the requirements in a reasonable timeframe that would satisfy HSE expectations.

Table 3 - Volume splits by Employee Turnover Status

Employee Categories	2022	2023	2024
Active	748	769	772
Leavers	15	40	8
Leavers (%)	2.01	5.20	1.04

2.4.3 What have NGN done to date?

In 2020 NGN engaged a statistician to carry out a piece of analysis to identify the required volume of Emergency Engineers required to achieve 98.5% standards of service on Gas Emergencies during a 1 in 20 Winter year. This work was instigated because of a wider utility sector issue with resilience in a 1 in 20 Winter. Previously mutual aid between the GDNs was utilised, but in the event of a nationwide incident, this shared resource became minimal. We wanted to ensure self-sufficiency through having the required resource to deal with such an event as well as minimising fatigue, with a focus on 16hr compliance.

The following key parameters were set as part of the modelling:-

- Weather data was used back to the 1960s
- General Linear Models were defined for each region for Uncontrollable Public Reported Escapes (PREs)
- Forecasting based on future REPEX workload and temperature forecasts to understand expected PRE forecasts.

The following conclusions were reached:

- Statistical findings demonstrate a clear relationship between **Uncontrollable PREs** and **day of the week, time of day, Cumulative REPEX workload** and **temperature**.
- A decision has been made to cover the expected 98.5% upper prediction interval for business as usual resource management.
- Demand coverage will be planned by FCOs only, not accounting for reservists.
- Forecasting based on future REPEX workload and 1 in 20 extreme temperature to understand extreme PRE forecasts, we can see that the temperature can significantly change the forecasts.

Impact of weather on work forecast

The graphs below, in figures 7 to 11, summarise temperature forecasts and associated uncontrolled and controlled work volumes in an example area of the network. The temperature actual/forecast highlights that there is a strong likelihood that future work profiles are likely to be more severe due to more extreme weather events and not comparable to historic trends and that we have a better understanding now of the occurrences of controllable and uncontrollable PREs under normal weather conditions.

Figure 7 - Annual temperature variance in Newcastle Upon Tyne from 1960 to 2030

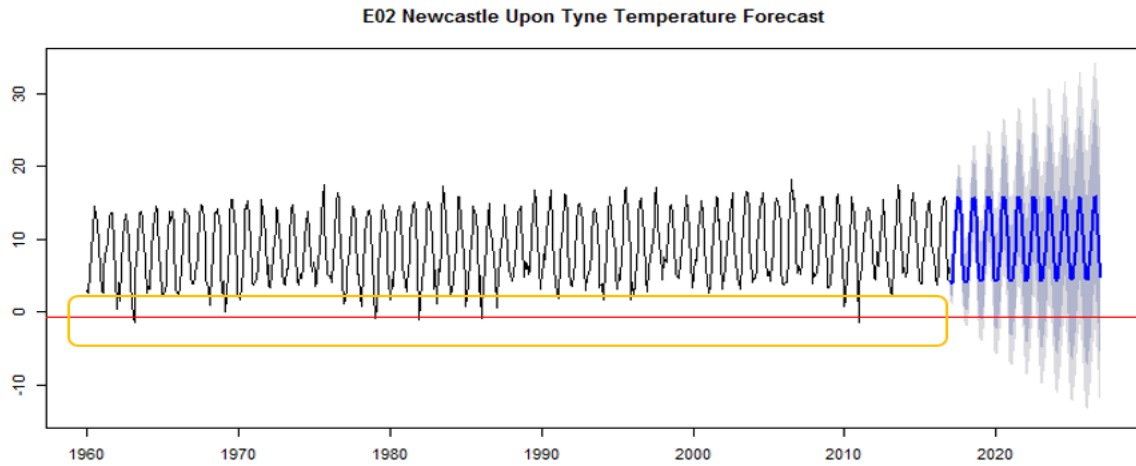


Figure 8 - Trends of actual and predicted uncontrollable PREs from 2010

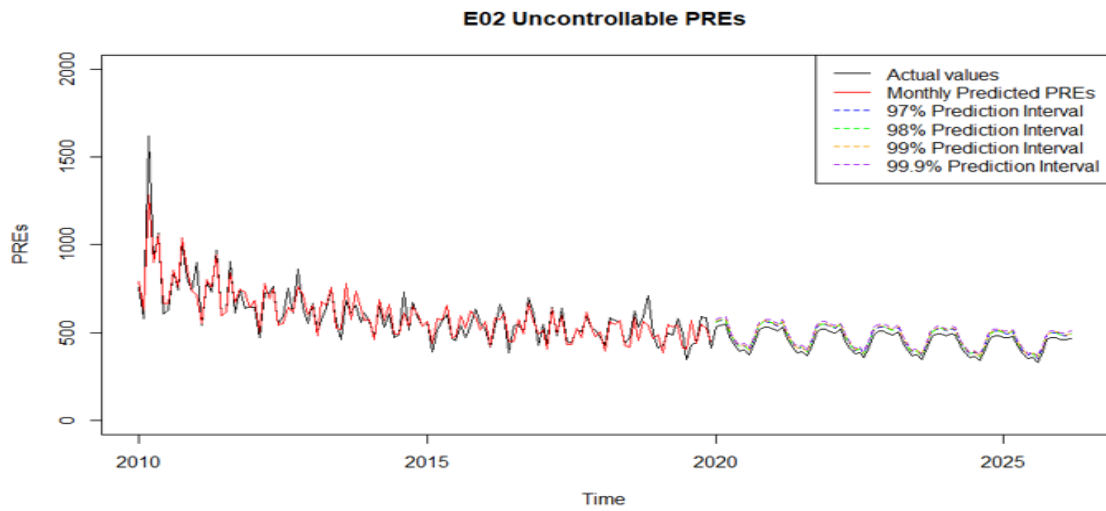


Figure 9 - Trend of projected uncontrollable PREs under worst weather scenario

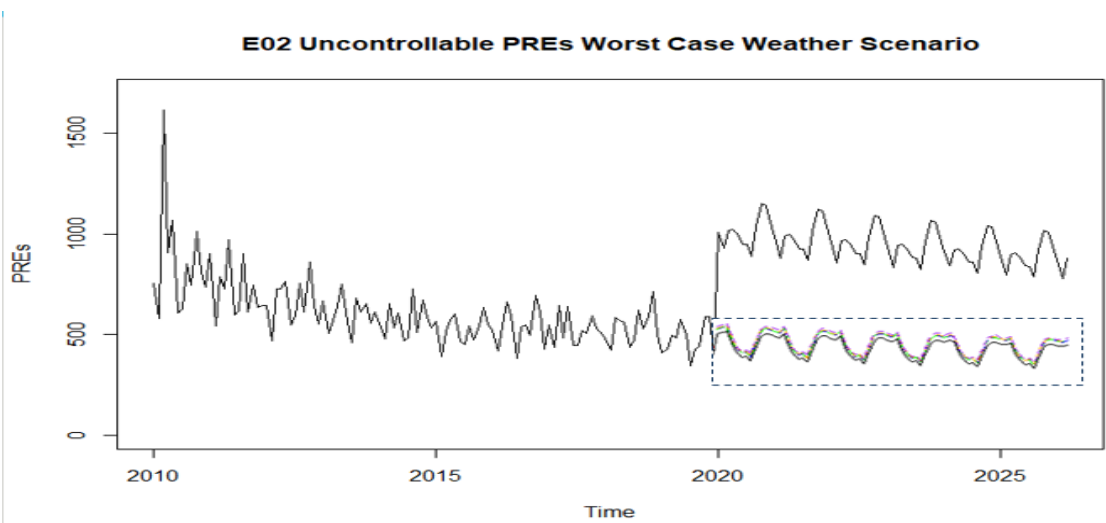


Figure 10 - Trends of actual and predicted controllable PREs from 2010

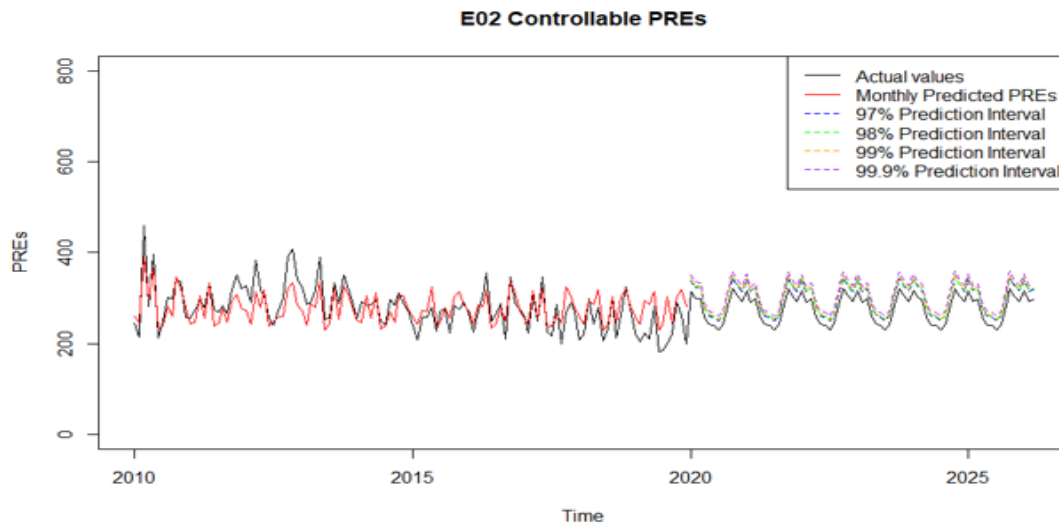
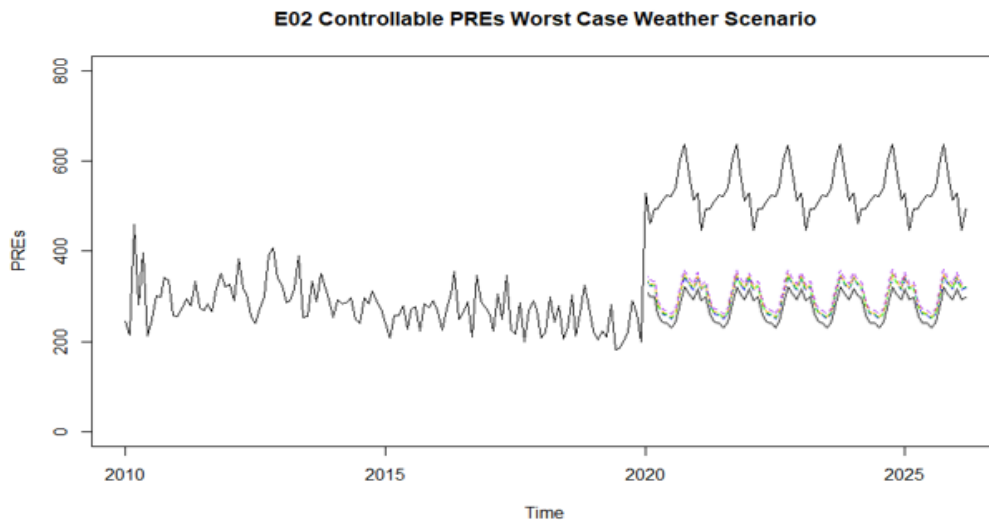


Figure 11 - Trend of projected controllable PREs under worst weather scenario



Building the Demand Profile

The forecast PREs and specific day planned work were summed and the time taken for a colleague to attend the job and make a repair was accounted for to create a demand profile. Scheduling software was then used to demonstrate coverage based on contract terms & conditions, for FCOs. It was found that a 98.5% demand level, there was only coverage for the expected demand between 12 and 4pm, with shortfalls in the morning and evening. Similarly, for FCO demand analysed at the extreme 1 in 20 level, the potential shortfall becomes much clearer with demand exceeding current numbers of FCOs throughout the day (see figure 12). This indicated the requirement for additional resources to ensure compliance in extreme weather and appropriately manage fatigue by reducing working hours (see table 4).

Figure 12 - Demand and Resourcing Profile for 98.5% resource demand scenario over 24hr period

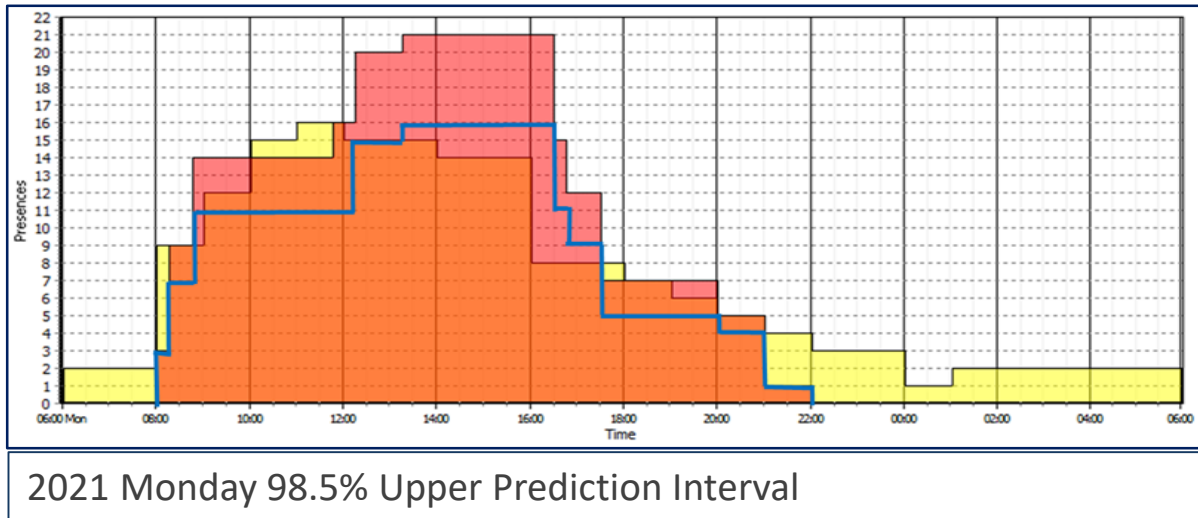


Table 4 - Comparison of existing FCO resource level and 98.5% resource demand and 1:20 winter resource demand scenarios

Area	Number of FCOs (Budget)	FCOs needed for 98.5% Emergency and specific day repairs.	FCOs needed for 1 in 20 low temperature.
BOL - Cumbria - Workington	6*	8	11
COL - Cumbria - Carlisle	6*	8	9
E02 – North Tyne	26	28	32
E03 – Wear	29	32	39
E04 – Tees	28	31	38
A0A - North Riding – Harrogate	8*	9	10
COA - North Riding – York	8*	9	11
DOA - North Riding – Scarborough	8*	9	11
BOA - East Riding - Pontefract	13*	14	20
EOA - East Riding - Hull	13*	14	22
E07 – Bradford	17	19	23
E08 – Leeds	23**	25	29
E09 - Pennines	23	25	30
Network Total	208*	231	285

Findings

The output of the project showed a shortfall in resourcing of [Redacted] Emergency Engineers (FCOs) to cover typical work basket and manage fatigue with a further [Redacted] required to achieve 98.6% performance on uncontrolled escapes during 1 in 20 low temperature winter conditions. These resources [Redacted] were recruited for GD2 to ensure NGN had appropriate resilience and managed fatigue appropriately. Rather than recruit a further [Redacted] NGN have put in place a formal reservists process and a resilience contract with external contractors to leverage the wider business workforce (office and industrial) to support severe weather

events and/or incidents so that surplus resources and inefficient costs are not embedded and capacity is only increased as and when needed.

By increasing the workforce and using the modelling, NGN have pro-actively increased capacity and resilience which has ensured we are leading the sector on uncontrolled and controlled gas escape standards in GD2, whereas some other networks have failed the minimum 97% standard.

Fatigue performance has improved because of this recruitment, specifically 16hr compliance. 1.24% (2,134 breaches) of timesheet were non-compliant with 16hr in 20/21 which has improved to only 0.0% (60 breaches) in 23/24 following resource increase. This submission covers the retrospective costs not accounted for at the setting of the RIIO-2 Business Plans to cover this recruitment, plus the additional costs of becoming compliant with 12 hour standards as set out in the following sections.

Table 5 - Comparisons of 12hr and 16hr shift working breaches between 2020/21 to 2023/24

	2020/21	2021/22	2022/23	2023/24
Total Timesheets	172,541	168,722	180,318	190,150
Timesheet >12 Hour	8,733	7,730	9,049	8,275
% >12	5.1%	4.6%	5.0%	4.4%
Timesheets >16 Hours	2,134	691	156	60
% >16	1.2%	0.4%	0.1%	0.0%

Cost

[Redacted] Emergency Engineers were recruited in 21/22 with a further [Redacted] in 22/23 to arrive at the full recommended compliment of [Redacted] additional engineers. The total cost in GD2 of the recruitment of the [Redacted] engineers is £7,305,235 in 2018/19 prices (£6,751,203 - Opex and £554,032 - Capex), as shown in table 6. These costs include for remuneration, vehicles, tools and PPE and exclude training and recruitment costs.

Table 6 - Breakdown of cost for recruiting [Redacted] FTEs in GD2

2018/19 Prices						
Emergency (+23)	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource FTE	[Redacted]					
(OPEX) New Resource £	£443,743	£1,275,761	£1,275,761	£1,275,761	£1,275,761	£5,546,785
(OPEX) Vehicles - Running Costs & Depreciation)	£64,236	£184,677	£184,677	£184,677	£184,677	£802,945
(OPEX) Tools & PPE	£32,118	£92,339	£92,339	£92,339	£92,339	£401,473
(CAPEX) Vehicles	£192,707	£361,325				£554,032
Total	£732,803	£1,914,102	£1,552,777	£1,552,777	£1,552,777	£7,305,235
Opex Total	£540,096	£1,552,777	£1,552,777	£1,552,777	£1,552,777	£6,751,203
Capex Total	£192,707	£361,325	£0	£0	£0	£554,032

2.4.4 What is still required for HSE compliance?

The recruitment of the [Redacted] Emergency Engineers enabled NGN to reduce fatigue and be 16hr compliant. However, as part of the legislation linked to fatigue management (HSG256), the HSE have set an expectation that GDNs will progress beyond 16hr compliance and move to 12hr compliance around fatigue management.

To achieve this level of compliance and reduce fatigue and associated working hours of colleagues whilst maintaining standards of service (specifically 1 and 2hr licence conditions) and protect life and property NGN will require further additional resources.

A significant level of analysis and modelling has been undertaken to establish the workforce requirements needed to achieve 12hr compliance across key workstreams. Specifically

- Emergency and Repair Fatigue Workload Analysis – This centred on the extraction of historical data to enable accurate analysis and trend of average workload pattern under 12hr shift working, based on day/month/time and area. Workload averages were to be built for Winter (October to March) and Summer (April to September) patterns using our S4 HANA SAP system.
- The inclusion of new shift patterns to achieve 12hr compliance as existing shift patterns in NGN do not cover these hours, instead they are covered via a Standby rota which generate additional working hours.
- Embedding the necessity for any additional resources recruited from August 2024 being under the new terms and conditions which allows working patterns that cover a 24hr period and only being able to work nights on a 1 in 4 shift pattern.

2.4.4.1 Emergency & Repair Fatigue Workload Analysis

This project was commenced in the summer of 2021 as NGN commenced formal discussions with colleagues and the HSE regarding a solution to fatigue. All data was taken from SAP, NGNs core system. NGN launched a new SAP system in Autumn 2019, and given the impact of Coronavirus on workload volumes, it was decided to use workload from the previous SAP system so that 5 regulatory years of consistent workload, from April 2014 to March 2019, could be collated without the impact of a pandemic which would alter trends abnormally. The example below is for Emergency workload, Repair workload follows the same principle using different work activity types. Geographic areas are the same.

Categorising our Operational Area

The network is split up geographically into 5 areas. For the purposes of this reporting, certain areas were subdivided into smaller sub-areas as per our system infrastructure to spread the workload out and match against the way resource is allocated.

- Blue = North and Cumbria (Split approximately East/West. The Eastern part (The North) has much larger work volumes than Cumbria).
- Orange = Tees
- Green = The Ridings
- Yellow = Central
- Purple = Bradford and Pennines (Split approximately North/South. Workload volumes are quite similar).

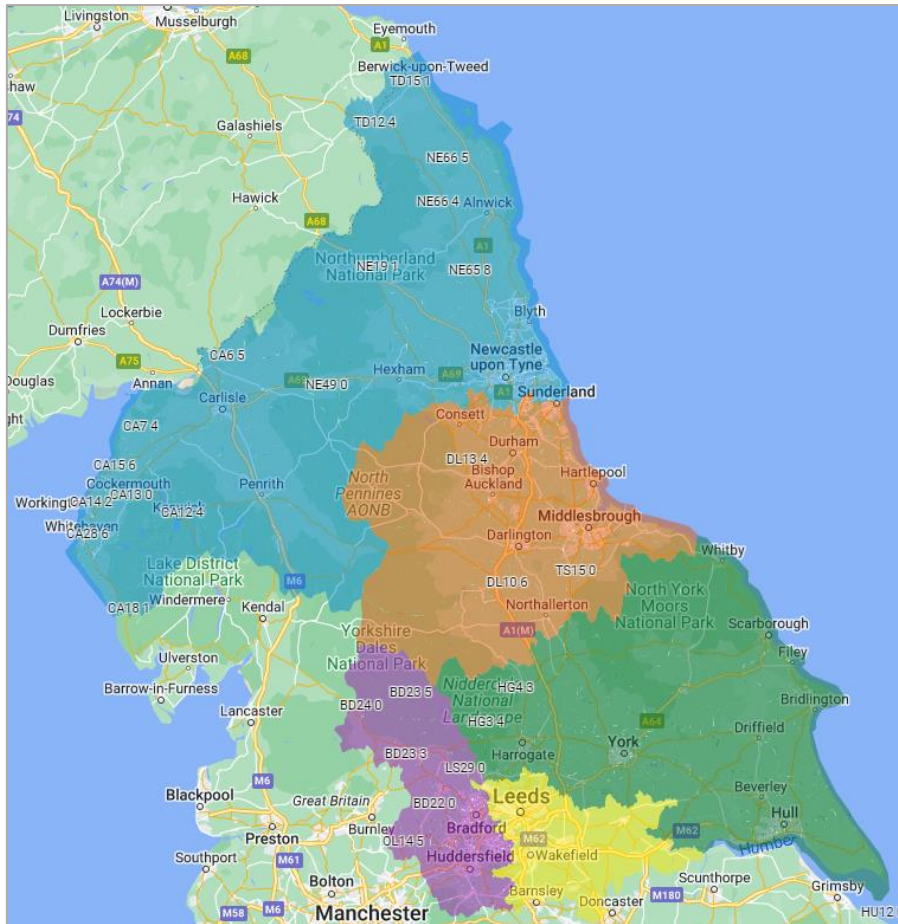


Figure 13 - Graphic illustrating the 5 operational areas and their sub-categories

Workload Activity Types

An Activity type field is used within SAP to categorise workload. Some workload is added into the system based on when the job is created, such as PRE Emergency jobs with a 1 or 2 hour response time. Other work is added into the system in advance. PRE workload uses the created month, weekday, and hour as the measure to indicate when it should be captured and measured in the workload. All other workload uses onsite date as this is not time driven, and phased during a 12 hour window (8am to 8pm) throughout the day.

Accounting for Workload Reduction post Pandemic

As the core data extracted was 5 years pre-COVID pandemic it was recognised that workload volumes are reducing, with the main contributor to this being positive impact of the mains replacement programme. Unreliable sections of pipe have been prioritised for replacement, which has led to a gradual improved network performance. Some analysis was undertaken to look at historical workload volumes on PRE's resulting in workload volumes being reduced by 20.78%.³

Calculating Average Workload

³ The 5-year PRE average between 2014/15 and 2018/19 was 87,962 PRE's per year. The 3-year PRE average between 2019/20 and 2021/22 was 69,688 PRE's per year. Comparing the 87,962 and 69,688 results in a 20.78% reduction.

All workload was counted using Pivot tables to give total volumes over 5 years, split by day of the week and month of the year. Table 7 below shows the breakdown of the number of rechecks performed by FCOs between April 2014 and March 2019 in the North operational area. For example, from 2014 to 2019 the total number of rechecks performed on Mondays, in April, in the North operational was 214.

Table 7 - Example of the 5 year total number of rechecks performed per day each month

Weekday	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total (5 Years)
Monday	214	189	161	89	127	107	127	82	166	173	167	181	1,782
Tuesday	212	258	194	141	132	155	160	125	185	202	185	177	2,125
Wednesday	267	231	195	154	150	163	175	131	204	226	227	193	2,314
Thursday	261	218	153	160	150	164	176	126	190	219	227	216	2,260
Friday	234	241	191	173	177	183	196	120	196	231	195	202	2,340
Saturday	241	246	181	151	161	158	148	140	221	216	202	227	2,292
Sunday	240	224	173	147	151	131	142	143	179	196	171	201	2,098
	1,669	1,606	1,247	1,015	1,047	1,061	1,124	867	1,341	1,464	1,373	1,397	15,211

The next step was to calculate a daily average, so the 214 jobs need to be divided up by the number of occurrences for each day in the 5-year period (see table 8).

Table 8 - Total frequency of days between 2014 and 2019

Total Days (5 Yrs)	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Monday	21	22	22	22	22	21	23	21	22	22	21	21
Tuesday	21	23	21	22	22	22	22	21	22	23	20	22
Wednesday	22	22	21	22	23	21	22	22	22	22	20	22
Thursday	21	22	22	22	22	21	22	22	22	22	20	23
Friday	21	22	22	22	22	22	22	21	22	22	20	23
Saturday	22	22	21	22	22	22	22	21	23	22	20	22
Sunday	22	22	21	23	22	21	22	22	22	22	20	22

Taking the values from tables 7 and 8, we were able to calculate the average number of jobs on any given day for every month. For example the average number of rechecks performed in on Mondays in April is 10.2.

Table 9 - Average number of jobs performed on a given day for each month of the year

Weekday	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Monday	10.2	8.6	7.3	4.0	5.8	5.1	5.5	3.9	7.5	7.9	8.0	8.6
Tuesday	10.1	11.2	9.2	6.4	6.0	7.1	7.3	6.0	8.4	8.8	9.2	8.0
Wednesday	12.1	10.5	9.3	7.0	6.5	7.8	8.0	5.9	9.3	10.3	11.3	8.8
Thursday	12.4	9.9	6.9	7.3	6.8	7.8	8.0	5.7	8.6	10.0	11.3	9.4
Friday	11.2	10.9	8.7	7.9	8.1	8.3	8.9	5.7	8.9	10.5	9.7	8.8
Saturday	10.9	11.2	8.6	6.9	7.3	7.2	6.7	6.7	9.6	9.8	10.1	10.3
Sunday	10.9	10.2	8.2	6.4	6.9	6.2	6.4	6.5	8.1	8.9	8.6	9.1
	77.9	72.5	58.3	45.8	47.3	49.4	50.8	40.4	60.5	66.1	68.2	63.1

Once the average number of jobs was calculated, the average number of hours is required. To do this, hours per job is required, and multiply that by the number of jobs will give number of hours required. Average travel time and work time on site were calculated individually for each work type using productivity data (referenced in section 5.1). The average travel time for rechecks was 20.3 minutes, and 62.6 minutes work time on site. This works out at an average time requirement of 82.9 minutes per job (1.38 hours in decimal). Using the average for a Monday in April, multiplying 10.2 jobs by 1.38 hours results in a requirement of 14.1 hours. This method has been used to populate table 10 below.

Table 10 - Average number of hours required for a given day for each month of the year

Weekday	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Monday	14.1	11.8	10.1	5.6	8.0	7.0	7.6	5.4	10.4	10.9	11.0	11.9
Tuesday	13.9	15.5	12.8	8.9	8.3	9.7	10.0	8.2	11.6	12.1	12.7	11.1
Wednesday	16.8	14.5	12.8	9.6	9.0	10.7	11.0	8.2	12.8	14.2	15.6	12.1
Thursday	17.2	13.7	9.6	10.0	9.4	10.8	11.0	7.9	11.9	13.8	15.6	13.0
Friday	15.4	15.1	12.0	10.9	11.1	11.5	12.3	7.9	12.3	14.5	13.5	12.1
Saturday	15.1	15.4	11.9	9.5	10.1	9.9	9.3	9.2	13.3	13.6	14.0	14.3
Sunday	15.1	14.1	11.4	8.8	9.5	8.6	8.9	9.0	11.2	12.3	11.8	12.6
Hours	107.5	100.1	80.5	63.3	65.3	68.3	70.2	55.8	83.6	91.4	94.3	87.1

The 14.1 hours requirement is then phased over 12 hours (8am – 8pm) to create a requirement of 1.2 hours cover required per hour on a Monday in April (see table 11).

Table 11 - Average hourly workload demand for any day for each month of the year

Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1.2	1.0	0.8	0.5	0.7	0.6	0.6	0.5	0.9	0.9	0.9	1.0
1.2	1.3	1.1	0.7	0.7	0.8	0.8	0.7	1.0	1.0	1.1	0.9
1.4	1.2	1.1	0.8	0.7	0.9	0.9	0.7	1.1	1.2	1.3	1.0
1.4	1.1	0.8	0.8	0.8	0.9	0.9	0.7	1.0	1.1	1.3	1.1
1.3	1.3	1.0	0.9	0.9	1.0	1.0	0.7	1.0	1.2	1.1	1.0
1.3	1.3	1.0	0.8	0.8	0.8	0.8	0.8	1.1	1.1	1.2	1.2
1.3	1.2	0.9	0.7	0.8	0.7	0.7	0.7	0.9	1.0	1.0	1.1

The same principle is applied for the other work types, PRE’s work the same way but are slightly more detailed as they are also split by the hour that the job was created.

Total Workload

All of the workload is calculated the same way as the previous example and then added together to give a total hours requirement, by month, weekday and hour. Table 12 below is an example for the North operational area in April for total workload. Evidently the workload increases between the hours of 08:00 and 19:00 and lessons out with this timescale.

Table 12 - Hourly profile of workload for each given day in the North operational area

Total Hours	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	0.5	0.2	0.2	0.2	0.3	0.1	0.6	3.4	7.5	6.9	7.5	7.3	6.9	5.4	7.5	6.5	6.1	5.0	5.7	4.2	1.6	1.3	0.3	0.4
Tuesday	0.1	0.1	0.1	0.1	0.0	0.3	0.7	2.4	8.9	9.5	8.5	8.2	8.4	7.4	8.8	6.5	6.4	6.4	5.7	5.5	1.6	0.4	0.9	0.2
Wednesday	0.1	0.2	0.1	0.1	0.2	0.4	1.3	3.2	8.6	8.3	8.1	8.4	7.1	7.9	7.3	7.3	6.8	6.0	5.3	5.6	1.4	0.9	0.3	0.3
Thursday	0.2	0.1	0.2	0.1	0.0	0.2	1.3	2.8	8.5	8.2	8.7	8.1	9.0	8.0	8.8	8.4	7.0	5.8	6.1	6.2	0.8	1.0	0.4	0.3
Friday	0.2	0.3	0.0	0.2	0.1	0.0	1.4	2.9	6.3	8.1	7.9	7.6	7.1	6.0	7.1	7.5	6.4	5.9	5.6	5.2	1.2	1.2	0.5	0.1
Saturday	0.2	0.2	0.2	0.0	0.0	0.0	0.6	1.4	3.6	4.6	4.2	4.1	4.3	4.1	3.7	3.8	3.7	3.7	3.1	2.7	1.3	0.6	0.4	0.3
Sunday	0.3	0.1	0.2	0.0	0.0	0.1	0.4	0.9	2.5	3.3	2.9	3.7	2.6	2.6	3.2	3.2	2.6	3.1	2.4	2.6	0.9	0.7	0.6	0.7
	1.5	1.2	1.0	0.6	0.6	1.2	6.3	16.9	45.8	48.9	47.7	47.5	45.4	41.5	46.3	43.2	39.0	35.9	33.7	32.0	8.9	6.2	3.5	2.4

Next the hourly workload profile for each month is averaged for Winter (October to March) and Summer (April to September) to smooth out peaks and troughs which will give a more accurate average demand. There is one for total workload, and a second one to only show 1 and 2 hour PREs. Winter example for total workload in Hours is shown below:

Table 13 – Average winter hourly workload for each day of the week

	Winter Workload - October to March																							
Total Workload	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	0.3	0.2	0.2	0.1	0.2	0.2	0.4	1.5	7.3	8.9	9.7	9.3	8.7	8.8	8.6	8.8	8.2	7.4	6.3	5.9	2.1	1.7	1.1	0.5
Tuesday	0.4	0.2	0.2	0.1	0.1	0.1	0.4	1.6	7.3	9.2	9.5	9.4	8.8	8.7	9.4	9.2	8.2	7.5	7.1	6	2	1.4	1.1	0.6
Wednesday	0.3	0.2	0.2	0.2	0.1	0.2	0.7	1.6	7.3	9.3	9.2	9.2	8.6	8.5	8.7	9	8.2	7.5	7	6.2	1.8	1.3	0.8	0.6
Thursday	0.4	0.3	0.1	0.1	0.1	0.1	0.5	1.5	6.9	9.1	9.3	9	8.7	8.6	8.8	8.7	8.2	7.1	7.1	6.4	2.1	1.5	1.1	0.8
Friday	0.3	0.2	0.1	0.2	0.1	0.2	0.5	1.6	6.7	9	8.6	8.5	8.4	8	8.3	8.3	7.5	7.1	6.6	5.7	1.8	1.2	0.8	0.6
Saturday	0.4	0.3	0.2	0.1	0.2	0.1	0.2	0.7	3.7	4.9	5.5	5.3	5	4.9	4.6	4.6	4.6	4.2	4	3.5	1.3	1	0.7	0.6
Sunday	0.3	0.2	0.3	0.1	0.2	0.2	0.3	0.6	2.7	3.3	3.5	3.8	3.7	3.8	3.5	3.7	3.8	3.5	3.5	3.2	1.5	1.2	0.7	0.5

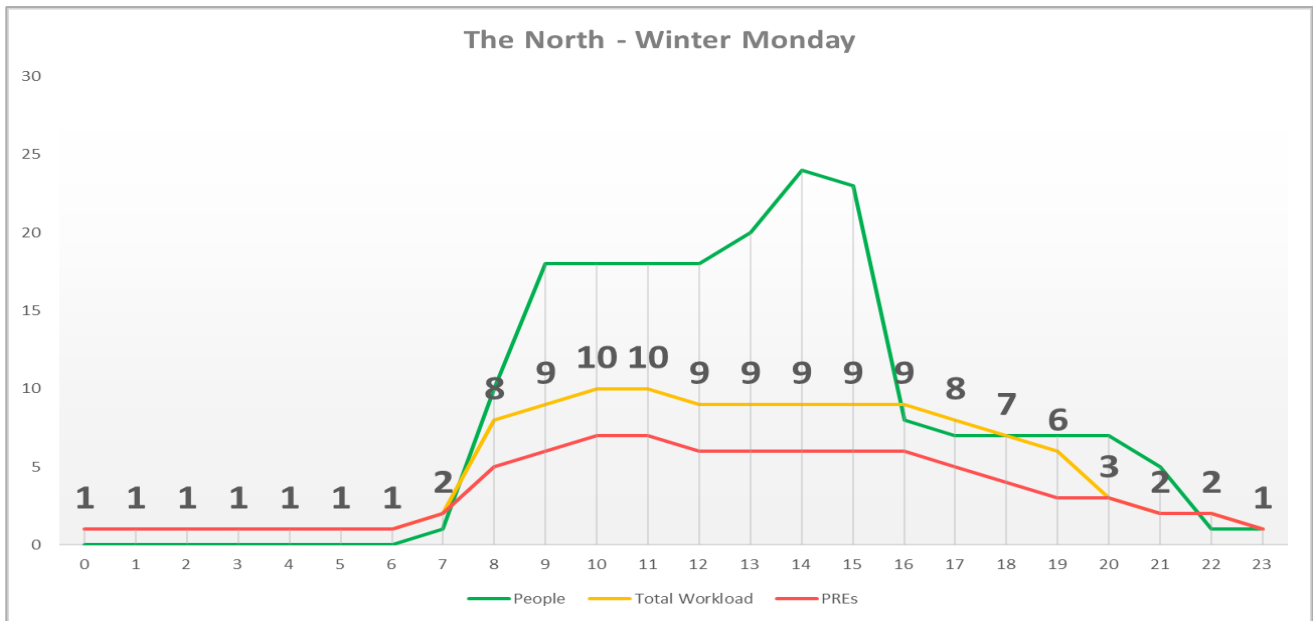
Finally, to equate these hours to a resource requirement, numbers are rounded up to the nearest whole number. For example, if a workload requirement is 0.1 hours on a Monday in the winter, between 3am and 4am, this will be uplifted to a requirement of 1 full time employee (FTE). This is due to a colleague being required to action an escape so even an average of less than 1 job would still meet the requirement for resource to be available as it indicates, on average, work will be incoming at that time.

Table 14 - Average winter hourly FTE requirement by day

Rounded Total	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	1	1	1	1	1	1	1	2	8	9	10	10	9	9	9	9	9	8	7	6	3	2	2	1
Tuesday	1	1	1	1	1	1	1	2	8	10	10	10	9	9	10	10	9	8	8	6	3	2	2	1
Wednesday	1	1	1	1	1	1	1	2	8	10	10	10	9	9	9	10	9	8	7	7	2	2	1	1
Thursday	1	1	1	1	1	1	1	2	7	10	10	10	9	9	9	9	9	8	8	7	3	2	2	1
Friday	1	1	1	1	1	1	1	2	7	10	9	9	9	8	9	9	8	8	7	6	2	2	1	1
Saturday	1	1	1	1	1	1	1	1	4	5	6	6	6	5	5	5	5	5	4	4	2	1	1	1
Sunday	1	1	1	1	1	1	1	1	3	4	4	4	4	4	4	4	4	4	4	4	2	2	1	1

This table is then used to build graphs to give a demand curve, which can then be used to build proposed shift patterns to compare colleague availability against workload demand. Figure 14 below is an example graph for a Monday in the North operational area in Winter. It clearly shows how the total workload demand matches the line in the graph with resource deficit pre 07:00 and post 22:00.

Figure 14 - Trendlines for hourly FTE requirement for the North operational area on a Monday



2.4.4.2 Additional Resourcing for 12hr compliance

Further resource is required, above the [Redacted] claimed above to achieve 16hr compliance, as we move to manage fatigue to 12hr compliance. Using the average annual demand, by area, by hour of the day calculated in the section above the resourcing requirement for emergency, repair, support, maintenance, and site manager teams can be calculated.

Emergency response teams resourcing

[Redacted] resources were recruited at the beginning of GD2 form part of this reopener as they were not accounted for at the time of business plan submission in 2019. NGN have estimated the need to increase resourcing by [Redacted] to arrive at a total additional value of [Redacted] Emergency Engineers within NGN, allowing for anticipated new colleagues and improved productivity to efficiently achieve 12hr compliance. This is ultimately an embedded efficiency improvement by NGN as the calculated [Redacted] resources are above the [Redacted] already in place. The efficiency NGN are planning to deliver through effective productivity/people management amounts to a c£1.7m per annum reduction in reopener funding requirements and is a benefit to customers.

The following assumptions were used in calculating the FTE requirement:

- Work Categories used as 'core' Emergency work:-
- 1 & 2 Hour PREs (52%) & Rechecks (22%), Non-Emergency PREs (6%).
- Emergency Purge & Relights (7%), Customer Planned (2%), Survey (8%), Xoserve Driven (3%).
- 'Waiting Time'/Non-Productive Working Time has been embedded to reflect the fact that the vast majority of Emergency workload is reactive and non-planned and therefore a 100% productivity level is not achievable.
- Average Job Times for Emergency have been calculated using the time recorded in SAP, by area and specific to each job type (incl. Travel).
- Work and Travel time has been applied to all works specific to each region, this accounts for geographical benefits/challenges.

- All proposed shift patterns and resource requirements ensure that required capacity is at work to deal with PREs across a 24hr period. Working patterns are across core daylight hours to cover all other 'core' work types.
- The above resource requirement of [Redacted] additional Emergency Engineers is based upon [Redacted] additional resources required through the night in each of the 5 key regional areas of the Network (The North, Tees, Ridings, Central, West Yorkshire) whilst taking into account the ability to only work 1 in 4 nights and also the amount of non-productive time due to holidays, sickness and training/briefings.
- Areas – 5 Business Operational Lead areas stretching from Cumbria, the Scottish borders and down to the Humber and West Yorkshire regions.
- Resources per area based on 100% Nights – [Redacted]
- Resources per area based on only 1 in 4 Nights – [Redacted]
- Non-Productive adjustment (73% Productive) = [Redacted] Resources.

Table 15 - Emergency response team re-opener adjustment

2018/19 Prices						
Emergency (+32)	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource FTE	[Redacted]				[Redacted]	
(OPEX) New Resource £	[Redacted]				£1,774,971	£1,774,971
(OPEX) Vehicles - Running Costs & Depreciation)	[Redacted]				£256,942	£256,942
(OPEX) Tools & PPE	[Redacted]				£128,471	£128,471
(CAPEX) Vehicles	[Redacted]				£770,827	£770,827
Total	£0	£0	£0	£0	£2,931,212	£2,931,212
Opex Total	£0	£0	£0	£0	£2,160,385	£2,160,385
Capex Total	£0	£0	£0	£0	£770,827	£770,827

Repair teams resourcing

Despite not needing to respond to work in a similar timeframe to Emergency colleagues i.e. 1 hr and 2 hr PREs, Repair Teams are still active on the Network throughout the night to support PREs and other reactive Gas Emergency activities. The Repair community are currently 16hr compliant due to the modernisation of workforce throughout GD1 and GD2 (see Section 4) but 12hr breaches still occur so improved fatigue compliance will involve removal of standby throughout the evening, replaced by night resources who carry out Emergency support as party of core hours. The required [Redacted] additional teams already contains an optimal level of productivity because of ongoing productivity management. The performance levels used for Repair team requirement modelling has an embedded 20.1% productivity improvement (see Section 4.1) since GD1 and therefore equates to 6 teams less than the 33 that would have been required without optimal productivity. This embedded efficiency amounts to a c£0.8m per annum reduction in reopener and benefit to customers.

- For Repair demand, volumes have been rounded to nearest whole number (i.e. >0.5 = 1, <0.5 = 0).
- Average Job Times for Repair and associated capacity requirement have been calculated using the Productivity Reporting data for 2021.
- Work and Travel time has been applied to all works specific to each region, this accounts for geographical benefits/challenges.

- All proposed shift patterns and resource requirements ensure that required capacity is at work to deal with PREs across a 24hr period. Working patterns are across core daylight hours to cover all other 'core' work types.
- Areas – 5 Business Operational Lead areas stretching from Cumbria, the Scottish borders and down to the Humber and West Yorkshire regions.
- Resources per area based on 100% Nights – [Redacted]
- Resources per area based on only 1 in 4 Nights – [Redacted]
- Non-Productive adjustment (73% Productive) = [Redacted]

Table 16 - Repair team re-opener adjustment

2018/19 Prices						
Repair (+27 Teams)	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource (Teams)	[Redacted]				[Redacted]	
New Resource FTE	[Redacted]				[Redacted]	
(OPEX) New Resource £	[Redacted]				£2,601,542	£2,601,542
(OPEX) Vehicles - Running Costs & Depreciation)	[Redacted]				£252,928	£252,928
(OPEX) Tools & PPE	[Redacted]				£108,398	£108,398
(CAPEX) Vehicles	[Redacted]				£867,181	£867,181
Total	£0	£0	£0	£0	£3,830,048	£3,830,048
Opex Total	£0	£0	£0	£0	£2,962,867	£2,962,867
Capex Total	£0	£0	£0	£0	£867,181	£867,181

Support driver resourcing

NGN operates a ratio of [Redacted] support driver for every [Redacted] Repair Teams to provide the relevant support to ensure optimal productivity and efficient spend. This was applied consistently to this reopener arriving at [Redacted] additional support drivers for the [Redacted] teams.

Table 17 - Support driver re-opener adjustment

2018/19 Prices						
Support Drivers (+5)	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource FTE	[Redacted]				[Redacted]	
(OPEX) New Resource £	[Redacted]				£200,736	£200,736
(OPEX) Vehicles - Running Costs & Depreciation)	[Redacted]				£40,147	£40,147
(OPEX) Tools & PPE	[Redacted]				£20,074	£20,074
(CAPEX) Vehicles	[Redacted]				£120,442	£120,442
Total	£0	£0	£0	£0	£381,399	£381,399
Opex Total	£0	£0	£0	£0	£260,957	£260,957
Capex Total	£0	£0	£0	£0	£120,442	£120,442

Maintenance team resourcing

We have calculated that an additional [Redacted] FTE (Appendix - A6) are required for HSE compliance across the instrumentation, electrical, and mechanical maintenance teams. The following assumptions were used:

- All work has been to modelled for a work pattern and workforce that removes 12 and 16 hour working as well as 48hr WTR compliance.

- Work was split into geographical areas as well as key functions - Mechanical Maintenance, Instrumentation and Electrical.
- Modelling has been developed by calculating average annual demand, by area, by hour of the day using 'completed' NGN work data in SAP/S4 in 2023.
- This data was used at it involved a full completion of the AMP as well as NGNs new planning team which enabled improved work visibility and optimum work allocation.
- All works pre 08:00 and post 17:00 are assumed to currently covered by additional working hours/standby due to modernised patterns for Emergency & Repair not being as materially present in Maintenance.
- All proposed shift patterns and resource requirements ensure that required capacity is at work to deal with faults across a 24hr period. Working patterns are across core daylight hours to cover all other 'core' work types including Annual Maintenance Plan (AMP).

Table 18 - Maintenance team re-opener adjustment

2018/19 Prices						
Maintenance (+13)	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource FTE					[Redacted]	
New Resource £					£730,680	£730,680
Vehicles -Opex					£52,191	£52,191
Tools & PPE					£52,191	£52,191
Vehicles - Capex					£417,531	£417,531
Total	£0	£0	£0	£0	£1,252,594	£1,252,594
Opex Total	£0	£0	£0	£0	£835,063	£835,063
Capex Total	£0	£0	£0	£0	£417,531	£417,531

Site Manager resourcing

NGN operates a ratio of 1 Site Manager for every [Redacted] Repair Teams and 1 to [Redacted] in Maintenance to provide the supervisory support and leadership to ensure optimal productivity and efficient spend. This was applied consistently to this reopener arriving at [Redacted] additional Site Mangers in Total – [Redacted] for the [Redacted] Repair Teams and [Redacted] Support Drivers and [Redacted] for the [Redacted] Maintenance resource.

Table 19 - Site Manager re-opener adjustment

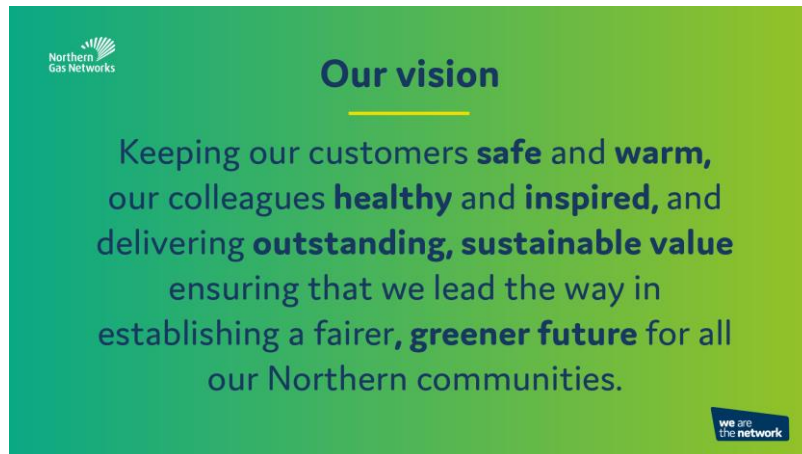
2018/19 Prices						
Site Managers (+8)	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource FTE					[Redacted]	
New Resource £					£513,885	£513,885
Vehicles -Opex					£0	£0
Tools & PPE					£0	£0
Vehicles - Capex						£0
Total	£0	£0	£0	£0	£513,885	£513,885
Opex Total	£0	£0	£0	£0	£513,885	£513,885
Capex Total	£0	£0	£0	£0	£0	£0

2.5 Alignment with overall business strategy and commitments

2.5.1 Alignment with NGN's RIIO-2 business plan and obligations

Through agreeing the proposed additional cost allocation, we will be able to deliver our legislative obligations. More specifically, we will be able to react in a safe, timely manner to repair/replacement jobs as the risk of shift worker fatigue will be mitigated. Everything we do is focused on our vision as set out in Figure 15 below.

Figure 15 – NGN's overall vision.



In order to provide a focus for our efforts as we work towards achieving our vision, we have identified four pillars, each of which is built upon the bedrock of our people and our genuine desire to deliver a safe, conscious and supportive working environment. These are safety, efficiency, customer and business integrity.

Safety

Safeguarding our colleagues, customers and the wider environment is an unshakable foundation of our business and we are dedicated to establishing the processes, practices and procedures that are necessary to ensure that everyone stays safe and, just as importantly, feels safe.

This is incredibly important to us so we work closely with our regulators - Ofgem and the Health & Safety Executive - to ensure we continue to outperform all our safety and environmental targets.

In summary, we promise to:

- Put safety before everything.
- Take steps to ensure that no-one goes home harmed.
- Make sure that customers and members of the public are protected from our works.

Efficiency

Ultimately, we are accountable to our customers because a percentage of your gas bill is allocated to us to pay for the services we provide. It's important therefore that we carefully balance our trailblazing vision with the need to establish responsible measures that are designed to ensure the service we provide is not just safe and reliable, but also affordable.

It simply isn't in our nature to waste our resources, our time and our money on ideas that don't significantly contribute to the success of our business, the security and wellbeing of our customers and people and, therefore, the success of our region and our local economy.

In summary, we promise to:

- Take steps to minimise inefficiency.
- Think smart and operate as effectively as possible.
- Manage our time: right person for the right job at the right time.

Customer

We have always aimed to deliver beyond expectations and to delight all our customers by taking to them regularly, listening to their views, ideas and needs, and positively acting upon what we've heard. This plays into the way that we go above and beyond to support vulnerable people across our region by working hard to better understand the impact of what we do through their eyes taking into account their individual circumstances and responding accordingly with sensitivity and a heartfelt desire to get it right for them.

As a direct result of all this, we are not only outperforming our sector, we're acknowledged as best in class in UK for achieving unprecedented levels of customer satisfaction. We love what we do and we don't exist win awards for our customer service but when we do, we're as proud as punch that our colleagues are recognised for their work and everything we achieve as a team. It means a lot to us but we don't rest on our laurels, we constantly strive to raise the bar even further.

In summary, we promise to:

- Provide the best possible customer experience.
- Go beyond customer expectations.
- Respond quickly if things go wrong, and take steps to put them right.

Business Integrity

We hold ourselves accountable for everything we do; indeed, this is a huge part of collective consciousness so we don't just talk about the ways in which we might deliver sustainable transformation, we actually do it.

We are reviewing and radically upgrading all our business systems to build a coherent and joined up framework of interlinked initiatives that will support the delivery of exciting, effective and efficient tools that will enable us to work in ways that are unprecedented for such a huge business with a workforce that is dispersed across many hundreds of miles.

Delivering our dream will ensure that we are able to operate in the most efficient way possible as well as opening the doors to new levels of doing business really well which will deliver a strong and respected business, delighted customers, a happy and fulfilled team and a sustainable future for all.

In summary, we promise to:

- Provide up to date and accurate data
- Be responsive when asked for data
- Be professional in all that we do (written, verbal, physical)

By providing sufficient funding for meeting the HSE policy legislation and mitigating the health and safety risks associated with shift working, we are in turn creating a better working environment for our employees, which will inevitably lead to better individual and business performance. Also, removing the risk of financial penalties from the HSE will enable NGN to re-invest more money into business improvement activities. Therefore, this will contribute to all four of our pillars above.

2.5.2 Alignment with Ofgem's strategy and priorities

The proposed cost allocation outlined in table 2 of this document will assist in the achievement of national net zero carbon targets by mitigating the gas leaks and system losses that are an endemic feature of distribution networks with ageing asset bases. The additional HSE policy allowance also contributes to Ofgem's priority of establishing an efficient, fair and flexible energy system. There is an opportunity for NGN and Ofgem to mutually benefit, where NGN will have greater resilience in response to leaks at those times, and Ofgem can initiate a proposal that will benefit NGN employees and their customers. Furthermore, through socialising these costs to gas consumers bills, it will remove the necessity for NGN to make difficult business decisions with regards to prioritising workloads, ensuring that current gas users are not impacted.

3 Detailed cost breakdown

This section details how the cost requirements have been developed for this re-opener submission and how they comply with the requirement of RIIO-GD2.

Costs for the HSE Policy Reopener submission are split into 4 key areas in the overview and total values below for each area of additional costs linked to 16hr and 12hr fatigue compliance:-

1. (Opex) New Resource £
2. (Opex) Vehicles - Running Costs & Depreciation)
3. (Opex) Tools & PPE
4. (Capex) Vehicles

NGN are requesting £16.214m (in cost base 2018/19) of Totex funding for remuneration of additional HSE Policy costs relating to 16hr and 12hr compliance incurred during the RIIO-GD2 period and projected additional costs for the remainder of RIIO-GD2. An overview of project cost is provided in table 20, in both 2023/24 and 2018/19 cost bases.

Table 20 - Overview of additional cost allocation for RIIO-GD2 (2023/24 Prices)

All in 2023/24 prices						
Total HSE Policy Reopener Summary	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource FTE	[Redacted]					
(OPEX) New Resource £	£552,644	£1,588,852	£1,588,852	£1,588,852	£8,839,428	£14,158,627
(OPEX) Vehicles - Running Costs & Depreciation)	£80,000	£230,000	£230,000	£230,000	£980,000	£1,750,000
(OPEX) Tools & PPE	£40,000	£115,000	£115,000	£115,000	£500,000	£885,000
(CAPEX) Vehicles	£240,000	£450,000	£0	£0	£2,710,000	£3,400,000
Total	£912,644	£2,383,852	£1,933,852	£1,933,852	£13,029,428	£20,193,627
Opex	£672,644	£1,933,852	£1,933,852	£1,933,852	£10,319,428	£16,793,627
Capex	£240,000	£450,000	£0	£0	£2,710,000	£3,400,000
TOTEX Total	£912,644	£2,383,852	£1,933,852	£1,933,852	£13,029,428	£20,193,627
Load Related Capex						
Non Load Capex	£240,000	£450,000	£0	£0	£2,710,000	£3,400,000
Business Support Opex						
Directs Opex	£672,644	£1,933,852	£1,933,852	£1,933,852	£10,319,428	£16,793,627
Repex						
TOTEX	£912,644	£2,383,852	£1,933,852	£1,933,852	£13,029,428	£20,193,627

Table 21 - Overview of additional cost allocation for RIIO-GD2 (2018/19 Prices)

2018/19 Prices						
Total HSE Policy Reopener Summary	2021/22	2022/23	2023/24	2024/25	2025/26	GD2 Total
New Resource FTE	[Redacted]					
(OPEX) New Resource £	£443,743	£1,275,761	£1,275,761	£1,275,761	£7,097,575	£11,368,600
(OPEX) Vehicles - Running Costs & Depreciation)	£64,236	£184,677	£184,677	£184,677	£786,886	£1,405,154
(OPEX) Tools & PPE	£32,118	£92,339	£92,339	£92,339	£401,473	£710,606
(CAPEX) Vehicles	£192,707	£361,325	£0	£0	£2,175,981	£2,730,013
Total	£732,803	£1,914,102	£1,552,777	£1,552,777	£10,461,915	£16,214,373
Opex Total	£540,096	£1,552,777	£1,552,777	£1,552,777	£8,285,934	£13,484,360
Capex Total	£192,707	£361,325	£0	£0	£2,175,981	£2,730,013
TOTEX Total	£732,803	£1,914,102	£1,552,777	£1,552,777	£10,461,915	£16,214,373
Load Related Capex						
Non Load Capex	£192,707	£361,325	£0	£0	£2,175,981	£2,730,013
Business Support Opex						
Directs Opex	£540,096	£1,552,777	£1,552,777	£1,552,777	£8,285,934	£13,484,360
Repex						
TOTEX	£732,803	£1,914,102	£1,552,777	£1,552,777	£10,461,915	£16,214,373

4 Justification of Costs

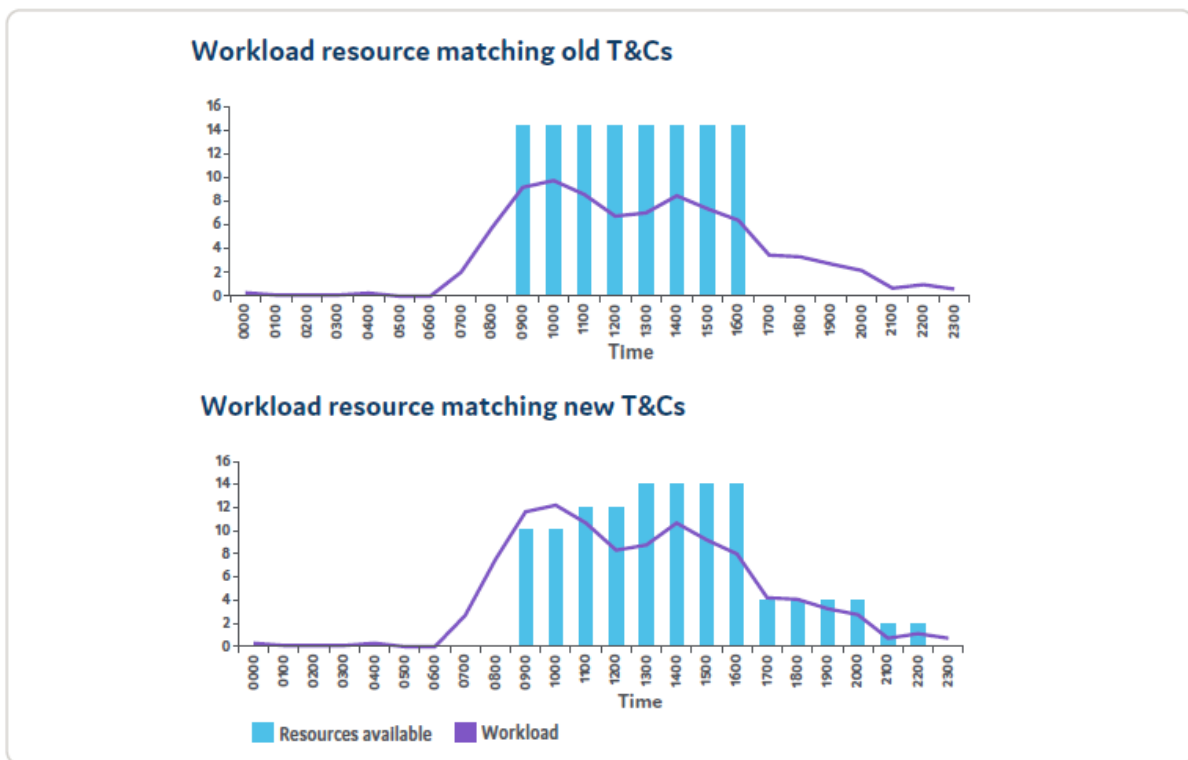
NGN transformed its workforce in GD1 by direct funding of circa. £30m from shareholders outside of regulatory funding. This investment facilitated a reduction in average age of the workforce from 48 to 38 (now 36 in 23/24) via an over-55s retirement programme.

New Terms and Conditions were rolled out for current employees and new starters which were market led and reflected the skill levels required in the business to deliver frontier performance for customers.

As of 2023/24 82% of operational colleagues are on new terms and conditions which include incentivisation linked to regulatory framework performance commitments.

Modernisation of our workforce has improved efficiency by extending ‘normal’ working hours to between 07:00 and 22:00 across all seven days of the week, reducing extended working hours (overtime), providing greater opportunity to manage fatigue and reduce cost to the customer.

Figure 16 - Comparison of old T&Cs and new T&Cs for work load v available resource



The resulting overtime benefit because of the modernisation of workforce and removal of premium hours for most of the resource on weekends and weekday evenings amounts to a c60% reduction in overtime hours and a circa. £4m per annum (2018/19 prices) benefit for customers compared to legacy contracted workforce.

This investment has not been claimed as part of any reopener and is not requested as part of this reopener but should be considered in the wider GDN submissions as part of fatigue as NGN have made this investment to benefit customers and modernise to drive efficiency and manage fatigue by reducing hours through contract/workforce modernisation and not just through extra resource.

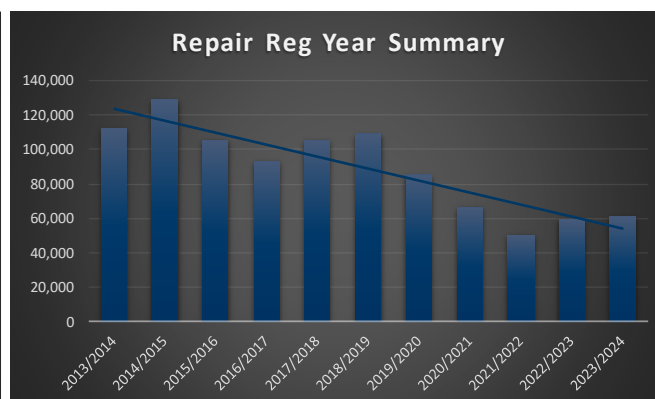
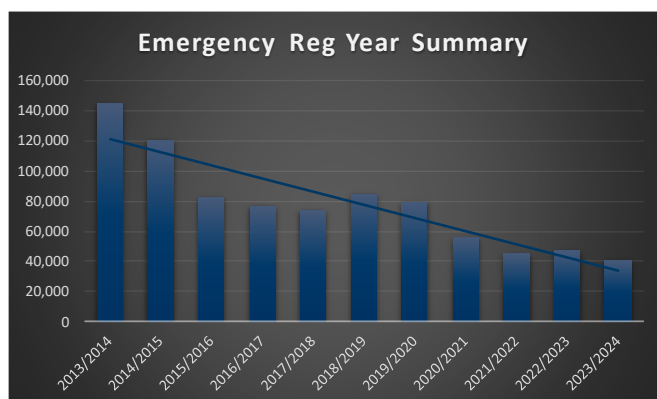
In summary, NGN have a workforce on modernised T&C's that have reduced fatigue, working hours and costs to the customer and these are the basis of which this reopener application are submitted. Previous expenditure to arrive at this position (i.e. implementation of modern T&C's and associated investment) is not being claimed with costs only linked to a modern, efficient, productivity led workforce which is covered further in section 4.1.

4.1 Efficiency and Productivity

Due to the modernisation of NGN's workforce following £30m of shareholder investment outside of regulatory funding, NGN have reduced working hours and compliance with fatigue through the ability to resource more hours of the day within existing core hours.

This has had a significant benefit on overtime hours (Appendix A7) as the population of colleagues on modern T&C's has increased. A reduction of 155,023 (60%) overtime hours has been delivered between 2013/14 and 2023/24 in Emergency and Repair which account for 90% of all overtime hours worked by industrial colleagues.

Overtime Hours	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024
Emergency	144,578	120,040	82,556	76,938	73,624	84,256	79,267	56,121	45,123	46,684	40,606
Repair	112,129	128,944	105,413	92,815	105,512	109,538	85,769	66,434	50,350	59,808	61,079
Grand Total	256,708	248,984	187,969	169,753	179,136	193,795	165,036	122,555	95,473	106,492	101,685



As well as the significant overtime reduction as part of T&C's modernisation, NGN have also embedded robust productivity metrics. As a result of S4 HANA implementation in 2019 (GD1) NGN have developed a productivity model that allows all Industrial colleagues time and outputs to be measured on a weekly basis against target(s) using field captured data.

In 2020 we developed the modelling using actual system data capturing timesheet data captured in real-time in the field against activity (REP FIELD) and outputs (completed jobs).

- Timesheet Data – Extracted from SAP on a weekly basis for all Team Leaders (via SAP Analysis For Office)
- Productive Time (normal & overtime) against In Scope / Out of Scope work by Rep Field
- Non-productive time against specific jobs by Rep Field
- Productive and Non-productive time that is not categorised to a work type
- Non-working time (Holidays, sickness etc)
- Workload Data – Extracted from SAP on a weekly basis for all Team Leaders (via SAP Analysis For Office)
- Completed work orders by individual and Rep Field for all completed work registered in that given period

Repair Teams were the first tranche of productivity that was monitored with 2020 providing the initial benchmark. Weekly meetings with site managers took place to embed productivity management and refine the

metrics and visuals used. These sessions led to refinement of the Management Information and a forum from which to challenge and review, ultimately improving performance of the workforce in the field.

At end of 2023 productivity has improved by 20.1% across Repair Teams, 22.3% across the top 9 activities accounting for 90% of all time spent completing activities in the network.

Table 22 - Analysis of changes in productivity by job type

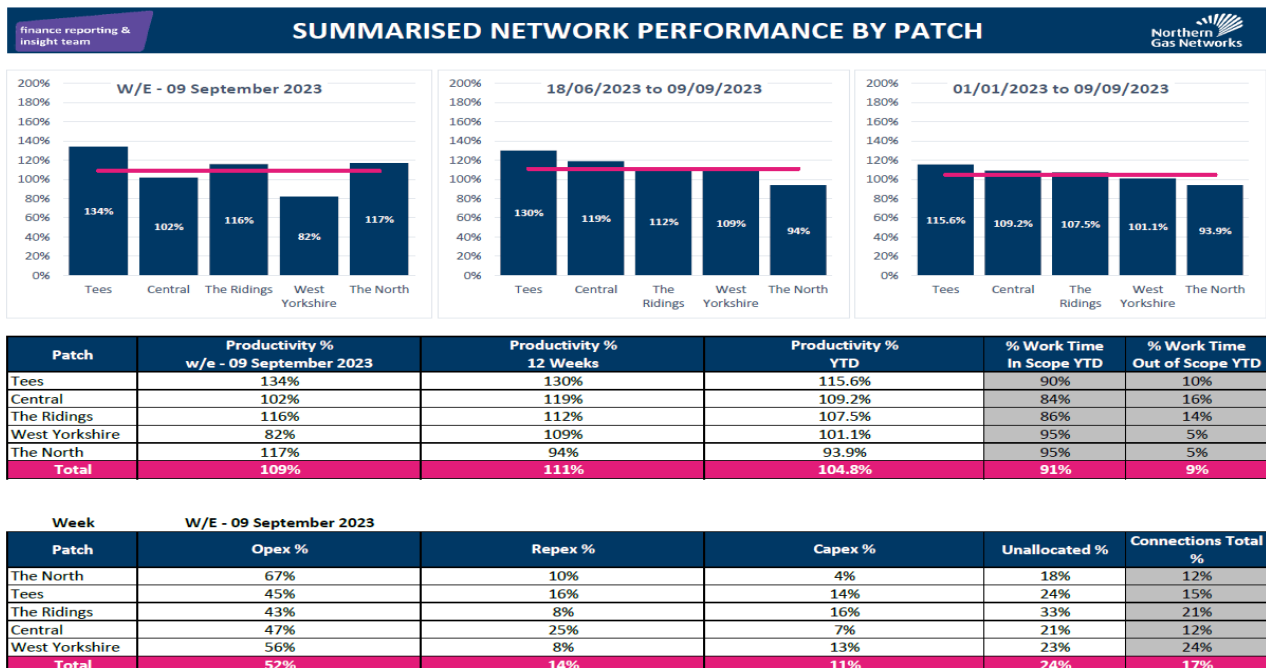
PMA	Description	Count	% of Timesheet for Repair Teams in Jan-Dec 2020	Cumulative %	Network Ave. 2020	Network Ave. 2023	Variance (Hours)	%	2023 Jobs	Total Time @ 2020	Total Time @ 2023	Variance (Hours)
116	Escape Repair Main	1	44.20%	44%	17.1	12.8	4.3	25.0%	6,101	104,312	78,250	26,062
117	Escape Repair Service	2	25.27%	69%	13.9	8.9	5.0	36.2%	5,741	79,738	50,875	28,863
157	Escape Follow Up Work	3	8.31%	78%	4.6	4.2	0.4	8.6%	6,192	28,290	25,850	2,440
101	Dom Rel After Gas Esc LP	4	3.59%	81%	3.6	3.0	0.6	16.7%	2,569	9,178	7,642	1,536
126	Service Disconnect (GSR)	5	2.34%	84%	3.5	5.2	-1.7	-47.2%	1,695	6,004	8,840	-2,837
104	Service Relay Policy SD	6	1.95%	86%	5.8	7.3	-1.5	-26.3%	553	3,196	4,036	-840
137	MO - Mains Identification	7	1.57%	87%	2.7	3.2	-0.6	-20.6%	349	939	1,132	-193
131	MO DR4 Investigations	8	1.41%	89%	8.9	9.4	-0.6	-6.6%	835	7,393	7,881	-488
108	Relay BO Domestic	9	1.31%	90%	8.2	9.0	-0.8	-9.8%	428	3,515	3,860	-344
							22.3%		24,463	242,563	188,365	54,199

An overview of the productivity metrics are provided in Appendix A5 - Productivity Summary for HSE Policy Reopener (2020 - 2023) and an extract of part of the internal weekly metrics are shown below in Table 23. Please note that productivity targets are increased every year to challenge annual improvements and target year-on-year improvements.

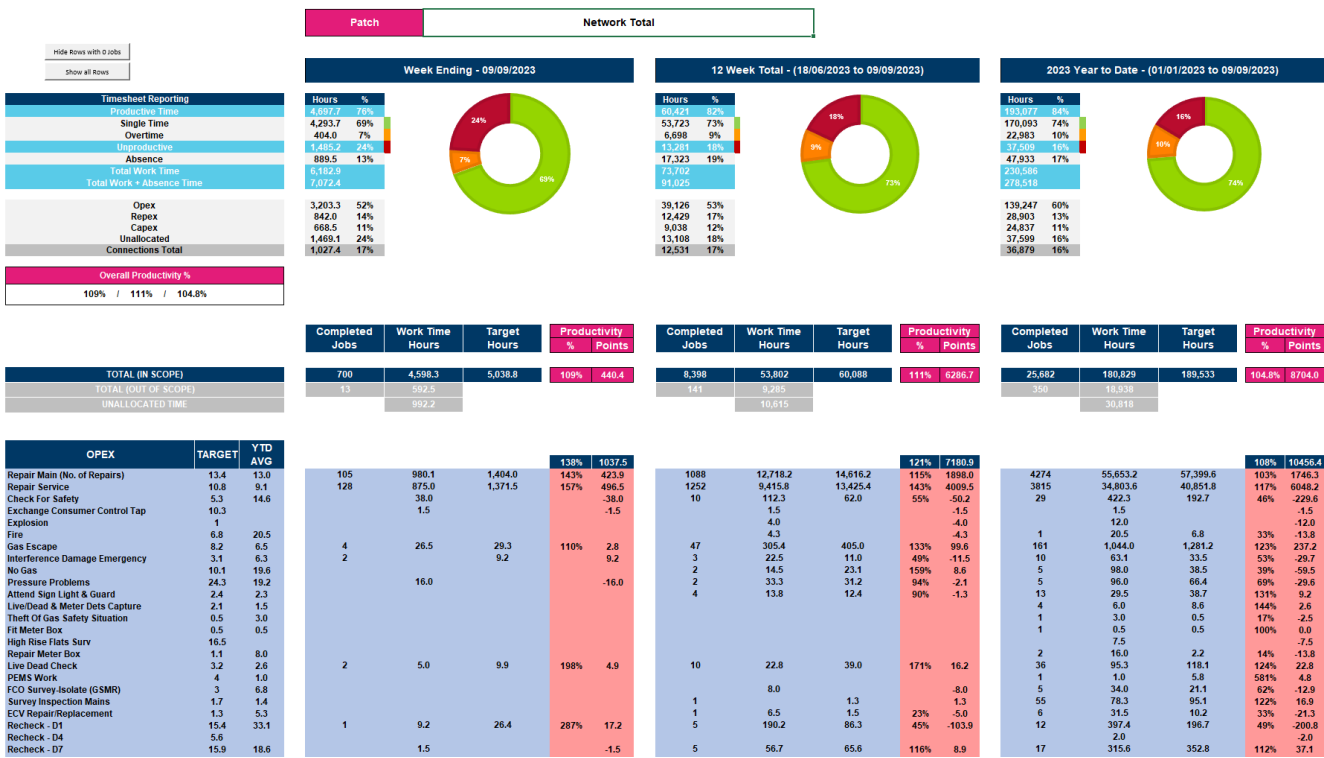
Alongside this there is a dashboard for each colleague that can be used for coaching and guidance as well as performance management.

This 20.1% increase delivered in productivity equates to 53 Repair teams and has been embedded into the reopener application as an efficiency, resulting in the re-opener application being 53 teams more than if productivity had not been measured and maximised. This equates to £4.6m TOTEX in 2018/19 prices (£3.6m Opex, £1.0m Capex) of efficiency savings per annum as part of the submission due to NGN driving optimum productivity on a weekly basis with full visibility of workforce capacity and utilisation.

Table 23 - Example of the productivity dashboards



NGN PRODUCTIVITY TRACKER



What NGN are not submitting as part of this reopener application

NGNs reopener submission for HSE policy is fully linked to additional resources to achieve 16hr compliance ([Redacted] Emergency Engineers already recruited and in place in GD2 and future recruitment to achieve 12hr compliance). Associated costs such as capital purchase of vehicles as well as running costs and Tools/PPE to enable colleague to carry out their duties are also included. However, NGN are not claiming any costs for IT changes, increase in licences or additional IT equipment for new colleagues as we would look to leverage our existing assets and leverage our commercial arrangements with software providers instead of passing these costs on to customers.

The changes to fatigue have also led to increase volume of risk assessments which involve increased time from management previously not experienced to these levels. We understand the need for increased risk assessments as part of the fatigue management best practice but consider this a duty of NGN and have not included any additional costs for risk management assessments in this reopener.

We plan to minimise the impact of additional risk assessments requirements by utilising S4 HANA and our wider IT portfolio to automate visibility of fatigue and working hours so that KPIs are embedded and proactively managed via systems to minimize time spent by management in this area.

In this reopener there has been reference to significant modelling and analysis which has been undertaken often involving third party external consultants and professionals. NGN are not looking to recover these cost as we consider this is a core responsibility of the employer and care for colleagues. The associated research and development costs of our fatigue strategy have not been included for socialising to the customer.

The changes to fatigue have also led to increase volume of risk assessments which involve increased time from management previously not experienced to these levels. We understand the need for increased risk assessments



as part of the fatigue management best practice but consider this a duty of NGN and have not included any additional costs for risk management assessments in this reopener.

NGN have also recruited a dedicated Human Factors specialist in GD2 which was not part of our GD2 plan. This role has been pivotal in our understanding of fatigue as well as our management of fatigue and our associated fatigue strategy into GD3. The cost of this role has not been included in this reopener as NGN see it as a key business role and core to how we want to manage fatigue and wellbeing of colleagues.

4.2 Regulatory treatment of funding

This application is necessary under Special Condition 3.17 HSE policy Re-opener⁴ as the changes to requirements have caused NGN's Licenced Activity and costs to increase during the RIIO-2 Price Control Period. There are several available approaches to Regulatory Treatment of Funding for the project. The table below summarises the potential options and their relative strengths and weaknesses.

Funding Mechanism	Pros	Cons
Ex-Ante Allowance (Additional TOTEX) Preferred Approach	<ul style="list-style-type: none"> • Clear allowance based on forecasts. • Simple / low regulatory burden. • Incentive to outperform cost forecasts and share benefit with customers through the Totex Incentive Mechanism (TIM). • Network is liable for ~50% of any overspend based on RIIO-2 TIM factors, which shares the risk between customers and networks. 	<ul style="list-style-type: none"> • Partial protection for customers and networks from uncertainty in forecasts. • Not ringfenced / no mechanism to claw back if underspend beyond TIM.
Use It Or Lose It (UIOLI)	<ul style="list-style-type: none"> • Accounts for Cost Uncertainties. • Flexible Mechanism. • Low Regulatory Burden. • Customer gets all of underspend back. 	<ul style="list-style-type: none"> • Lack of incentive to outperform costs / drive efficiencies. • Network liable for any overspend, may encourage conservative cost forecasts.
Actual Cost Recovery (Pass Through)	<ul style="list-style-type: none"> • Accounts for Cost Uncertainties. • Flexible Mechanism. • Low Regulatory Burden. • Customer only pays for actual costs incurred. 	<ul style="list-style-type: none"> • Lack of incentive to outperform costs / drive efficiencies. • Open ended risk to customers for overspend.
Price Control Deliverable	<ul style="list-style-type: none"> • Unused allowances automatically returned to customers. • Specific deliverables linked to funding. 	<ul style="list-style-type: none"> • Lack of incentive to outperform costs / drive efficiencies. • Network liable for any overspend, may encourage conservative cost forecasts.

⁴ Ofgem, "Northern Gas Networks Limited Gas Transporter Licence Special Conditions," 2024

Volume Driver		<ul style="list-style-type: none"> Requirement to demonstrate deliverables increase regulatory burden, plus challenges in measurement.
	<ul style="list-style-type: none"> Not appropriate in this case, due to discrete large-scale project. 	<ul style="list-style-type: none"> No unit cost / standardised variable volume.
Delay to next price control	<ul style="list-style-type: none"> No bill impact in GD2. 	<ul style="list-style-type: none"> Against GD2 / net zero commitments/ ambitions. Risks delay, increasing net zero costs for industry / UK as per needs case and CBA.

Table 21 Description of the different funding mechanisms and their suitability to fund this project

NGN support the selection of the most appropriate and least burdensome way to approach regulatory treatment of funding for the re-opener adjustment, which provides value for money to consumers. The approach should fairly share the risks between the network and consumers, whilst incentivising efficient delivery. Given the unprecedented nature of the HSE compliance, NGN’s preferred approach is to fund deficit via additional totex allowance.

Should HSE Fatigue Management compliance cost less than forecast, customers benefit from the return of funding via the Total Incentive Mechanism (TIM). Should there be overspend, NGN will be liable for funding their proportion of the TIM, currently approximately 50% at RIIO-2. This approach has the advantage of fairly sharing risks between customers and networks and sharing costs between customers over time due to the partial capitalisation of costs through the Totex revenue mechanism and regulatory asset value. NGN must demonstrate that the programme of works has been efficiently delivered on its objectives at closeout and Ofgem could recover costs if that wasn’t the case. This ensures that customers are adequately protected. Ex-Ante is the most appropriate and fair regulatory treatment of funding for consumers, therefore NGN propose this approach should be used.

5 Cost Benefit Analysis (CBA)

A conventional CBA has not been completed for the HSE Policy reopener due to its nature and this approach was confirmed with Ofgem on a bilateral on 6th September 2024. Instead a narrative detailing the iterative process that arrived at the preferred solution iterations is provided to illustrate the importance of the additional funding requirement.

Initially, internal options were explored to reorganise our existing workforce to cover 24/7 on rostered shifts to provide greater control and certainty of working hours, however this wasn't accepted by the trade union.

Next, a joint working group developed a range of internal options to consider including; permanent night shift; all colleagues rostered to work nights on minimal frequency; various shift patterns and shift duration options to optimise resource fit with workload, sociability of pattern and ability to address fatigue risk. Separately as the discussions became problematic other options considered included; outsourcing; mass recruitment; and phased recruitment and turnover (replacement currently very low at 2.75% per annum).

Finally, using available historic data, we were able to build an hourly average workload profile for each operational area and account for the seasonal variance of workload. This process was repeated for each role and job type enabling us to calculate the necessary FTE resourcing we need to meet the HSE legislation for 12hr shift working by the end of GD2.

6 Stakeholder engagement and whole system opportunities

HSE have been engaged throughout our refinement of the preferred option. Since the HSE first raised fatigue as a risk to address, there have been regular stakeholder meetings and updates to ensure the options being considered and actions being taken were in line with their expectations, guidelines, and appropriate legislation.

Trades unions – the GMB were engaged early in the consultation process and subsequently the negotiations to identify and explore options. However, the expectations and demands of the trade's union for improved terms and conditions were deemed excessive c£28m on cost and without merit beyond the material offers that were made by NGN and rejected.

Colleagues – were kept informed of progress and as part of that consultation a significant proportion of colleagues made it clear that they were not in favour of working scheduled nights even with the monetary offer on the table worth approximately £5m.

Other networks were consulted to establish benchmark our terms and conditions to ensure we remained competitive and fair to colleagues. This stakeholder engagement may be limited to those categories of stakeholder who are materially impacted by the choice of preferred option. Where there are opportunities to collaborate with other networks on whole system issues, this must be reflected in the analysis and evidence provided.

7 Appendices

Appendix number	Appendix title	Description
A1	Presentation to NGN Directors for [Redacted] Additional Emergency Resources (2020) - Reopener Submission	This presentation was the output of analysis completed to model the required resources needed for NGN to progress to 16hr compliance and improve resilience to maintain 1hr and 2hr PRE compliance in extreme weather conditions.
A2	Detailed Workload Data	The 8 files in this appendix which cover the detailed workload data extracts from NGN SAP system over a 5 year period (2014 – 2019). The 8 files provide sub-area granularity and a summarised total file which were used to arrive at resource demands across a 24hr period throughout a typical calendar year. Each file shows the detailed work for that area and then categorises the work by hour of day, day of week and month.
A3	Workload Profile Graphs (Emergency)	The 7 files in this appendix graphing the demand output from the detailed Workload data to show demand curves/resource requirements over a 24-hour period across a 7 day calendar week. These graphs demonstrate the Emergency resourcing gaps present in NGN that are required to be filled through additional resource covering 22:00- 07:00.
A4	Workload Profile Graphs (Repair)	The 7 files in this appendix graphing the demand output from the detailed Workload data to show demand curves/resource requirements over a 24 hour period across a 7 day calendar week. These graphs demonstrate the Repair Team resourcing gaps present in NGN that are required to be filled through additional resource covering 22:00- 07:00.
A5	Productivity Summary for HSE Policy Reopener (2020 - 2023)	This file provides an output summary of Repair Productivity metrics from 2020 and 2023 demonstrating the step-change in productivity of 20.1% in Repair Team outputs following implementation of S4 HANA in GD1 and productivity modelling/metrics embedded. The data shows time sheeted hours against all activities measured with the top 9, which account for 80% of all productive time separated at the top. Workload output (completed jobs) for each of the years is shown and the Network Ave. for 2020 and 2023.
A6	Maintenance - Fault Workings and Resourcing Requirements - HSE Policy Reopener Submission	This file provides an extract of system-based data of Maintenance workload for 20018 to 2024 with categorisation of work by month, day, time, location, priority status, work stream and Network patch. This data is then summarised in a Pivot table 'Pivot' tab to show work that is outside of normal working hours i.e. driving additional OT hours through extended working and/or standby callout. The total hours required are then calculated based on resource (individual technician or Team of 2) as well as the average time taken for a task to be completed using productivity data for the full 12 months of 2023. Colleague working hours have then been adjusted for sickness and holidays (15%) as well as fatigue requirements of nighttime working (max 40%) to arrive at an amount of hours that 1 additional recruited colleague can fill. This then provides the volume of resources needed to meet the required hours currently filled by additional working hours and comply with 12hr.
A7	A7 - Overtime Summary for HSE Policy Reopener (2013-14 to 2023-24)	This file provides a summary of NGN's overtime hours (Emergency & Repair) for industrial colleagues over the period 2013/14 to 2023/24 by regulatory year. This table and graphical summary on the Summary tab evidence the benefits/efficiencies made following NGN's shareholder investment of £30m in modernisation of T&C's with a 60% reduction in overtime hours over the 10 year period. The source data was extracted from SAP and is provided in the 'Data' tab (employee details redacted)