Guidance on Delivering Water Sufficiency in England and Wales for Public Supplies

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Executive Summary
Guidance on Delivering Water Sufficiency using the Drinking Water Safety Planning (DWSP) approach

Background

The Drinking Water Inspectorate's research and reviews have concluded that a systems approach to considering supply risks is essential, with sufficiency serving as a practical indicator for both resilience and asset health. This also aligns with World Health Organization's (WHO) recognition of water sufficiency as a public health factor Guidelines for drinking water quality.

The Inspectorate published Guidance on risk assessment and risk management specific to drinking water safety plans (DWSPs) in June 2025 following over a decade of iterative progress in implementation of the water safety planning concept across the water industry. This guidance is an operational continuation of the DWSP process to integrate the causes and risks of insufficient water supply.

Implementation Plan

The Inspectorate supports the principles of, clear definitions, risk assessment planning, collection of empirical data, measurable outcomes, event conditions, consumer validation and regulatory reporting. The Inspectorate will work further with water companies and other relevant stakeholders including regulators during 2026 on the development of sufficiency risk assessments and reporting pathway alongside the well-established risk assessment and risk management framework for drinking water risks required by regulations 27 and 28 of the Water Supply (Water Quality) Regulations 2016 (2018 in Wales) ('the Regulations'). This guidance represents an approach that will provide a robust framework for future refinements and also allow scope for additional mechanisms to be incorporated such as for example asset condition assessments, asset resilience targeting and investment prioritisation.

The Inspectorate's expectation is for water companies to be able to submit information on sufficiency risk within their risk assessment reports under regulation 28 of the Regulations to the Inspectorate by 1 October 2027, however a first iteration of this data may be made available earlier with a trial submission planned for March 2027. Initial reports will be submitted via a structured template in the appendices of this guidance. The risk assessment reported data and analyses of the data will show

the water industry's gaps in sufficiency and therefore resilience weakness points and where water companies should be prioritising efficient investments into the risk of sufficiency. This is covered by the water sufficiency and resilience planning stages in section 4 of this guidance.

The outcome of the sufficiency assessments should allow companies to identify risks of insufficiency and therefore efficiently structure prioritised and well evidenced investments for asset improvements and other mitigating actions in accordance with a drinking water safety planning methodology that includes a water quantity assessment as described by the WHO in the Water Safety Planning Manual.

Any queries relating to this guidance document should be addressed to dwi.enquiries@defra.gov.uk.

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Abbreviations

DWSP: Drinking water safety plan

WHO: World Health Organization

WIA: Water Industry Act 1991

Glossary of Terms

Adequate quantity and pressure	A minimum flow of 9 L/min[1] at a pressure of at least 7 metres head (0.7 bar)[2] at the boundary stop tap of property.
Asset	An item, thing or entity that has potential or actual value to an organisation such as an individual water main or a pump, or a necessary component part of a process. This term may also be used at a higher level to refer to part of a supply system at a specific stage for example, a service reservoir or treatment works.
Asset condition	The measure of the state of a particular asset at fixed point in time.
Asset failure	The failure of an asset to function as required for example, burst, collapse, lack of treatment or transfer capacity.
Asset health	Asset health is an indicator of a company's ability to continue to perform its functions for the benefit of customers, the environment and wider society now and in the future. Poor asset health is when assets are allowed to deteriorate to a point where the risk of failures exceeds the company's risk tolerance. The health of companies' assets is a crucial element of achieving resilience in the water sector.
Asset life	Period from asset creation to asset end-of-life.
Asset management plan	The high-level principles and requirements by which the organisation manages its assets.

[1] What is the minimum water pressure that a water supplier must supply?

[2] The-guaranteed-standards-scheme-GSS-summary-of-standards-and-conditions-June-2026.pdf

Carried forward risk	A risk that is brought forward from the upstream supply system stage. The risk may inform the downstream risk assessment where further information is available or be maintained through the supply system where there is no further information.
Company	The term is used within this document to represent a water undertaker or wholesale licensee.
Component	A distinct part or element of a larger asset that contributes to that asset's ability to function, and which may have its own maintenance needs, life cycle, value, and risk profile.
Continuous supply	A 'continuous' supply must be uninterrupted, unless the outage is planned and appropriately notified to the consumer for the purposes of carrying out necessary works as defined as per section 60(1) WIA 1991.
Control or counter measure/mitigation	An activity or process to prevent, eliminate or reduce the risk of a hazard or hazardous event to an acceptable level.
Criticality	A measure of the degree of dependency on an asset where failure of the asset directly impacts the sufficiency of supply of safe drinking water. This has been scored for assets at specific stages in Appendix 5.
Domestic purpose	The drinking, washing, cooking, central heating, and sanitary purposes for which water supplied to those premises may be used. As per section 218(1) WIA 1991.
Drinking water safety plan	A proactive risk assessment and risk management approach to help ensure drinking-water safety, encompassing the entire drinking water supply, from catchment to consumer.
Headroom	Headroom is defined as the available margin or additional capacity within a system that allows it to operate effectively before reaching its maximum limits. It is the buffer zone that accommodates variability, spikes in demand, or unexpected demand without compromising stability.
Impact	The duration, number and type of consumers without piped water supply.

Power resilience	Where power resilience is required, this is defined as not being solely on mains power. This might be the ability to bring temporary power to the site within a certain time period. However, this should be documented through a power plan specific to the site. This could be incorporated in the site operating manual for example.
Risk	The product of the likelihood of occurrence of a hazard or hazardous event and its severity (or consequences).
Risk assessment	An evaluation of the significance of a combination of hazards and hazardous events.
Sufficient supply	A continuous delivery of wholesome water in adequate quantity, pressure, and quality to meet all domestic purposes.

1. Foreword

1.1. The Challenge

1.1.1. Supply systems are complex in nature with resilience coming in different forms depending on the system. Some systems have multiple standby redundancy in terms of treatment works or storage reservoirs, others have wider system redundancy, for example the opportunity to rezone parts of a water supply network from another area. Other systems however cannot be rezoned and are considered 'Island Zones' where alternative methods of supplying drinking water must be built into contingency plans to secure supply.

1.1.2. The Inspectorate's view is that a systems approach is needed to identify critical systems in water supply and understand sufficiency risks. In measuring the criticality of systems, a measurement of sufficiency was most indicative of the impact to consumers. Therefore, in this case the proposal of sufficiency is an indirect indicator of asset health and resilience. Resilience and sufficiency are interdependent, there will be scenarios where there is resilience in company assets, but the water resource is not available for use.

1.1.3. The World Health Organization (WHO) Guidelines for drinking water quality identifies quantity as being an important influence on health[3]. The WHO considers that access to less than 50 litres of water per person per day (L/p/d) is likely to produce medium levels of health concerns, increasing to high-risk concerns at less than 20 L/p/d – Table 5.1 Summary of water access, adequacy and level of health concern, Guidelines for drinking-water quality: Fourth edition incorporating the first and second addenda.

1.2. The Research

1.2.1. To help inform our approach to sufficiency risk assessments, the Inspectorate commissioned an independent research project on water sufficiency. Entitled Resilience and sufficiency in public water supply, which is published alongside this guidance. The Inspectorate also engaged with the water industry on existing data for 'No Supply' risk assessments within companies' drinking water safety plans (DWSP).

1.2.2. Whilst many definitions and models have been published regarding resilience, robustness, and efficiency of water supply systems, it became evident that there was no consensus on definitions, methodologies and monitoring to ensure a sufficient supply. (Page 77 Table 5.1 resilience and sufficiency in public water supply, provides *A Summary of Indicators and Metrics* for consideration).

1.3. The Legal Context

1.3.1. In England and Wales section 37 of the Water Industry Act 1991(WIA) requires licensed water companies to ensure the demand for water is met.

1.3.2. Section 41 of the WIA imposes a duty on water companies to provide water mains for providing supplies that are sufficient for domestic purposes.

1.3.3. Section 52 of the WIA, requires water companies to supply households with water as is sufficient for domestic purposes.[4]

[3] WHO Guidelines for Drinking Water Quality – World Health Organization Guidelines for Drinking Water Quality

[4] Water Industry Act 1991, section 52.

1.3.4. Under the requirements of the Security and Emergency Measures Direction 2022 (as amended)[5] water companies are required to continue to exercise their water supply functions during a civil emergency.

1.3.5. In accordance with section 202[6] of the WIA, water companies must furnish the Secretary of State with information as required under the Water Industry (Suppliers' Information) Direction.[7]

2. Drinking Water Inspectorate Response to Sufficiency Risks

2.1. Establish regulatory philosophy and function

2.1.1. To respond to sufficiency risks, the Inspectorate has conducted analysis and research and developed a framework to assess sufficiency risk. This guidance has also been designed using current water quality regulatory core principles and purposes, such as:

- Clear definitions
- Risk assessment planning
- Measurable outcomes
- Collection of empirical data
- Defined event conditions
- Consumer validation
- Regulatory reporting

2.1.2. This guidance will work alongside the Inspectorate's existing regulatory systems assisting its audit and regulatory functions. See Appendix 2 – *Sufficiency framework*.

[5] The Security and Emergency Measures (Water and Sewerage Undertakers and Water Supply Licensees) Direction 2022

[6] WIA Section 202

[7] The Water Industry (Suppliers' Information) Direction 2024

2.2. Defining a Sufficient Supply

2.2.1. Everybody must have access to a sufficient water supply, that supply being wholesome and not a danger to their health.

2.2.2. The Inspectorate's analysis and conclusions consider that defining and implementing an operational approach for a 'sufficient water supply' would cover key gaps identified relating to sufficiency while benefitting wider resilience. By assessing lack of sufficiency as a risk, companies should then make consideration for peak demands, criticality of assets and asset health. In doing so the resilience of supply systems will improve.

2.2.3. The aim of these definitions is to ensure companies plan and prepare in a systematic way to ultimately achieve accessible wholesome water at all times, with sufficient flow and pressure to provide for domestic purposes which includes for common water appliances and heating needs. Section 218(1) WIA[8] defines domestic use as, *'the drinking, washing, cooking, central heating and sanitary purposes for which water supplied to those premises may be used*'.

2.2.4. For the purposes of this guidance, the Inspectorate defines a ***sufficient supply*** as, '*continuous delivery of wholesome drinking water in adequate quantity and pressure to meet all domestic purposes.'*

2.2.5. In the above definition:

2.2.6. a '***continuous***' supply means uninterrupted, unless the outage is planned and appropriately notified to the consumer for the purposes of carrying out necessary works as defined by section 60(1) WIA.

2.2.7. ***'adequate quantity and pressure,'*** means a minimum flow of 9 litres per minute (L/min)[9] at a pressure of at least 7 metres head (7 mH, or 0.7 bar)[10] at the boundary stop tap to the property. For clarity, the provision of a 'non-piped' supply such as bottled alternative water supplies (AWS) does not meet the definition of a sufficient water supply.

[8] Water Industry Act 1991

[9] What is the minimum water pressure that a water supplier must supply?

[10] The-guaranteed-standards-scheme-GSS-summary-of-standards-and-conditions-June-2026.pdf

2.3. Water Sufficiency in Drinking Water Safety Planning

2.3.1. To meet the definition of sufficiency as defined in this guidance, the Inspectorate expects companies to use this guidance to conduct risk assessments in a similar approach to the recognised risk assessment and management methodology of drinking water safety plans for water quality, which encompasses whole supply systems, source to tap. Sufficiency is already described as a hazard by the WHO (detailed as a quantity risk), and the Inspectorate continues to endorse the WHO WSP Manual[11]. Sufficiency risk directly links to resilience as an outcome of how resilient a water supply system and the components of the system can be assessed for probability of failure. Failure of upstream processes in a system affect downstream sufficiency so it is important to look at consequences carrying risk over to the next stage of a system. This guidance uses the same approach as drinking water safety planning in applying steps to take in the process of assessing sufficiency in a drinking water supply system. The risk assessment methodology uses a single stage process for scoring and categorising risks considering any mitigation already in place. This is slightly different to the DWSP process that companies use for risk assessment for water quality, which is a dual stage process assessing the risk scores before and after mitigation is in place.

3. Drinking water sufficiency planning stages

Stage 1 – Establishing responsible teams with the relevant knowledge and skills

3.1. Companies should refer to the Guidance on risk assessment and risk management specific to drinking water safety plans (DWSPs) published by the Inspectorate in June 2025 to have an understanding of the stages and risk assessment process described in section 1 'WHO steps for water safety planning'.

3.2. Companies are expected to identify people within their organisations who have the relevant skills and knowledge to contribute to risk assessment of

[11] WHO Water safety plan manual: step-by-step risk management for drinking-water suppliers, second edition, March 2023.

sufficiency. Members of companies' drinking water safety planning teams may be needed to facilitate risk assessment and reporting of information internally and externally to the Inspectorate. Similar to DWSPs, companies are expected to engage with many internal and external stakeholders including but not limited to; members of any water resources management planning (WRMP) teams, operational teams responsible for water production and distribution, distribution metering and leakage team members, and customer contact teams. External stakeholders may include the Environment Agency (EA), Natural Resources Wales (NRW), Ofwat, local authorities, other water companies where a water resource may be shared, and housing developers.

3.3. Companies are expected to promote an understanding of water quantity risks and sufficiency, and how these risks can be identified, mitigated and reviewed alongside drinking water quality risks. This may require additional training to achieve competency in risk assessment and management of sufficiency of water supply.

Stage 2 – Establishing Supply System Asset Data

3.4. In order to understand its supply systems, the company should be able to collate, review, and document its asset base, for example, through routine surveys and building asset data sets. This guidance describes the asset level that should be considered and which should align with common barriers used as control measures for water quality risks, such as treatment process assets as whole components. For example, assets such as clarifiers and rapid gravity filters consist of components to enable the processes of clarification and filtration to function in the reduction of risks to water quality; if these processes do not operate as they should for water quality purposes, there is a sufficiency risk.

3.5. Matrices for documenting and reporting the level of sufficiency risk at assets are described in the appendices of this guidance. Companies may decide to include increased granularity in understanding the asset base to include other smaller scale components. Assessments of these may feature in the overall sufficiency assessment of assets, but the minimum that should be included in assessment is detailed in this guidance. Consideration should be given based on the serviceability and asset life of the components. The whole life cycle of the assets should be included in the assessment to determine sufficiency risk presented now, and what may be required of the asset in the future. Asset management methodologies should be used to understand the efficacy of the control measures used to reduce risk to water quality and quantity.

3.6. The assets within a supply system that require sufficiency risk assessment are listed in the table below. These are assets in common with DWSP risk assessment and some of their components are also used as control measures

within a multibarrier approach for water quality risk management. Not all assets at the catchment and abstraction stages will be within a company's control, but knowledge of them may help towards understanding risks. A set of hazardous events relating to sufficiency risks is assigned to each asset. Further details on what components of the asset are given in the hazardous event scoring matrices. This guidance endorses the use of asset condition assessments already developed by Ofwat for some assets to avoid duplication of company effort; this information can be added to, as these asset condition assessments are further developed. The asset information from these condition assessments can be used to inform the risk assessment against hazardous events that require scoring of a component contributing to the overall risk score for the asset. The risk assessments should be reported in the same manner as water quality risks reported against regulation 28 reporting requirements using the template in Appendix 4.

Stage 3 – Understanding asset age, asset health and condition assessments

3.7. Once asset data is recorded, the company should assess asset age against the original intended design life to establish the remaining service life. This will create a baseline asset health assessment. Asset age is often the only known asset health factor commonly understood and captured in the water industry for certain classes of asset.

3.8. However, age alone is not a good indicator of asset health. Therefore, the company should use surveys by competent persons to adjust the remaining asset life from the original intended design life based on robust evidence, risk assessment, the intended performance criteria, and with decisions recorded. Any extensions recorded for asset life should be based on frequency of maintenance and asset performance to account for deterioration. Future investment should be planned for assets where the remaining life has been recorded as extended. Future risk to water quality and quantity presented by extension to asset life should be recorded and reported.

3.9. Water mains present a specific issue for consideration, due to their complexity, location, accessibility, and distances involved in accurately assessing condition. Given this, great care should be taken if proposing to extend the original intended design life. Ideally the asset life should not be exceeded and where this is the case significant attention should be applied to outline detailed mitigations and the plans to deliver permanent remedial solutions. However, detailed asset assessment and other indicators such as higher-than-expected frequencies of bursts, may indicate a reduction in the expected asset life and thus should be mitigated appropriately.

Figure 1 Example of a basic asset heath and asset life assessment

A1 more than 30% of expected design life remaining. Very low probability of failure as asset is assessed as being in a good condition.

A2 10% to 30% of expected design life remaining. The assets present a low probability of failure given they are assessed as being in a reasonable condition.

A3 10% or less of expected life remaining. These assets present a reasonable probability of failure given it is approaching the end of its design life, or the condition is assessed as poor or very poor.

3.10. Asset health assessments should be used as evidence to inform the component part of the overall assessment against the listed hazardous events in the appendices attached to this guidance.

3.11. Further work is being undertaken collaboratively by the sector and regulators to develop asset health understanding and measurements of performance that will continue to contribute to a holistic view of sufficiency risks.

Stage 4 – Understanding criticality

3.12. Criticality is defined, for the purposes of this guidance, as 'the impact the functional loss an asset would have on the extent (number of consumers) and duration of an insufficient water supply.' Criticality may also include the importance of downstream consumers such as hospitals, schools, care homes and other critical infrastructure and services. Impact can be considered as the duration and number and type of consumers affected.

3.13. At a local asset level, for example a service reservoir at the storage stage, an asset might be considered critical where there are no options to a supply to consumers from this service reservoir should it need to be removed from service for maintenance. Companies should consider increasing options to be able to maintain all assets, whilst maintaining a drinking water supply. In this example, it might be necessary to build a temporary water storage tank and construct a bypass facility if this infrastructure is not already in place, to allow maintenance to go ahead on this critical asset.

3.14. Using the asset data collected, the company can then conduct analysis to determine the criticality of its assets in maintaining a sufficient water supply as

defined above. It is for the company to determine the method of proactive analysis, examples of analysis could include single point failure analysis SPFA, hazard and operability – 'HazOps', and a systems approach.

3.15. The aim of these assessments is to pinpoint critical nodes and critical pathways within a supply system. The results of the analysis should be clearly documented to allow for external audit.

3.16. Companies should use information gained from performing criticality assessments at stages and assets within their supply systems to align a criticality score with the matrices in Appendix 5. Where a hazardous event describes the sufficiency risk from an asset process such as filtration at a treatment works, use the criticality scoring for this process.

Stage 5 – Complete Sufficiency Risk assessments and identify mitigation requirements

3.17. Using the hazardous events lists and scoring matrices for each stage, attached in Appendix 5, carry out assessments of the supply systems. To carry risk forward, score the carried forward hazardous event with the highest risk score from the hazardous event(s) at that relevant stage.

3.18. Use the DWI categories in the table below to indicate the status of any existing control measures or identify a need for further mitigation to reduce the risk of an insufficient water supply. Companies should list any control measures that are in existence against the hazardous events in the reporting template.

3.19. Companies are expected to understand where the risk requires mitigation and in what timeframe mitigation is required. For example, it may be identified that the risk of sufficiency at Lost Lake water treatment works is high because of deficiencies in the clarification control, there is a need to deliver mitigation now, so a short, medium and potentially a long term plan may be needed to reduce the risk at this asset, this would be categorised as a D. Or the clarification process might be functioning as intended now, however, the chemical dosing system will need to be replaced due to the asset life span expiring within five years for example, so this would be a category I. The question companies should ask is whether existing control measures will still be effective in the future. Categories should be taken together with criticality scoring and hazardous event scoring to get a holistic view of the risk of sufficiency from the stage and assets assessed in each supply system, in order to identify further mitigation requirements and prioritise these measures for delivery.

3.20. The expectation is for companies to act systematically to address prioritised sufficiency risks over a period of time, in suitably managed action

programmes. Such programmes will likely involve short-term mitigation work for high risks identified but are also likely to include longer term approaches that require pragmatic multiple year and associated investment cycles to achieve.

3.21. Where an existing control measure(s)/mitigation is found to be adequate and the company has decided it is appropriate to assign a category A to the hazardous event, the mitigation should be validated and maintained. For example, if there is mitigation for a potential loss of power supply to a set of high lift pumps at an abstraction site in the form of a backup generator or UPS system, this mitigation should be tested regularly so that there is assurance that it works.

Table 1 DWI categories for indicating risk and mitigation status, as used in DWSPs and regulation 28 reporting

DWI category	Description
A	Target risk mitigation achieved, verified, and maintained
B	Additional or enhanced control measures which will reduce risk are being validated
C	Additional or enhanced control measures which will reduce risk are being delivered
D	Additional or enhanced control measures are required to materially reduce risk
E	Risk under investigation
F	Partial mitigation
G	No mitigation in place: control point downstream
H	No mitigation in place and none required
I	Future risk not requiring mitigation at present
J	No mitigation in place, carried forward risk: control point upstream
X	Line no longer relevant.

Stage 6 – Report Sufficiency risk and plan for investment using short-, medium- and long-term strategies

3.22. Companies should complete the recording of their sufficiency risk assessments in the template shown in the Appendix 4. This is a shorter template compared to the standard format for regulation 28 reporting and is designed to capture the necessary component data for understanding a holistic view of company sufficiency risks. All populated templates of sufficiency risk should be reported in Excel format and be emailed to the risk assessment team inbox dwi.ra.auditteam@defra.gov.uk.

3.23. Companies should maintain records of the information used to complete the assessments as these may be requested following data analysis by the Inspectorate, and for audit purposes. This is similar to maintaining regulation 27 information regarding DWSPs.

3.24. It is expected that companies will use the data alongside the water quality risk assessment data to prioritise investment and delivery of mitigation in areas where there are sufficiency risks. In prioritising delivery of mitigation, companies should consider the balances between short-, medium- and long-term mitigation for risk reduction. Companies should provide short-term mitigation where there is a high risk of loss of supply to consumers whilst planning and implementing long term solutions. Risk reduction can also be achieved incrementally this way.

Stage 7 – Review the Sufficiency risks

3.25. A review of all sufficiency risks should take place using a risk-based approach to the frequency of such reviews. The table below outlines a typical review frequency based on risk scores for hazardous events. It is expected that companies will review their sufficiency risks on this basis as a minimum.

3.26. Risk assessment reviews should take gaps in information gathering into consideration throughout stages 3, 4 and 5 described above. Where a risk assessment may be incomplete due to lack of data or evidence to validate the risk assessment is insufficient, a programme of further work to understand the risk should be undertaken as described in the Guidance on risk assessment and risk management specific to drinking water safety plans (DWSPs), section 1.8 on page 24. This activity should impact on the risk assessment review frequency.

3.27. Companies should review risk assessments in the planning stages of an asset maintenance activity, or any change to the supply of water throughout a supply system.

3.28. Companies should review a risk assessment following an event where there may have been a near miss involving loss of supply to consumers, where an event caused a loss of supply to consumers, and where any risk to the sufficiency of supply has been realised within the supply system.

3.29. If a risk score, criticality score or DWI category is changed during the review process, this should be reported to the Inspectorate using the reporting template.

Table 2 Minimum review frequency for sufficiency risks based on risk scores

Risk Score	Review frequency
1	Review in line with company DWSP methodology
2	Review at least annually
3	Review every 6 months
4	Review quarterly
5	Review monthly

3.30. The table below is a summary of the steps that form the basic principles of sufficiency within the drinking water safety planning approach.

Table 3 Overview of the stages for completing a sufficiency risk assessment

Planning Stage	Definition and Desired Outcomes	Regulations/Standards/ Methods/Examples
1. Establish responsible teams	Identifies people with the relevant knowledge and skills to be able to contribute information needed to risk assess sufficiency in the supply systems.	In the same way that a multidisciplinary team of people is required for DWSP, this stage expands on this.

2. Establish stages and assets in the supply systems	Recorded connected supply system from source to tap. Uses common asset classes.	Also used for DWSP and regulation 28 data reporting.
3. Asset Health	Condition and performance of assets using established condition methodologies by Ofwat.	Asset health Indices, maintenance plans, and obsolescence
4. Criticality	Understand how critical an asset and/or asset pathway is. Use the scoring in appendices of this guidance to apply a score.	SPFA -Single Point Failure Analysis, Hazard, and Operability - HAZOPs, Failure Modes and Effects Analysis - FMEA, Fault Tree Analysis -FTA, Root Cause Analysis – RCA
5. Completing a risk assessment	Recording findings against common hazardous events and using consistent scoring/categorisation.	Similar to the approach used for water quality under regulations 27 and 28.
6. Reporting and delivering mitigation	Submission of data produced from the outcome of the risk assessment. Planning for improvement based on risks.	Similar to the approach used for water quality under regulations 27 and 28.
7. Reviewing the risks	Using a risk-based frequency to review risk data and validate control measures in place.	Continuous improvement cycles, feedback loops. Reassessment following loss of control measures.

4. Summary of Actions

4.1. In summary, the Inspectorate has defined sufficiency for the purposes of this guidance and established a risk assessment process. Event reporting principles are detailed in Appendix 2 below.

4.2. The Inspectorate expects water companies to identify and rank critical points (nodes) and pathways from source to tap to ensure a sufficient supply using the hazardous event matrices in the Appendix 5. This will allow companies to mitigate risks at the appropriate control point within the system. For example, this could be creating and connecting multiple raw water sources and/or rezoning options at the distribution level. Understanding the criticality and

health of assets as part of the risk assessment will improve the assessment of sufficiency and resilience, identifying areas of the supply systems where investment should be prioritised.

4.3. The expectation on companies is to reduce the risk of insufficiency to as low as reasonably practicable in a prioritised manner by ensuring a realistic understanding of common and rare risk scenarios, applying a hazardous event methodology, understanding the criticality of assets in the supply systems and carrying out good asset management practices. A reasonable worst-case scenario (RWCS) approach should be used.

4.4. Companies are expected to improve sufficiency of the water supplied to consumers via their controlled areas of a water supply system source to tap. Where parts of supply systems are outside of company control, the expectation is that companies seek to forecast, plan and implement contingencies and mitigation measures to become more resilient to any changes outside of their control.

4.5. In accordance with their statutory duties the aim of companies must be to prevent occurrence of loss of supplies[12] within a degree of tolerance within their consumer base. This means understanding consumer vulnerability and assigning appropriate levels of criticality to those assets supplying vulnerable consumers.

4.6. A validation for pressure checking at the consumer stage is suggested and could be carried out and recorded by compliance sampling teams.

4.7. The expectation is that companies should preferably aim to provide a continuous supply of tap water via rezoning, tankering to storage or distribution mains as opposed to using bottled water as a validated contingency for loss of supply.

4.8. Companies should submit their sufficiency risk assessment reports for each supply system, using the reporting template in the Appendix 4.

4.9. Companies should include details of any realised sufficiency risk within notification to the Inspectorate for water quality events. Events that include the following circumstances should include details of the sufficiency risk in the event notification description:

[12] Water Industry Act 1991, section 52.

- ≥24 h pressure drop with impact on continuous supply to consumers.
- when a critical asset(s), as determined by the company applying the scoring guidance in Appendix 5, has been taken out of service for planned or unplanned maintenance leading to a water quality event.
- when there are any site restrictions in output flow from a treatment works or storage volume at any treated water tank caused by a water quality event or result in a loss of supply to consumers.

4.10. This document is continuously reviewed; all feedback should be addressed to dwi.enquiries@defra.gov.uk.

5. Appendices

5.1. Appendix 1 – Asset Principles for Sufficiency and Resilience

5.1.1. To ensure that assets are documented and perform to the required standards the Inspectorate considers it good practice to follow a standard for asset management systems, such as BS ISO 55001:2024.

5.1.2. UKWIR in its report titled "Resilience – Performance measures, costs and stakeholder communication 2017"[13] suggest that the sector develops an industry specific standard based on ISO 22301. Until this standard has been published, companies should use BS EN ISO 22301:2019+A1:2024 to demonstrate compliance with statutory duties.

5.1.3. Asset principles should be applied across a company's estate. Criticality and vulnerability should be determined through assessment, assessing the 'critical pathways' of supply from source to tap. This naturally means some assets will be considered more important than others indicating where efforts to address sufficiency should be focused. This should then form part of a continuous improvement plan.

5.1.4. Not all assets need to conform to these principles but within the risk assessment reports they should be noted as a risk, with that risk being carried forward and mitigated with downstream control or counter measures as appropriate.

[13] Resilience – performance measures, costs, and stakeholder communication

5.2. Appendix 2 – Sufficiency framework

5.2.1. The following table is a comparison using existing water quality regulatory principles and showing suggested parallel for sufficiency.

Table 4 – Water quality regulatory principle and suggested parallel for water sufficiency. *Enforcement policy to be developed.

Regulatory Principle	Water Quality	Water Sufficiency	Suggested Action for Sufficiency
Definitions/legislation	Definitions of 'Wholesome' and 'Unfit'	Guidance definition of 'Sufficient supply' and interaction with terminology on resilience.	Risk assessment for sufficiency identifies the gaps between current sufficiency status and meeting a resilience standard in the future.
Hazard Assessment and Risk-Based Approach	Drinking Water Safety Planning	Drinking Water Safety Planning including the quantity risk – termed sufficiency.	Risk analysis methodology detailed in this guidance to be followed using the listed relevant hazardous events for sufficiency in the guidance.
Risk Assessment Reporting to Regulator	Risk line submissions (regulation 28, A–J and X categories)	Report risk lines for sufficiency using the reporting template in this guidance.	Report a risk line. Assess risks across Catchment → Consumer. Carry forward residual risks.
Empirical Data Collection	Telemetry and Sampling (such as turbidity)	DMA pressure monitoring, on-site pressure testing, asset health and performance, risk data.	Conduct risk assessments following this guidance methodology, use performance measurements to validate control of risk where this exists.
Standards	Prescribed Concentration or Values, and Indicator Parameters	Sufficiency is an indicator of resilience, managing the risk of supply loss closes the gap to being more resilient.	Ensuring risk assessment accounts for criticality of assets and scenarios that could cause vulnerable consumers to be without water. Prevent this occurrence with a degree of tolerance.

Event Notification	Event reporting Regulations and Guidance	Report risk changes in event reports on loss of supply, event reporting on any critical asset restrictions in volume of supply.	Event notification description additions for circumstances detailed in section 5.9 above.
Enforcement	Enforcement Policy	Sufficiency enforcement policy*	Use of enforcement instruments as required

5.3. Appendix 3 – Simplified supply system worked examples

5.3.1. The below Figure 2 and Tables 5 and 6 represent a simplified supply system to help demonstrate the proposals of the document. Sections of the supply system have been broken down into nodes to demonstrate which assets and hazardous events being assessed can lead to a loss of supply event. The table shows how the risk scores and categories are recorded for the hazardous events assessed in the examples.

5.3.2. In Table 5, node 6 WSZ 1 only has a single supply route, a proposed booster station (node 15) between nodes 6 and 7 is one potential solution. But the table also identifies other areas for improvement where a category D is recorded to prevent upstream scenarios having a ‘knock on’ effect at the distribution stage.

5.3.3. Table 6 shows an example of using the same assessment method to forecast and plan future sufficiency risk mitigation. The dashed lines on the figure represent some future changes to stages and assets that could be considered as mitigating future impacts on sufficiency.

Table 5 Worked example through hazardous event analysis using a loss of supply event. Current assessment identifying needs for improvement in sufficiency of water supply.

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
1	Catchment	Lost Lake Catchment	CA1	5	Weather and climate induced hydrological event	4	G	Drought and heavy rainfall cycles causing significant raw water changes.
1	Catchment	Lost Lake Catchment	CA1	5	Third Party Dependency/use of shared water resource	2	E	Land use changes near SPZ of boreholes supplying the reservoir.
2	Abstraction	Lake Farm Boreholes	AB1	5	Sufficiency risk carried forward from upstream stage	4	J	Investigating raw water challenges impact on abstraction.
3	Abstraction	Lost Lake Reservoir	AB2	5	Weather and climate induced hydrological event	4	E	Drought and heavy rainfall cycles causing significant raw water changes
3	Abstraction	Lost Lake Reservoir	AB2	5	Treatability constraint, water quality risk (from DWSP reg 28 data)	4	E	Raw water changes in pH and conductivity.

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
4	Treatment	Lost Lake Water Treatment Works	WTW1	5	Sufficiency risk carried forward from upstream stage	4	J	Raw water quality challenges from the reservoir presented to the treatment works
4	Treatment	Lost Lake Water Treatment Works	WTW1	4	Deficiencies in Clarification control, asset and process conditions	5	D	Process control monitoring lacking. Unable to treat in changing raw water conditions
4	Treatment	Lost Lake Water Treatment Works	WTW1	5	Treatability constraint, water quality risk (from DWSP reg 28 data)	5	D	Lack of monitoring, control and visibility of water quality through the treatment process.
4	Treatment	Lost Lake Water Treatment Works	WTW1	4	Deficiencies in Filtration control, asset and process conditions	4	C	Civil structural repairs and sand replacement to DAFF ongoing, site output restrictions.
4	Treatment	Lost Lake Water	WTW1	5	Deficiencies in any carbon processes GAC or PAC used	5	D	Upstream treatment train performance affecting GAC, GAC cannot be

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
		Treatment Works						bypassed but required for pesticide risk.
4	Treatment	Lost Lake Water Treatment Works	WTW1	4	Inadequate disinfection process components, chemical dosing, control or asset conditions.	3	C	Contact tank maintenance ongoing. Flow restriction in place.
5	Storage	Service Reservoir	SR1	5	Availability of asset bypass	5	E	Strategic asset cannot be bypassed, risk if water quality fails here.
5	Storage	Service Reservoir	SR1	4	Storage retention/turnover time	4	E	Investigating alternative supply contingency. Investigating supply route from neighbouring WSZ2.
6	Distribution	Water Supply Zone	WSZ 1	4	Sufficiency risk carried forward from upstream stage	5	J	Low retention at upstream asset
6	Distribution	Water Supply Zone	WSZ 1	5	Availability of rezoning for continued supply	5	I	Potential to mitigate via zone 2 with booster station installation. New

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
								asset being considered for future investment to mitigate loss of supply in WSZ1 Node 15

Figure 2 Example of a nonlinear supply system diagram showing as set stages (nodes) for assessment of sufficiency

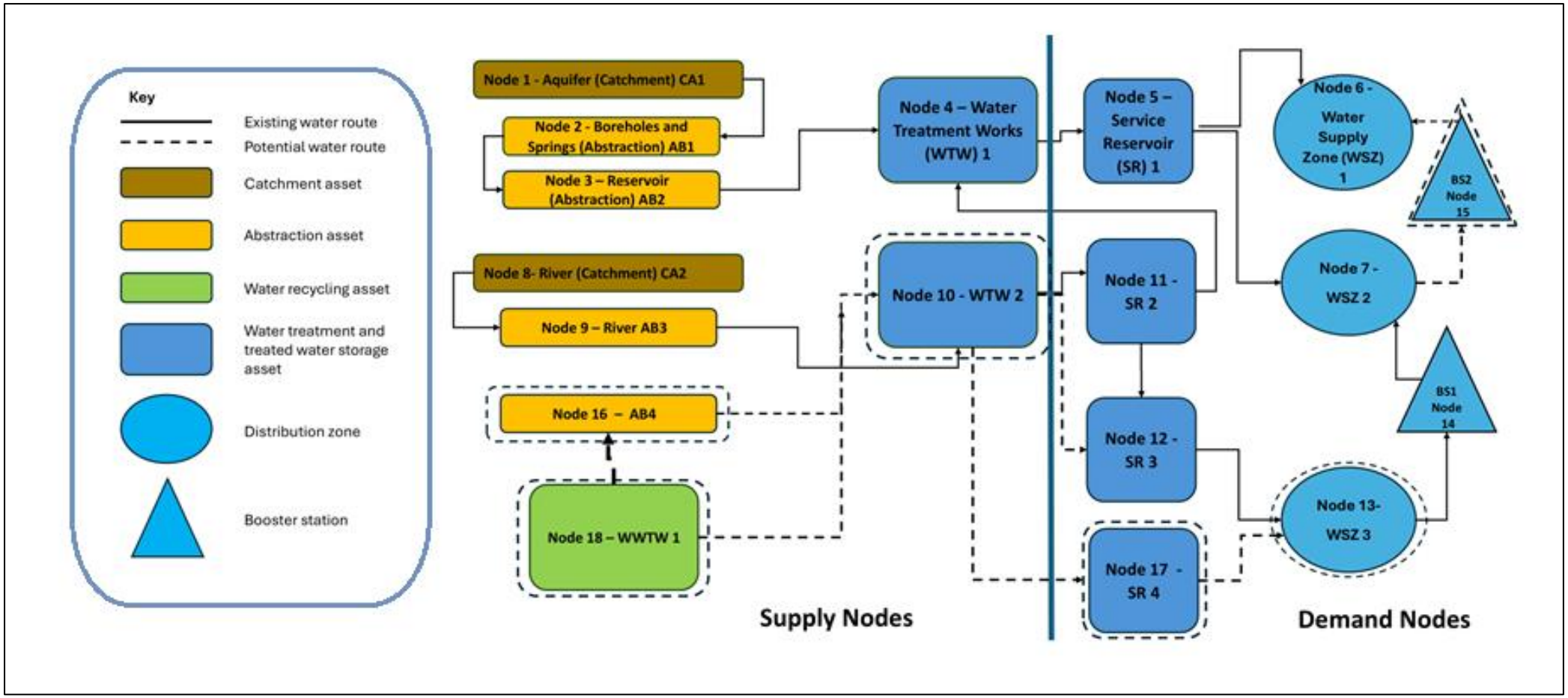

Table 6 Sufficiency risk assessment example capturing potential future changes to the supply system requiring mitigation and examples for improving sufficiency. Consider a planned expansion of the town in zone WSZ 3 Node 13 shown in the diagram above. *New stage included and under review for future guidance.

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
1	Catchment	Lost Lake Catchment	CA1	5	Weather and climate induced hydrological event	4	G	Drought and heavy rainfall cycles causing significant raw water changes
1	Catchment	Lost Lake Catchment	CA1	5	Third Party Dependency/use of shared water resource	2	I	Land use changes near SPZ of boreholes supplying the reservoir.
2	Abstraction	Lake Farm Boreholes	AB1	5	Sufficiency risk carried forward from upstream stage	4	J	Catchment land use change, potential to impact water availability. Investigating raw water challenges impact on abstraction.
3	Abstraction	Lost Lake Reservoir	AB2	5	Weather and climate induced hydrological event	4	E	Drought and heavy rainfall cycles causing significant raw water changes
3	Abstraction	Lost Lake Reservoir	AB2	5	Treatability constraint, water quality risk	4	I	Increase bankside storage and abstraction

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
					(from DWSP reg 28 data)			monitoring to be able to shutdown intake on raw water deterioration.
4	Treatment	Lost Lake Water Treatment Works	WTW 1	5	Sufficiency risk carried forward from upstream stage	4	J	Raw water quality challenges from the reservoir presented to the treatment works
4	Treatment	Lost Lake Water Treatment Works	WTW 1	4	Deficiencies in Clarification control, asset and process conditions	5	D	Process control monitoring lacking. Unable to treat in changing raw water conditions
4	Treatment	Lost Lake Water Treatment Works	WTW 1	5	Treatability constraint, water quality risk (from DWSP reg 28 data)	5	D	Lack of monitoring, control and visibility of water quality through the treatment process.
4	Treatment	Lost Lake Water Treatment Works	WTW 1	4	Deficiencies in Filtration control, asset and process conditions	4	C	Civil structural repairs and sand replacement to DAFF ongoing, site output restrictions.

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
4	Treatment	Lost Lake Water Treatment Works	WTW 1	5	Deficiencies in any carbon processes GAC or PAC used	5	D	Upstream treatment train performance affecting GAC, GAC cannot be bypassed but required for pesticide risk.
4	Treatment	Lost Lake Water Treatment Works	WTW 1	4	Inadequate disinfection process components, chemical dosing, control or asset conditions.	3	C	Contact tank maintenance ongoing. Flow restriction in place.
5	Storage	Service Reservoir	SR1	5	Availability of asset bypass	5	E	Strategic asset cannot be bypassed, risk if water quality fails here.
5	Storage	Service Reservoir	SR1	4	Storage retention/turnover time	4	E	Investigating alternative supply contingency. Investigating supply route from neighbouring WSZ2.
6	Distribution	Water Supply Zone	WSZ 1	4	Sufficiency risk carried forward from upstream stage	5	J	Low retention at upstream asset

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
6	Distribution	Water Supply Zone	WSZ 1	5	Availability of rezoning for continued supply	5	I	Potential to mitigate via zone 2 with booster station installation. New asset being considered for future investment to mitigate loss of supply in WSZ1 Node 15
13	Distribution	Water Supply Zone	WSZ 3	5	Sufficiency risk carried forward from upstream stage	5	J	Expansion of the town is leading to higher demand, upstream planning needed.
17	Storage	Service Reservoir	SR 4	2	Availability of asset bypass	2	I	New Service reservoir planned to increase storage and water supply route to zone 3, also supports zones 1 and 2 via boosters.
10	Treatment	Hope Water Treatment works	WTW 2	2	Treatability constraint, water quality risk (from DWSP reg 28 data)	2	I	Expansion of works with run to waste to support SR2, WTW1 and SR3.

Node	Asset Stage	Asset Name	Asset Reference	Asset Criticality Score	Hazardous Events (examples from matrices)	Controlled Matrix Risk Score	Risk Category	Commentary
16	Abstraction	Hope Boreholes	AB4	2	Weather and climate induced hydrological event	4	I	New borehole site planned to support abstraction from Hope River at AB3 into WTW2.
18	Reuse*	Hope Waste Water Works	WWTW1	2	Treatability constraint, water quality risk (from DWSP reg 28 data)	4	I	Effluent treatment planned for reuse into WTW2

5.4. Appendix 4 – Sufficiency risk reporting template

Sufficiency Risk Reporting Template.xl

5.5. Appendix 5 – Hazardous event and criticality risk scoring matrices

Hazardous Event Scoring Sheets.xlsx