HNTAS Feedback Form - TS1 Guidance

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This feedback form shall be used to provide feedback on the draft version of the Heat Network Technical Standard (TS1) which is of an editorial and/or technical nature.

Feedback regarding policy items, or general feedback regarding the Heat Network Technical Assurance Scheme, shall be provided through the HNTAS technical standards consultation.

How to provide feedback

1. Provide information about you

Individual names:	*Example individual 1*
	Example individual 2 (optional)
	Example individual 3 (optional)
Organisation:	*Example organisation*
Relevant experience and expertise:	*Example relevant experience and expertise*

2. Select which piece of text to provide feedback for

Item
Example item

- Select the item within TS1 for which you wish to comment.

3. Provide the category of the feedback

Category
Editorial / Technical

- Editorial comments might include typing errors or alternative wording suggestions which do not result in a material change to the technical contents of the item.
- Technical comments are those which result in a material change to the technical contents of the item.

4. Provide details of the issue which feedback is being provided for

Comment
Example comment

5. Provide proposed replacement text and justification

Proposed replacement text	**Justification / link to evidence**
Example proposed replacement text	*Example justification*

- The justification should be with regards to the proposed replacement text provided.
- Evidence may include links to relevant data analysis, industry-recognised resources, technical reports/research, or case studies.
- The justification / link to evidence should be impartial, and not an expression of opinion from the individual/organisation providing feedback.

HNTAS Feedback Form - TS1

About you

Individual names:	Julie Godefroy
Organisation:	CIBSE
Relevant experience and expertise:	Chartered Institution of Building Services Engineers; comments raised here originate from the Heat Networks group

Status	Complete

HNTAS

Use extra tabs to provide evidence

Item	Category	Comment	Proposed replacement text	Justification / link to evidence	Status
General (all stages) — Key Aims (Section i.i) and Scope (Section ii)	Technical	HNTAS compliance burden disproportionate to a reliability- focused standard. TS1 sets out a broad set of Key Aims, including carbon reduction, affordability, consumer experience, investor confidence, and evidence building. While these are all important objectives, they are also influenced by a wider set of policy and regulatory instruments currently being developed, including heat network zoning, consumer protection regulation, and funding and delivery mechanisms. HNTAS is particularly well positioned to address a clearly defined core objective: improving the technical quality, performance (including energy efficiency and carbon emissions), and reliability of heat networks in order to protect consumers. However, the current TS1 framework — which applies requirements across multiple lifecycle stages and system elements, with independent assessment at each gateway — appears to be calibrated to deliver against all of the stated objectives simultaneously. This may result in a level of compliance complexity and administrative burden that is disproportionate, particularly for smaller operators or those developing or operating multi-phase networks. There is a risk that this could act as a barrier to investment in newheat networks, and create significant remediation challenges for existing operators, including local authorities and registered social landlords. Consideration could therefore be given to ensuring that the scope and structure of TS1 remain proportionate to its primary role within the wider	The Key Aims in Section i.i could be clarified to emphasise the primary role of HNTAS within the wider regulatory framework i.e. improving the technical quality, performance (including energy efficiency and carbon emissions), and reliability of heat networks, and in protecting consumers. Greater clarity could also be provided on how wider objectives — including carbon reduction, cost of heat, and market development — are delivered through the broader policy framework, including heat network zoning, consumer regulation, and funding and delivery mechanisms. In this context, consideration could be given to reviewing whether the compliance process — including the number of assessment stages, documentation requirements, and KPI framework in Annex M — remains proportionate to the primary role of HNTAS within the wider regulatory landscape. To support this, DESNZ could publish a policy integration statement setting out how HNTAS, heat network zoning, cost of heat policy, and delivery bodies such as the Warm Homes Agency collectively deliver the full range of heat network policy objectives. This would help ensure that the burden placed on any individual instrument remains proportionate to its intended role.	TS1 sets out a broad set of Key Aims, including carbon reduction, affordability, consumer experience, investor confidence, and evidence building. While these are all important objectives, they are also influenced by a wider set of policy and regulatory instruments currently being developed, including heat network zoning, consumer protection regulation, and funding and delivery mechanisms.	Complete
i.ii	Technical	The middle photo of figure 2 says 'HIU – Indirect Heating'. It should say Direct space heating and indirect DHW HIU. Furthermore there is no pump shown on the DHW and Cold Water feed should be labelled.	Middle Photo label to be corrected. Pump to be added for DHW and Cold Water Feed Labelled.	see column D Comments	Complete
i.vi What is a Heat Network?	Technical	The definition of "heat network" in Section i.vi of TS1 is aligned with the Energy Act 2023 and Ofgem's regulatory language, which is appropriate for legal and regulatory consistency. However, the technical elements that constitute a heat network—such as the energy centre (heat source), network of pipework, substations, consumer connections, and consumer heat systems are only described later in Section ii.iii.	We recommend adding a definition, linking it to Section ii.iii where the elements are described. This will help bridge the gap between the legal definition and the technical reality of heat networks, without conflicting with statutory language, Cross-reference or explanatory note to the main Proposed wording for addition (as a note or footnote to the definition in Section i.vi): *Note: This definition is aligned with the Energy Act 2023 and Ofgem's regulatory language. For the purposes of this technical standard, a heat network typically comprises the following elements: an energy centre (heat source), a network of pipework (district and/or communal distribution), substations, consumer connections, and consumer heat systems. These elements are described in detail in Section ii.iii. Practitioners should refer to Section ii.iii for the technical breakdown relevant to the design, construction, and operation of heat networks*.	justified to improve clarity and internal consistency for practitioners	Complete
Background - ii.i and 22.iii	Technical	**Single compliance pathway conflates district heating and communal systems. TS1 does not currently provide a clearly defined compliance pathway or assessment framework tailored to large-scale DH networks.** TS1 is intended to apply to both communal and district heat networks. However, the structure and emphasis of the technical requirements appear more closely aligned with communal, building-level systems. The majority of detailed requirements focus on building- scale infrastructure, such as plant rooms, heat interface units (HIUs), and tertiary distribution systems. For large- scale district heating (DH) networks — which may comprise multiple heat sources, extensive buried distribution networks, intermediate substations, and phased expansion over extended timeframes — the application of TS1 on an element-by- element and stage-by-stage basis is not fully aligned with how such systems are designed, delivered, and operated. In several areas, this approach risks being disproportionate and technically misaligned with established DH engineering and delivery practices. See also related but more specific comments on	TS1 should provide a clearly defined alternative compliance pathway for large- scale district heating (DH) networks, alongside the existing framework which is more closely aligned with communal, building-level systems. For DH networks, the compliance approach should be primarily outcomes-based at a system level, rather than prescriptive at an individual element level. This would better reflect the scale, complexity,and phased development of such networks, and align with established European district heating standards and practices (e.g. EN 14336, EN 253). Where specific building- level requirements within TS1 are not applicable to a DH scheme, this should be clearly identified through a defined "Statement of Applicability". This would provide a transparent and consistent mechanism for demonstrating compliance, avoiding the need for repeated requirement-by- requirement dispensations.	see column D Comments	Complete
Background - ii.i	Technical	**Ambient loop and fifth-generation networks are excluded from the current TS1, this is a potential regulatory gap**. TS1 explicitly excludes networks with a flow temperature below 50°C. The absence of a technical standard framework for these systems creates a potential regulatory gap. Such networks may fall within the scope of heat network regulation under HNTAS, but without clearly defined technical requirements against which compliance can be demonstrated. This may create uncertainty for developers, investors, and assessors, and risks deterring deployment of innovative, low- carbon network typologies. We note that TS1's own foreword acknowledges this as a gap for future development, and we would urge that this is addressed before regulatory commencement to avoid creating a two-tier market and/or creating a legacy of limitations , given the long development timescales of networks. See also various other comments, especially on the KPIs, which demonstrate the unsuitability of the current TS1 to ambient loop networks.	DESNZ and the Code Manager should confirm whether ambient loop and 5GDHC networks are in scope of HNTAS regulation. If they are, TS1 scope should be extended (or a companion standard developed) to cover these network types, with technical requirements calibrated to their characteristics — including: metering at array or building level rather than individual consumer connection level; carbon intensity calculation based on heat pump seasonal performance rather than delivered fluid temperature; and thermal performance assessment reflecting the low- temperature distribution medium. This is identified as a known gap for future development in TS1's own foreword and should be addressed before regulatory commencement to avoid a two-tier market.	This exclusion removes ambient loop networks and fifth- generation district heating and cooling (5GDHC) systems from the scope of the standard. These network types represent a growing segment of the heat network market and are expected to enable low-carbon heat supply, including the potential to deliver heating and cooling simultaneously via shared ambient loops and distributed heat pumps.	

Section ii.iv (Scope —Stages) and Requirement 1.1.12	Technical	**Mismatch between linear lifecycle logic and non-linear network growth.** The stage-gate structure in TS1 (Concept Design through to Operation) appears to assume a largely linear development pathway. This does not fully reflect the delivery of large- scale district heating (DH) schemes, which are typically developed incrementally, with different phases progressing at different times.	TS1 should include explicit provisions addressing phased and incrementally developed heat networks, setting out how HNTAS requirements apply where different parts of a network are at different lifecycle stages. In particular, TS1 should provide: (1) a clear definition distinguishing a new phase from an extension or modification of an existing network; (2) confirmation that HNTAS certification of existing phases is not affected by the addition of new phases, unless previously certified elements are materially modified; (3) worked examples illustrating how compliance and assessment should be applied across multi-phase developments. This should be complemented by equivalent provisions within the wider HNTAS Code documents (including assessment and certification procedures), to ensure consistency in how phased developments are assessed and certified. Further supporting guidance on phased development should be made available ahead of regulatory commencement to support consistent interpretation across the sector.	Requirement 1.1.12 requires the development of a phasing plan; however, it does not provide guidance on how HNTAS compliance should be applied across multiple phases progressing simultaneously. In practice, a major DH scheme may have Phase 1 in operation, Phase 2 in construction, and Phase 3 at feasibility or design stage concurrently. In particular, the following questions are not currently addressed by TS1 or the draft Code documents: (a) which lifecycle stage requirements apply to each phase within a multi-phase network; (b) whether certification of operational phases is affected when new phases are added or modified; (c) howand when HNTAS assessments are triggered forextensions to an already certified network. This lack of clarity may create uncertainty for developers, operators, and assessors, particularly in relation to certification status and	Complete
1.3.4	Technical	In Figure 11, the HIU bottom connection is incorrectly shown as connecting from the top. Also, both primary flow and return are connected to flow pipe.	The HIU bottom connection should show connection from bottom. Furthermore, A primary flow and return pipe should be added.	see column D Comments	Complete
1.7.15	Technical	Section 1.7.15 recommends a minimum thermal storage volume of 75 l/kW of heat pump output for hybrid systems. The basis for this value is not explained in the document, and it may not be optimal for all system types, operating strategies, or future flexibility needs. It may be optimal for residential development only as published by Fairheat in CIBSE journal (Hourly Load Modelling for Heat Pump and Thermal Store Sizing in a Hybrid Energy Centre).	A note should be added as caveat e.g.: Note: The 75 l/kW guideline is based on industry experience (add document reference e.g. CIBSE journal). However, optimal storage volume may vary depending on system configuration, load profile, network temperature. Designers are encouraged to use dynamic modelling or operational analysis to determine the most appropriate storage size for their specific project, and to justify deviations from this guideline where appropriate	see column D Comments	Complete
1.7.21	Technical	Inadequate carbon calculation framework: The carbon calculation requirements within TS1 lack a coherent whole- system framework and are distributed across multiple lifecycle stages without clear alignment. This creates ambiguity in how carbon performance should be consistently assessed and demonstrated. Key issues include: Requirements 1.7.21–1.7.24 require CO_2 calculations using Green Book emission factors, but provide no guidance on how to account for key system characteristics such as seasonal performance of heat pumps, the contribution of thermal storage, or the treatment of recoverable waste heat. See also comments on 2.7.15/3.7.15 , 7.7.1 and Annex M (HNTAS KPIs)	Requirements 1.7.21–1.7.24 should provide guidance on how to account for key system characteristics such as seasonal performance of heat pumps, the contribution of thermal storage, or the treatment of recoverable waste heat.	Requirements 1.7.21–1.7.24 provide no guidance on how to account for key system characteristics such as seasonal performance of heat pumps, the contribution of thermal storage, or the treatment of recoverable waste heat.	Complete
1.7.22	Technical	see comment on section 1.7.21	see comment on section 1.7.21	see comment on section 1.7.21	Complete
2.7.15/3.7.15	Technical	Inadequate carbon calculation framework : Requirements 2.7.15 / 3.7.15 define average CO_2 content at design stage using predicted values, with no provision for dynamic or time-varying carbon intensity factors	Requirements 2.7.15 / 3.7.15 should include provision	Requirements 2.7.15 / 3.7.15 do not include provision for dynamic or time-varying carbon intensity factors	Complete
2.8.26/3.8.26	Technical	Section 2.8.26 recommends multiple pumps for redundancy and efficiency. We suggest adding a guidance note to clarify that the designer should evaluate the pumping strategy to ensure that low-flow conditions are de-risked, particularly in systems where the heat source (e.g. ASHP or chiller) is sensitive to flow interruption. In some configurations, such as where the heat source is directly coupled to the distribution pump, it may be appropriate to operate two pumps simultaneously at part load to maintain flow in the event of a pump failure. In other configurations, such as those incorporating a thermal store and shunt pumps, a duty/standby arrangement may be sufficient. The key objective should be to avoid scenarios where a single pump failure could lead to tripping of the heat source or disruption of service.	Additional words to be added as below: The designer should evaluate the pumping strategy to ensure that low-flow conditions are de-risked and that the heat technologies like ASHP and Chiller are protected from flow interruptions. The strategy should be selected to avoid tripping of the heat source and ensure continuity of service. This strategy shall be clearly described in the Description of Operation (DesOps)	see column D Comments	
2.13.11/3.13.11	Technical	Heat-loss limits (as defined in Table J.3: 265W/dwelling and 12.0 W/kW_connection) may not be appropriately calibrated for large-scale district heating (DH) networks. As currently framed, the KPI risks treating fundamentally different system types as equivalent, which may lead to unintended outcomes — including disincentivising the use of low- carbon or waste heat sources that are not co-located with demand.	A review of this KPI is recommended, however this should not be at the detriment of overall energy efficiency and carbon performance. This points to the fact that KPIs that would consider OVERALL performance of the network could ensure more consistent overall outcomes, while affording design flexibility to different network configurations, heat sources etc.	The heat loss thresholds do not appear to be differentiated by network characteristics such as scale, distribution distance, or heat source type. For large DH systems with extensive distribution networks serving thousands of dwellings — particularly those utilising low-grade or waste heat sources located at a distance from demand — the relationship between distribution heat losses and overall system performance is fundamentally different from that of shorter, building-level or communal networks. In such cases, higher absolute distribution losses may be an inherent consequence ofv network geometry and strategic heat source utilisation, rather than an indicator of poor insulation or	Complete

3.17	Technical	The current draft does not provide guidance on phased construction or staged commissioning of heat networks. In practice, many networks are delivered in phases (e.g. by building, zone, or load segment), with commissioning and performance evolving over time. The absence of requirements for phasing strategies, interim performance compliance, and staged commissioning plans may lead to ambiguity in compliance, under-tested systems, or inefficient design compromises. This omission could undermine the practicality of HNTAS for large or complex developments.	Introduce a requirement for a "Phasing and Future Expansion Plan" at the design stage, detailing intended phases, interim performance expectations, and provisions for future integration. Require a "Staged Commissioning Plan" at the construction stage, outlining how each phase will be tested and integrated. Clarify how phased expansions affect certification and whether re-assessment is required. Consider allowing controlled interim variances in KPIs for early phases, with binding commitments to meet full compliance upon completion.	see column D	Complete
Sections 3.17 and 4.17	Technical	The draft TS1 does not currently reference the need for temporary heat load banks or equivalent provisions to enable full-load commissioning of primary plant (e.g. large heat pumps or boilers). In many projects, the connected network load during commissioning is insufficient to test plant at design capacity, especially when commissioning occurs in warmer months or before full network build-out. Without a temporary heat sink, systems may not be adequately tested, risking undetected performance or control issues. This omission could compromise the reliability and compliance of HNTAS-certified networks	Add a requirement that the commissioning plan must include a strategy for achieving full-load testing of each primary heat source. Where peak network loads may not be available during commissioning, the design should allow for connection of a temporary heat load (e.g. heat bank or dump radiator array). The energy centre should include physical provisions (e.g. valved connections, space, electrical supply) to support this. Evidence of full-load commissioning should be included in the assessment documentation.	see column D	Complete
7.7.1	Technical	Requirement 7.7.1 mandates operational CO calculation and recording, but does not specify calculation frequency, reporting requirements, or a consistent methodology	the calculation and reporting frequency pf operational carbon emissions needs to be specified.	see column D	Complete
Annex J	Technical	see comment on section 2.13.11/3.13.11	see comment on section 2.13.11/3.13.11	see comment on section 2.13.11/3.13.11	Complete
Annex M	Technical	Annex M (HNTAS KPIs) does not include a carbon performance metric, meaning carbon intensity is not monitored as a regulated KPI despite the stated objective of reducing carbon emissions. Taken together with the comments on sections 1.7.21-1.7.25, 2.7.15/3.7.15 and 7.7.1, this may lead to inconsistent approaches to carbon assessment and limits the ability of HNTAS to meaningfully regulate orvincentivise carbonvperformance across heat networks	carbon emissions from heat networks as a whole system need to be included as a KPI, to meet policy objectives behind the support for heat networks i.e. delivery of carbon savings	see column D Comments	Complete
Annex M	Technical	EC-KPI-05 This number is low and limits the operator's ability to make system improvements, especially with multiple shoulder or low-load seasons. In addition, if an operator wants to take an outage, but they have used their one for the year, they may consider an unplanned outage by not notifying.	Consider increasing the number of allowed planned outages. If it is desired to keep the total number of outages to four, then decrease EC-KPI-04 accordingly.	see column D Comments	Complete
Annex M	Technical	CD-KPI-05: This number is low and limits the operator's ability to make system improvements, especially with multiple shoulder or low-load seasons. In addition, if an operator wants to take an outage, but they have used their one for the year, they may consider an unplanned outage by not notifying.	Consider increasing the number of planned outages. If it is desired to keep the total number of outages to four, then decrease CD-KPI-04 accordingly.	see column D Comments	Complete
Annex M	Technical	EC-KPI-18 Distribution pump energy use. The KPI needs clarification, at the moment it states design: less than 1% of annual heat generation, and operation: 120% of design.	the KPI needs clarification if this is a blanket specification, i.e the pump energy requirement to be 1% of annual heat generation. This should be reviewed on a project to project basis taking into account the pumping requirements (peak flow rate), strategy (proportional or remote sensor method etc) and types and number of pumps specified for the project	see column D Comments	Complete
Annex M	Technical	CC-KPI-05: This number is low and limits the operator's ability to make system improvements, especially with multiple shoulder or low-load seasons. In addition, if an operator wants to take an outage, but they have used their one for the year, they may consider an unplanned outage by not notifying.	Consider increasing the number of planned outages. If it is desired to keep the total number of outages to four, then decrease CC-KPI-04 accordingly.	see column D Comments	Complete
Annex M	Technical	DD-KPI-05: This number is low and limits the operator's ability to make system improvements, especially with multiple shoulder or low-load seasons. In addition, if an operator wants to take an outage, but they have used their one for the year, they may consider an unplanned outage by not notifying.	Consider increasing the number of planned outages. If it is desired to keep the total number of outages to four, then decrease DD-KPI-04 accordingly.	see column D Comments	Complete
Annex M	Technical	SS-KPI-05: This number is low and limits the operator's ability to make system improvements, especially with multiple shoulder or low-load seasons. In addition, if an operator wants to take an outage, but they have used their one for the year, they may consider an unplanned outage by not notifying.	Consider increasing the number of planned outages. If it is desired to keep the total number of outages to four, then decrease SS-KPI-04 accordingly.	see column D Comments	Complete

Annex M	Technical	CC-KPI-06 Consumer connection: this covers consumer connection using apartment heat pumps only. Point 1) The specification does not specifically ask for additional metering hardware apartment side. It is assumed that the data produced by the heat pump controller for energy consumption and delivery can be used for performance monitoring. As this is not billing data we assume this would be acceptable, otherwise it will result in higher costs of installation, space take and additional equipment & complexity. Point 2) The requirement is for 90% of design efficiency target. This may not be appropriate for heat pumps. Heat pumps are typically assessed using Coefficient of Performance (COP) at certain ambient temperature or Seasonal COP (SCOP) and not directly comparable to percentage efficiencies. This could lead to confusion or misinterpretation when applying the KPI to low-carbon technologies. Furthermore, the efficiency of the apartment heat pump will vary depending on primary temperatures but also flow	Point 1) Clarification is required and engagement with manufacturers of ambient loop heat pumps is encouraged. Point 2) Clarify that for heat pumps, COP or SCOP should be used as the relevant performance metric. Provide indicative thresholds aligned with Building Regulations or industry standards (e.g. SCOP > 2.5 or 3.0 depending on application). Consider revising the KPI wording to accommodate different technology types. Furthermore, user changes to set points, and impacts on efficiencies, need to be factored into the technical specifications. A more meaningful assessment would be measuring if the heat pumps can achieve the design efficiencies at a specified range of different temperatures and load conditions. This needs to be properly evaluated otherwise 5G systems could be incorrectly assessed. In apartment controls using thermostats and correct water volume / bypasses on space heating & cooling circuit needs to be installed and maintained properly in order for the heat pump to perform as designed. Assessors need to be trained to properly assess these type of systems and the technical specification needs to be clearer.	see column D Comments	Complete
Annex M	Technical	CC-KPI-07: the VWART target of 45degC is not relevant to ambient loops.	clarify that the requirement is not applicable to ambient loop systems, and develop suitable KPIs as part of developing TS1 to incorporate ambient loop networks	see column D Comments	Complete
Annex M	Technical	CC-KPI-07: Volume weighted average temperature difference (VWATD), over 5degC is not relevant for ambient loops.	clarify that the requirement is not applicable to ambient loop systems, and develop suitable KPIs as part of developing TS1 to incorporate ambient loop networks	see column D Comments	Complete
Annex M	Technical	CC-KPI-08: Standby return temperature - no more than +3degC of expected - not relevant for ambient loops.	clarify that the requirement is not applicable to ambient loop systems, and develop suitable KPIs as part of developing TS1 to incorporate ambient loop networks	see column D Comments	Complete
Annex M	Technical	CC-KPI-10 is defined as the "Domestic hot water (DHW) return temperature". However, the target description for this KPI references "space heating operation".	The CC-KPI-10's target wording should be changed from "during space heating operation" to "during DHW operation" (or a similar DHW-specific phrase). This will align the document text with the KPI's intent and resolve the inconsistency	see column D Comments	Complete
Annex M	Technical	CD-KPI-06 & DD-KP1-06 defines heat loss as the difference between energy at the initiation point (CD1 & DD1) and termination point(s) (CD2 & DD2). However, the guidance does not explicitly state that CD2 and DD2 meters must be placed at all termination points to capture total heat loss. This could lead to underreporting if not all branches are metered. The plural use of 'termination point(s)' implies multiple CD2s and DDs, but this should be made explicit to ensure consistent interpretation	Clarify that CD2 and DD2 monitoring points must be installed at all final offtakes/termination nodes of the communal distribution network. For example, state: "CD2 & DD2 refers to the meter(s) at the termination of the communal distribution network – typically at each consumer connection or sub-network supplied. All such termination meters should be included to capture total delivered heat."	see column D Comments	Complete
Annex M	Technical	EC-KPI-09A, EC-KPI-09B, SS-KPI-09A, SS-KPI-09B: The KPI measurement methodology incorrectly refers to Volume Weight Average return temperature (VWART) instead of Volume Weight Average Flow Temperature (VWAFT)	Change VWART to VWARFT	see column D Comments	Complete
Annex M	Technical	EC-KPI-05: Wording duplication: The definition of an "Energy Centre interruption" repeats itself in KPI-05 (planned interruptions), making the bullet list hard to read.	Remove Duplication	see column D Comments	Complete
Annex M	Technical	Table 6. KPI Targets for EC-KPI-17: Heat pump COP is 2.0 which seems very low. We assume the COP is low since it is selected at ambient temperature of -5 oC.	The ambient temperature at which the COP is achieved should be specified. Also Specify an SCOP to help select efficient product	see column D Comments	Complete

Click + to expand rows