# Heat Network Technical Assurance Scheme

New Build Heat Networks

Technical Specification

District Distribution Network

Phase 4: Operation

**HNTAS-NB-TS-DD-P4**

# Version History

| Revision | Notes | Date |
|---|---|---|
| V0.4 | Draft issue | 05/12/25 |

# Disclaimer

The following HNTAS Code document is published in draft format. This document is intended to give the sector early sight of HNTAS requirements in their current stage of development for the purpose of facilitating sector understanding of the scheme.

Draft Code documents, including Technical Specifications and Assessment Procedures, have been reviewed and consulted on through a series of technical workshops with participation from a range of experts from across the heat network industry. The content of this document is still in development and subject to change. Requirements should not be considered as fixed at this stage.

Changes which may be made to this document in future include those to:

- reflect learnings from the New Build and Existing network pilot programmes;
- align with aspects of HNTAS which are subject to public policy consultation;
- align with new requirements in TS1 and MMS;
- align the terminology of this document with that used in other HNTAS documentation;
- rectify errors in this draft version; and
- improve clarity of contents.

The Key Failures set out in the draft Code documents have been identified as a specific area for review, to ensure that:

- all Key Failures enable a binary assessment;
- Key Failures are only included for genuine issues presenting major risks to KPIs, and that moderate or lower risks are considered via non-conformity processes; and
- Key Failures do not duplicate Technical Requirements unless there is a clear justification to do so.

DESNZ will be welcoming feedback on the information in this document via a change management process. This process will run in parallel to the HNTAS policy consultation and DESNZ invites stakeholders to engage with both, once they are open. You can sign up to receive updates on future detailed draft technical documents as they are published by contacting: heatnetworks@energysecurity.gov.uk.

Please be advised that this document references other HNTAS draft Code documents which have not yet been published. References to other documents will also be subject to change following the publication of updated standards. The final version of this document will be released before the launch of HNTAS.

# Note on Phase 4: Operation (initial) and Phase 5: Operation (ongoing)

The New Build Technical Specification and Assessment Procedures Overview (Phase 0) documents indicate that there are separate New Build Code Documents for Phase 4: Operation (initial) and Phase 5: Operation (ongoing).

These documents have since been consolidated to reduce the number of Code Documents, so the Phase 4: Operation documents cover requirements for New Build networks during both initial and ongoing operation.

This change does not impact the assessment of New Build networks in operation, which still occurs:

- after 1 year of operation; and
- after 2 years of operation.

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# Foreword

This Technical Specification forms part of the UK Government's Heat Network Technical Assurance Scheme (HNTAS, The Scheme) delivered by the Department for Energy Security and Net Zero, in partnership with the Scottish Government and Ofgem. The Department for Energy Security and Net Zero appointed FairHeat as technical author for this document.

The Scheme has been designed and developed in consultation with a range of experts across the heat network industry in the form of Technical Sub-Working Groups, culminating in a series of Technical Specifications and Assessment Procedures to facilitate the validation and verification of performance outcomes of Elements within a Heat Network.

This document specifies HNTAS Requirements for a District Distribution Network Element and is applicable to the following Heat Networks:

- A New Build Heat Network in Phase 4: Operation
- An Existing Heat Network between Milestone 4 and Milestone 5
- A Certified Heat Network in the Ongoing Regime

This document sits within a series of Technical Specifications for a District Distribution Network, which features within a wider Scheme documentation structure, as outlined in Table 1, Table 2 and Table 3 below.

This Technical Specification has been issued in draft format and will be updated prior to scheme launch.

For further information on the use of this document within the Heat Network Technical Assurance Scheme, please refer to:

- the Heat Network Technical Assurance Scheme – New Build Heat Networks – Scheme Rules – Assessment Regime (HNTAS-NB-SR-XX-AS) document; or
- the Heat Network Technical Assurance Scheme – Existing Heat Networks – Scheme Rules – Assessment Regime (HNTAS-EX-SR-XX-AS) document; or
- the Heat Network Technical Assurance Scheme – Ongoing Regime – Scheme Rules - Replacement Regime (HNTAS-ON-SR-XX-RR) document,

depending on the applicable Regime for the Heat Network.

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# Code Document Structure

## Technical Specifications

| Document Type | Element | | Part/Phase | | | | |
|---|---|---|---|---|---|---|---|
| | | | Overview | Phase 1: Feasibility | Phase 2: Design | Phase 3: Construction | Phase 4: Operation |
| | | | P0 | P1 | P2 | P3 | P4 |
| Technical Specification | Energy Centre | EC | HNTAS-NB-TS-EC-P0 | HNTAS-NB-TS-EC-P1 | HNTAS-NB-TS-EC-P2 | HNTAS-NB-TS-EC-P3 | HNTAS-NB-TS-EC-P4 |
| | District Distribution Network | DD | HNTAS-NB-TS-DD-P0 | HNTAS-NB-TS-DD-P1 | HNTAS-NB-TS-DD-P2 | HNTAS-NB-TS-DD-P3 | HNTAS-NB-TS-DD-P4 |
| | Substation | SS | HNTAS-NB-TS-SS-P0 | HNTAS-NB-TS-SS-P1 | HNTAS-NB-TS-SS-P2 | HNTAS-NB-TS-SS-P3 | HNTAS-NB-TS-SS-P4 |
| | Communal Distribution Network | CD | HNTAS-NB-TS-CD-P0 | HNTAS-NB-TS-CD-P1 | HNTAS-NB-TS-CD-P2 | HNTAS-NB-TS-CD-P3 | HNTAS-NB-TS-CD-P4 |
| | Consumer Connection | CC | HNTAS-NB-TS-CC-P0 | HNTAS-NB-TS-CC-P1 | HNTAS-NB-TS-CC-P2 | HNTAS-NB-TS-CC-P3 | HNTAS-NB-TS-CC-P4 |
| | Consumer Heat System | CH | HNTAS-NB-TS-CH-P0 | HNTAS-NB-TS-CH-P1 | HNTAS-NB-TS-CH-P2 | HNTAS-NB-TS-CH-P3 | N/A |

*Table 1: New Build Network Technical Specification structure*

| Document Type | Element | | Milestone | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Overview | Milestone 2 | Milestone 3a | Milestone 3b | Milestone 4 | Milestone 5 |
| | | | M0 | M2 | M3A | M3B | M4 | |
| Technical Specification | Energy Centre | EC | HNTAS-EX-TS-XX-M0 | HNTAS-EX-TS-EC-M2 | HNTAS-EX-TS-XX-M3A | N/A | HNTAS-EX-TS-EC-M4 | HNTAS-NB-TS-EC-P4 |
| | District Distribution Network | DD | | HNTAS-EX-TS-DD-M2 | | N/A | HNTAS-EX-TS-DD-M4 | HNTAS-NB-TS-DD-P4 |
| | Substation | SS | | HNTAS-EX-TS-SS-M2 | | N/A | HNTAS-EX-TS-SS-M4 | HNTAS-NB-TS-SS-P4 |
| | Communal Distribution Network | CD | | HNTAS-EX-TS-CD-M2 | | N/A | HNTAS-EX-TS-CD-M4 | HNTAS-NB-TS-CD-P4 |
| | Consumer Connection | CC | | HNTAS-EX-TS-CC-M2 | | HNTAS-EX-TS-CC-M3B | HNTAS-EX-TS-CC-M4 | HNTAS-NB-TS-CC-P4 |

*Table 2: Existing Network Technical Specification structure*

| Document Type | Element | | Ongoing Regime |
|---|---|---|---|
| Technical Specification | Energy Centre | EC | HNTAS-NB-TS-EC-P4 |
| | District Distribution Network | DD | HNTAS-NB-TS-DD-P4 |
| | Substation | SS | HNTAS-NB-TS-SS-P4 |
| | Communal Distribution Network | CD | HNTAS-NB-TS-CD-P4 |
| | Consumer Connection | CC | HNTAS-NB-TS-CC-P4 |

*Table 3: Ongoing Regime Technical Specification structure*

# Scope

This document specifies the HNTAS Requirements for a District Distribution Network within:

- A New Build Heat Network in Phase 4: Operation
- An Existing Heat Network between Milestone 4 and Milestone 5
- A Certified Heat Network in the Ongoing Regime

The application of this document in each of these scenarios is detailed below.

A District Distribution Network is defined as any pipework system that is not within a building and distributes thermal energy from one location within a Heat Network to another. For example, distributing thermal energy from an Energy Centre to a Building Connection underground.

A detailed definition of the District Distribution Network is contained within the Heat Network Technical Assurance Scheme – New Build Heat Networks – Technical Specification – District Distribution Network – Overview (HNTAS-NB-TS-DD-P0) document and the Heat Network Technical Assurance Scheme – Existing Heat Networks – Technical Specification – Overview (HNTAS-EX-TS-XX-M0) document.

## New Build Heat Networks

Following the award of Certificate 1 after Stage 6: Commissioning, a District Distribution Network in a New Build Heat Network must demonstrate compliance with the HNTAS Requirements of this Code Document for a period of 2 years to achieve compliance at the end of Phase 4.

There is one stage within Phase 4, which is Stage 7: Operation and Maintenance. This is outlined in Figure 1.

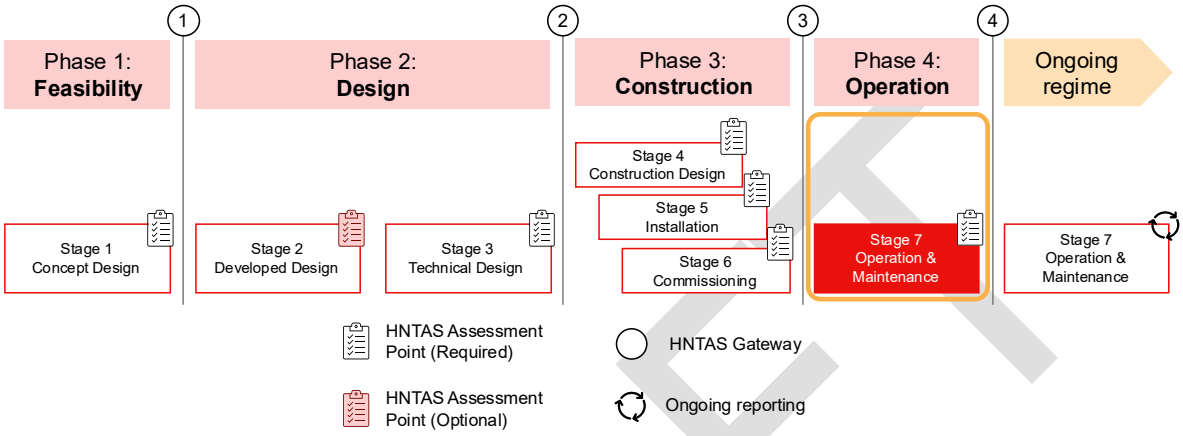


*Figure 1: HNTAS New Build regime phases and stages*

## Existing Heat Networks

Following the successful assessment of a District Distribution Network in an Existing Heat Network at Milestone 4, a District Distribution Network must demonstrate compliance with the HNTAS Requirements of this Code Document for a period of 2 years to achieve compliance at Milestone 5.

## Certified Heat Networks

Following the award of Certificate 2, a District Distribution Network shall maintain compliance with the HNTAS Requirements of this Code Document.

# References

## Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- Heat Network Technical Standard (TS1) (HNTAS, 2025)
- Heat Network Metering and Monitoring Standard (MMS) (HNTAS, 2025)
- Heat Network Technical Assurance Scheme – New Build Heat Networks – Scheme Rules – Assessment Regime (HNTAS-NB-SR-XX-AS)
- Heat Network Technical Assurance Scheme – Existing Heat Networks – Scheme Rules – Assessment Regime (HNTAS-EX-SR-XX-AS)
- Heat Network Technical Assurance Scheme – Ongoing Regime – Scheme Rules – Replacement Regime (HNTAS-ON-SR-XX-RR)
- Heat Network Technical Assurance Scheme – New Build Heat Networks – Technical Specification – District Distribution Network – Overview (HNTAS-NB-TS-DD-P0)
- Heat Network Technical Assurance Scheme – Existing Heat Networks – Technical Specification – Overview (HNTAS-EX-TS-XX-M0)
- Heat Network Technical Assurance Scheme – Existing Heat Networks – Technical Specification – District Distribution Network – Milestone 4 (HNTAS-EX-TS-DD-M4)

## Informative references

There are no informative references in this document.

# Terms and Definitions

For the purposes of this document, the terms and definitions given in the Heat Network Technical Assurance Scheme – Terms and Definitions (HNTAS-XX-TD) document apply.

# Key Performance Indicators

This document first becomes applicable for the District Distribution Network Element once Certificate 1 is achieved through either the New Build assurance pathway or the Existing Network assurance pathway.

The KPI thresholds to be met by a District Distribution Network as part of compliance with this Code Document are dependent on the assurance pathway taken to achieve Certification.

Refer to:

- the Heat Network Technical Assurance Scheme – New Build Heat Networks – Technical Specification – District Distribution Network – Overview (HNTAS-NB-TS-DD-P0) document for the New Build Regime; or
- the Heat Network Technical Assurance Scheme – Existing Heat Networks – Technical Specification – District Distribution Network – Milestone 4 (HNTAS-EX-TS-DD-M4) document for the Existing Regime,

for the detailed list of:

- Monitoring Points required for a District Distribution Network;
- the data and minimum read frequency required from each Monitoring Point;
- the Monitoring Points to be used to measure KPIs; and
- the KPI thresholds to be met.

# 7. Requirements for Stage 7: Operation and Maintenance

## 7.1. Technical Requirements

The applicable HNTAS Technical Requirements in Table 4 shall be fulfilled.

| Technical Requirement | | Applicable technical standard(s) | Evidence Requirement(s) |
|---|---|---|---|
| 7.1.1. | The O&M Manual shall be maintained in accordance with the applicable technical standard(s). | TS1 7.17.3<br>TS1 7.17.6 | DD-S7-E01 |
| 7.1.2. | The Planned Preventative Maintenance (PPM) Schedule shall be produced and maintained in accordance with the applicable technical standard(s). | TS1 7.6.5<br>TS1 7.14.4<br>TS1 7.15.2<br>TS1 7.15.3<br>TS1 7.15.4<br>TS1 7.15.5<br>TS1 7.15.10<br>TS1 7.15.13<br>TS1 7.17.2 | DD-S7-E02 |
| 7.1.3. | All documentation and drawings, shall be kept updated in accordance with the applicable technical standard(s). | TS1 7.12.2<br>TS1 7.17.6<br>TS1 7.17.8<br>MMS 4.1.2 | DD-S7-E04<br>DD-S7-E11 |
| 7.1.4. | All documentation and drawings shall be stored in a manner that facilitates easy access to organisations responsible for carrying out operation and maintenance activities in accordance with the applicable technical standard(s). | TS1 7.15.16<br>TS1 7.17.9 | DD-S7-E10 |
| 7.1.5. | The District Distribution Network shall be maintained in accordance with:<br>• the O&M Manual(s);<br>• the PPM Schedule;<br>• any manufacturers requirements; and<br>• the applicable technical standard(s). | TS1 7.6.1<br>TS1 7.6.2<br>TS1 7.6.3<br>TS1 7.6.4<br>TS1 7.6.5<br>TS1 7.14.5<br>TS1 7.14.6<br>TS1 7.15.1<br>TS1 7.15.10<br>TS1 7.15.11<br>TS1 7.15.13<br>TS1 7.17.1<br>TS1 7.17.2 | DD-S7-E03<br>DD-S7-E04<br>DD-S7-E05 |

| Technical Requirement | | Applicable technical standard(s) | Evidence Requirement(s) |
|---|---|---|---|
| 7.1.6. | Where there is a fault or maintenance activity on below-ground pipework that requires that pipework is removed, it shall be re-fitted in accordance with the technical standard(s). | TS1 7.16.10 | DD-S7-E03<br>DD-S7-E11<br>DD-S7-E14<br>DD-S7-E15 |
| 7.1.7. | Where maintenance activities on above-ground pipework require that insulation needs to be removed, the insulation shall be refitted or replaced as soon as practically possible in accordance with the applicable technical standard(s). | TS1 7.13.1 | DD-S7-E16 |
| 7.1.8. | Where a surveillance system is installed, this shall be maintained and utilised in accordance with the applicable technical standard(s). | TS1 7.12.8 | DD-S7-E03 |
| 7.1.9. | All Operatives responsible for carrying out operation and maintenance activities shall receive appropriate training in accordance with the applicable technical standard(s). | TS1 7.14.1 | DD-S7-E06 |
| 7.1.10. | All Operatives and Specialists responsible for carrying out operation and maintenance activities shall receive a site specific induction in accordance with the applicable technical standard(s). | TS1 7.14.2 | DD-S7-E06 |
| 7.1.11. | The Operating Risk Register shall be maintained in accordance with the applicable technical standard(s). | TS1 7.14.6<br>TS1 7.17.1 | DD-S7-E09 |
| 7.1.12. | At least once per annum, accessible (e.g. through valve chambers) equipment and pipework condition shall be determined, and remedial actions carried out where necessary in accordance with the applicable technical standard(s). | TS1 7.16.1<br>TS1 7.16.2<br>TS1 7.16.3<br>TS1 7.16.4<br>TS1 7.16.5<br>TS1 7.16.8 | DD-S7-E07 |
| 7.1.13. | Where necessary, the destructive testing of pipework shall be carried out in accordance with the applicable technical standard(s). | TS1 7.16.6<br>TS1 7.16.7 | DD-S7-E07 |
| 7.1.14. | Prior to a change in Designated Operator, the condition of pipework and equipment shall be determined in accordance with the applicable technical standard(s). | TS1 7.16.11 | DD-S7-E07 |

| Technical Requirement | | Applicable technical standard(s) | Evidence Requirement(s) |
|---|---|---|---|
| 7.1.15. | The Resilience Strategy shall be maintained in accordance with the applicable technical standard(s). | TS1 7.9.1<br>TS1 7.9.2<br>TS1 7.9.3<br>TS1 7.9.4 | DD-S7-E08 |
| 7.1.16. | The Planned Preventative Maintenance (PPM) Schedule shall include activities that sufficiently maintain the water quality of the Heat Network in accordance with the applicable technical standard(s). | TS1 7.11.8<br>TS1 7.15.11 | DD-S7-E02 |
| 7.1.17. | The District Distribution Network water quality shall be maintained within the required KPI thresholds.<br>Water quality sampling (and dosing of Chemically Treated systems) shall be carried out in accordance with the applicable technical standards(s).<br>The applicable water quality KPIs shall be reported to HNTAS at the following intervals:<br>• parameters measured via continuous monitoring shall be reported once per month; and<br>• parameters measured via laboratory testing of on site samples shall be reported in accordance with sampling frequency in the applicable technical standards(s). | TS1 7.11.1<br>TS1 7.11.4 | DD-S7-E19<br>DD-S7-E20<br>DD-S7-E21 |
| 7.1.18. | Water treatment records shall be kept detailing the:<br>• sampling;<br>• dosing (where applicable); and<br>• the remedial actions carried out regarding water quality,<br>in accordance with the applicable technical standard(s).<br>Water quality records shall contain, for each parameter, a graphical representation where both the trend and limits can be observed. | TS1 7.11.5 | DD-S7-E20 |

| Technical Requirement | | Applicable technical standard(s) | Evidence Requirement(s) |
|---|---|---|---|
| 7.1.19. | Where water quality parameters exceed defined KPI thresholds, or a trend of a water quality metric indicates a deterioration in water quality:<br>• the reporting and sampling frequency shall increase;<br>• a competent water treatment specialist shall be engaged; and<br>• appropriate remedial actions shall be undertaken,<br>in accordance with the applicable technical standard(s). | TS1 7.11.2<br>TS1 7.11.6 | DD-S7-E19<br>DD-S7-E20<br>DD-S7-E21<br>DD-S7-E23 |
| 7.1.20. | Where stagnant conditions occur in specific parts of the District Distribution Network, circulation shall be established through these areas in accordance with the applicable technical standard(s). | TS1 7.11.12 | DD-S7-E22 |
| 7.1.21. | Installed equipment no longer in use shall be disconnected and drained in accordance with the applicable technical standard(s). | TS1 7.11.13 | DD-S7-E04<br>DD-S7-E24 |
| 7.1.22. | Where equipment or pipework is to be replaced, this shall be undertaken in accordance with:<br>• the plant replacement strategy;<br>• the applicable technical standard(s); and<br>• the Heat Network Technical Assurance Scheme – Ongoing Regime – Scheme Rules - Replacement Regime (HNTAS-ON-SR-XX-RR) document. | TS1 7.6.1<br>TS1 7.6.2<br>TS1 7.6.3<br>TS1 7.6.4<br>TS1 7.11.13<br>TS1 7.17.10 | DD-S7-E04<br>DD-S7-E08 |

| Technical Requirement | | Applicable technical standard(s) | Evidence Requirement(s) |
|---|---|---|---|
| 7.1.23. | An annual inspection shall be undertaken by a competent individual or individuals within a team separate to the team responsible for District Distribution Network O&M activities, in accordance with the applicable technical standard(s).<br><br>The inspection shall check against compliance with Technical Requirements and ensure that Key Failures are not occurring.<br><br>Where non-compliances are identified, the report shall outline what remedial actions are required to ensure future compliance.<br><br>Any reports produced through this inspection shall be uploaded to HNTAS on an annual basis. | TS1 7.15.14 | DD-S7-E25 |
| 7.1.24. | The KPI Schedule shall be maintained with accurate information and references to relevant documentation. | | DD-S7-E26 |
| 7.1.25. | The Technical Parameters Schedule shall be maintained with accurate information and references to relevant documentation. | | DD-S7-E27 |

*Table 4: Technical Requirements for the District Distribution Network at Stage 7: Operation and Maintenance*

## 7.2. Performance Monitoring Requirements

The applicable Performance Monitoring Requirements in Table 5 shall be fulfilled.

| Performance Monitoring Requirement | | Applicable technical standard(s) | Evidence Requirement(s) |
|---|---|---|---|
| 7.2.1. | The Metering and Monitoring Strategy shall be maintained in accordance with the applicable technical standard(s). | TS1 7.12.2<br>MMS 4.1.2 | DD-S7-E12 |
| 7.2.2. | Thermal energy meters shall be maintained and recalibrated (where necessary) in accordance with the applicable technical standard(s). | TS1 7.12.4<br>TS1 7.12.5<br>MMS 1.1.8\|<br>MMS 1.3.3<br>MMS 1.3.4<br>MMS 1.3.5<br>MMS 1.3.6 | DD-S7-E12<br>DD-S7-E13 |
| 7.2.3. | The Metering and Monitoring System shall calculate and report, at the required interval, each applicable District Distribution Network KPI to HNTAS. | | DD-S7-E17 |
| 7.2.4. | The District Distribution Network performance shall be monitored against the KPI thresholds.<br>Where performance is outside of KPI thresholds for a reporting interval, the Responsible Party shall outline justification for this through a note uploaded to HNTAS.<br>Where performance is outside of KPI thresholds for 3 consecutive reporting intervals, a detailed investigation shall be undertaken by a competent individual to diagnose the root cause issue and develop a plan for remedial actions as necessary. Any remedial actions taken to rectify issues with performance shall be recorded in the Maintenance and Remedial Action Log. | TS1 7.8.1<br>TS1 7.8.3<br>TS1 7.8.6<br>TS1 7.12.6<br>TS1 7.17.4 | DD-S7-E17<br>DD-S7-E18 |

*Table 5: Performance Monitoring Requirements for the District Distribution Network at Stage 7: Operation and Maintenance*

## 7.3. Key Failures

The applicable Key Failures listed in Table 6 shall not be present.

| Key Failure | | Outcome to avoid | Evidence Requirement(s) |
|---|---|---|---|
| 7.3.1. | PPM personnel (or contracts) not in place and/or maintenance not scheduled at sufficient frequency, or not at all. | Maintenance not carried out on network, which could result in a reduction in performance of the District Distribution Network. This could lead to KPI thresholds not being achieved. | DD-S7-E02 |
| 7.3.2. | Operatives carrying out maintenance activities have not received sufficient, or any training specific to the system. | Lack of awareness of network requirements and characteristics. This could lead to false diagnosis of network issues, and/or incorrect maintenance activities carried out on the network, which impacts the longevity and performance of the network. | DD-S7-E06 |
| 7.3.3. | Bypasses, where installed, left open when should be closed, or controlled in such a way that increases flowrate and return temperature above KPI requirements. | Increased flowrates throughout the District Distribution Network, which could increase return temperatures and result in elevated energy consumption by the pumps. This may result in KPI thresholds not being achieved. | DD-S7-E17<br>DD-S7-E18 |
| 7.3.4. | Ancillary equipment (e.g. isolation valves) not regularly exercised. | Valve seizure due to being left in the same position for extended periods. This could lead to the valve needing to be replaced prematurely. Significant disruption to the network could be experienced during maintenance activities as a result of sections of the network not being able to be isolated. | DD-S7-E03 |

| Key Failure | | Outcome to avoid | Evidence Requirement(s) |
|---|---|---|---|
| 7.3.5. | Surveillance system not regularly inspected and tested (applicable for steel pipework systems). | Surveillance system faults are not detected, which could lead to leaks going undetected on the District Distribution Network. This could lead to the spread of moisture through network insulation, causing to insulation and reduced longevity. | DD-S7-E03<br>DD-S7-E19<br>DD-S7-E20 |
| 7.3.6. | Surveillance system faults not addressed in a timely manner (applicable for steel pipework systems). | Faults exacerbate and become significantly more difficult to fix. Faults such as for example, leaks, would increase the spread of moisture through the network insulation and could lead to a risk of corrosion and could result in KPIs not achieving their threshold. | DD-S7-E03<br>DD-S7-E19<br>DD-S7-E20 |
| 7.3.7. | Access chambers below ground are not inspected regularly for physical signs of a risk to future inaccessibility (for example, flooding) or damage. | Risk that access chambers become flooded, leading to the chamber becoming inaccessible to operation and maintenance personnel. Flooding could lead to damage to ancillary equipment, which could cause the equipment to become inoperable. | DD-S7-E03 |
| 7.3.8. | Insulation left damaged, wet, or not reinstalled following maintenance activities. | Increased heat losses from the system due to damaged or wet insulation, or due to insulation being removed from pipework and not replaced. This could result in heat losses not achieving the KPI threshold. | DD-S7-E03<br>DD-S7-E16<br>DD-S7-E17<br>DD-S7-E18 |
| 7.3.9. | Documentation not kept up to date (e.g. drawings not updated with changes to system such as weld and joint locations, maintenance activities carried out not recorded, risk register not updated). | Documentation not reflective of installed network and actual operation, which can lead to incorrect operation and maintenance of the District Distribution Network. | DD-S7-E01<br>DD-S7-E03<br>DD-S7-E04<br>DD-S7-E07<br>DD-S7-E08<br>DD-S7-E09<br>DD-S7-E11 |

| Key Failure | | Outcome to avoid | Evidence Requirement(s) |
|---|---|---|---|
| 7.3.10. | Documentation not adequately stored where they can be accessed by personnel carrying out operation and maintenance activities and/or documentation is not stored in a format where they can be updated. | Documentation cannot be accessed and/or updated by operation and maintenance personnel to reflect changes that have been made to the District Distribution Network, which can lead to a lack of clarity on the current network status for future operation and maintenance activities. | DD-S7-E10 |
| 7.3.11. | Replacement of equipment not in accordance with performance and/or design data. | Risk of equipment installation that is not in accordance with the performance and/or original design criteria. This may result in an increased risk of equipment failure, causing network outages, which could result in KPIs not being met. | DD-S7-E08 |
| 7.3.12. | The condition of Heat Network equipment leaves the system with insufficient resilience. | Increased risk of equipment failure and increased risk of interruption to heat supply. | DD-S7-E07<br>DD-S7-E08 |
| 7.3.13. | Resilience Strategy is not updated to reflect changes made to the Heat Network. | Increased likelihood of an interruption to heat supply and increased impact should that interruption occur. | DD-S7-E08 |
| 7.3.14. | Resilience Strategy is not reviewed following an unplanned interruption. | Increased likelihood of an interruption to heat supply and increased impact should that interruption occur. | DD-S7-E08 |

*Table 6: Key Failures for the District Distribution Network at Stage 7: Operation and Maintenance*

## 7.4. Evidence Requirements

The applicable Evidence Items listed in Table 7 shall be provided to demonstrate fulfilment with the Technical Requirements, Performance Monitoring Requirements, and avoidance of Key Failures.

| Evidence Item | | Detailed description and requirements |
|---|---|---|
| DD-S7-E01 | O&M Manual | A completed O&M Manual shall be provided, which shall include any changes made to the O&M manual during operation. |
| DD-S7-E02 | Planned Preventative Maintenance (PPM) Schedule | To include a schedule outlining the operation and maintenance plan for all equipment in the District Distribution Network.<br>Shall detail wherever Specialists or external bodies are required to carry out PPM activities. |
| DD-S7-E03 | Maintenance and Remedial Action Log | To detail any operation and maintenance activities carried out on the District Distribution Network.<br>Shall detail the date the activity was carried out and the person that performed the activity.<br>Shall outline any remedial actions carried out on the network as part of the operation and maintenance activity. |
| DD-S7-E04 | O&M Change Log | Shall be a log of any changes made to the network during operation. This includes:<br>• changes that result in the hydraulic arrangement deviating from previous;<br>• changes to the spatial layout of the District Distribution Network;<br>• changes to the control system, set points or Description of Operation;<br>• changes to the Resilience Strategy;<br>• changes to the Operating Risk Register;<br>• equipment that has been replaced; and<br>• Monitoring Points have been replaced.<br>This is not to include activities noted in the Maintenance and Remedial Action Log for the general maintenance carried out on the District Distribution Network. |
| DD-S7-E05 | Equipment servicing certification | Shall include all servicing certification for each piece of equipment.<br>Shall include certification at the frequency as required by the PPM Schedule.<br>Shall include detail for each piece of equipment as required by the PPM Schedule. |

| Evidence Item | | Detailed description and requirements |
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| DD-S7-E06 | Register of Operatives | To include a list of all personnel that have carried, or will carry out, operation and maintenance activities on the District Distribution Network .<br>This shall include for each person:<br>• confirmation that the person has completed a site specific induction;<br>• the activity(s) that the person has carried, or will carry out;<br>• the training that the person has received in relation to the activity(s);<br>• the relevant qualifications (where applicable) that the person has; and<br>• the relevant experience that the person has. |
| DD-S7-E07 | Condition Log | To include all basic asset data and condition data for all Heat Network equipment within the District Distribution Network , including:<br>• asset name;<br>• asset ID;<br>• asset classification code;<br>• asset classification description;<br>• asset criticality;<br>• asset maintainer;<br>• asset location;<br>• asset install date;<br>• asset condition grade;<br>• asset priority grade;<br>• whether asset is beyond economic repair;<br>• asset operational status;<br>• date of last condition survey; and<br>• remaining life expectancy (years). |
| DD-S7-E08 | Resilience Strategy | Shall outline the Resilience Strategy for the Heat Network, including:<br>• the redundancy and recovery measures implemented;<br>• the disaster recovery plan;<br>• the critical spares log; and<br>• the plant replacement strategy.<br>This shall contain the strategy in the case of loss of heat supply within the Heat Network, and design |

| Evidence Item | | Detailed description and requirements |
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| | | items for resilience (for example, isolation valve locations, locations for temporary heat supply). |
| DD-S7-E09 | Operating Risk Register | A project specific risk register which shall include all risks outlined and proposed approaches to eliminate during operation of the Heat Network, mitigate or manage these risks. |
| DD-S7-E10 | Document Storage System Statement | Shall outline the system intended to be used for storing and accessing documentation related to the Heat Network.<br>Shall outline any hierarchy of access to the storage system relative to the personnel carrying out operation and maintenance activities. |
| DD-S7-E11 | District Distribution Network drawings | As-built drawings of the District Distribution Network with any necessary changes made during operation implemented.<br>Shall include:<br>• schematics; and<br>• drawings (layout, plan, elevation). |
| DD-S7-E12 | Metering and Monitoring Strategy | Shall contain a description of how data required to calculate KPIs will be measured, extracted, recorded, and stored at the required read frequency, how the raw data will be transformed, and how KPIs will be calculated and reported.<br>The strategy shall also include:<br>• schedule of KPIs;<br>• schedule of Monitoring Points;<br>• data flow diagram;<br>• schematic with labelled Monitoring Points; and<br>• Monitoring Point labelling strategy. |
| DD-S7-E13 | Thermal Energy Meter Records | Shall contain record of the installation and commissioning of thermal energy meters. This shall include:<br>• meter make;<br>• type;<br>• serial number; and<br>• year of install.<br>Shall also contain record of the recalibration date of thermal energy meters or evidence of successful sampling and testing where required in accordance with the applicable technical standard(s). |
| DD-S7-E14 | Surveillance System Test Certificate | Test certification following maintenance activities on a joint or section of the network to certify the |

| Evidence Item | | Detailed description and requirements |
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| | (following maintenance activities) | surveillance system functions for that joint or section as the design intended. |
| DD-S7-E15 | Pipework Reinstallation Certificate (following maintenance activities) | Certificate following the reinstallation of pipework during maintenance activities.<br>Shall detail the person(s) that carried out the activities.<br>Any updates to joints or welds shall be recorded on the certificate. |
| DD-S7-E16 | Photographic evidence of insulation replacement | Shall include photographic evidence of areas where insulation has had to be reinstalled or replaced following maintenance activities.<br>Photographs shall be presented clearly with no blur. |
| DD-S7-E17 | Reporting of KPIs | KPIs reported to HNTAS at the required frequency.<br>Where KPIs are outside of required thresholds for the reporting period, the Responsible Party shall upload a note justifying this discrepancy to HNTAS. |
| DD-S7-E18 | KPI Remediation Report | Where any District Distribution Network KPI is not within its required threshold for 3 consecutive reporting intervals, a report shall be produced which shall outline:<br>• the findings of the investigation undertaken by a competent individual into the root cause issue of non-compliance; and<br>• the remedial action(s) taken, or planned to be taken, for the KPI to return to within its required threshold.<br>Where a diagnosis is not yet known, the report shall outline a plan for acquiring a diagnosis as to why the KPI has not achieved its threshold. |
| DD-S7-E19 | Reporting of water quality KPIs | Water quality KPIs reported to HNTAS at the required frequency. |
| DD-S7-E20 | Water quality sampling records | For each sample, shall include:<br>• hydraulic location the sample has been taken from;<br>• date the sample has been taken; and<br>• result of sample for each water quality KPI.<br>Trends in water quality KPIs over time shall be graphically represented. |
| DD-S7-E21 | Evidence of water quality specialist engagement | Written evidence that a water quality specialist has been engaged to carry out operation and |

| Evidence Item | | Detailed description and requirements |
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| | (where applicable) | maintenance activities on the system where KPI thresholds have not been achieved. |
| DD-S7-E22 | Evidence of circulation provision through stagnant areas | For example, where areas have been identified that could be subject to stagnant conditions, evidence that the control system switches equipment on a regular basis, or temporarily enables equipment on a regular basis that would otherwise not be required (i.e. enabling circulation through peaking plant equipment during low heating demand season). |
| DD-S7-E23 | Water Quality Remedial Action Log | To detail any operation and maintenance activities carried out on the District Distribution Network to remediate water quality.<br>Shall detail the date the activity was carried out and the person that performed the activity.<br>Shall outline any remedial actions carried out on the network as part of the operation and maintenance activity. |
| DD-S7-E24 | Evidence of equipment disconnection | Photographic evidence that decommissioned equipment has been completed disconnected from the system. |
| DD-S7-E25 | Annual Inspection Report | To outline the findings of the annual inspection.<br>Shall include the current status of the control system in relation to the O&M manual. |
| DD-S7-E26 | KPI Schedule | Shall contain all applicable KPIs to be met by the District Distribution Network. Shall be complete with accurate up-to-date information and contain references to relevant documentation. |
| DD-S7-E27 | Technical Parameters Schedule | Shall contain all applicable Technical Parameters for the District Distribution Network. Shall be complete with accurate up-to-date information and contain references to relevant documentation. |

*Table 7: Evidence Requirements for the District Distribution Network at Stage 7: Operation and Maintenance*