IoT Retrofit Monitoring

Procurement Guidance

for

London Boroughs and Housing Associations

Prepared by LOTI and Kingston & Sutton on behalf of Warmer Homes London

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1. Introduction

This guidance supports London boroughs and Housing Associations participating in the Warmer Homes London programme to procure IoT (Internet of Things) monitoring solutions for retrofit projects. IoT sensors enable continuous monitoring of property performance before and after retrofit interventions, providing evidence of improvement while also helping identify residents at risk of fuel poverty, damp and mould, or overheating.

1.1 Purpose of This Document

This document provides practical guidance for procuring IoT monitoring solutions that meet the technical, regulatory, and operational requirements of social housing retrofit programmes. It consolidates best practices from LOTI (London Office of Technology and Innovation), national standards, and London borough experience.

1.2 How to Use This Document

This guidance is a comprehensive toolkit designed to help London boroughs and housing organisations navigate the technical, legal, and operational complexities of procuring Internet of Things (IoT) monitoring solutions.

This will help with the following:

- **Strategic Alignment**: Start with Sections 1–3 to understand why this technology is being deployed and how it fits into the broader Warmer Homes London programme.
- **Technical Benchmarking**: Use Section 4 and Appendix B to set your minimum hardware and software requirements.
- **Operational Execution**: Sections 5–7 provide the "how-to" regarding resident trust, legal procurement routes, and phased rollout.
- **Governance & Compliance**: Use Section 8 and Appendix C to ensure your data handling and contracts are legally sound.
- **Tendering**: Appendix A contains a ready-made "Question Bank" to insert directly into your procurement documents.

2. Strategic Context

This section details the Warmer Homes London programme and the need for building performance data to justify public investment and support health policies. It highlights that data is the evidence base for scaling these projects across London.

Who should be involved: Finance Officers, Policy Leads, and Senior Management.

2.1 Warmer Homes London Programme

Warmer Homes London is working in partnership with boroughs and housing associations to deliver £231m in funding to improve the energy efficiency of Londoner's homes, making them greener, healthier, and more affordable to heat. This funding is made up of £121m from central government, £100m from the boroughs and housing associations themselves and £10m over four years from the Mayor of London.

A key strategic focus for Warmer Homes London is data and innovation. Insights derived from building performance data - specifically, data collected from homes receiving large-scale retrofit investments - are essential for establishing the evidence of energy savings and health benefits. Key building performance insights are needed for finance models and justifying further public investment. A key component is the development of a pan-London data platform aggregating environmental monitoring data to support public health, retrofit policy, and strategic housing decisions.

2.2 Programme Aims for IoT Monitoring

IoT monitoring within the Warmer Homes London programme serves four strategic aims:

1. **Evidence retrofit performance:** Demonstrate measurable improvements in thermal efficiency through Heat Transfer Coefficient (HTC), Heat Loss Rate (HLR), and Time to Heat (TTH) metrics before and after interventions.
2. **Validate resident experience and quantity cost/benefit:** Correlate measured property performance with resident comfort, health outcomes, and energy costs.
3. **Accelerate scale:** Build an evidence base that supports investment decisions and policy development across London.
4. **Support regulatory compliance:** Meet Awaab's Law requirements for proactive identification and response to damp and mould conditions.

2.3 Evidence Base

London borough pilots have demonstrated significant benefits from IoT monitoring:

- Detection of mould risk conditions up to 6 months before visible mould appears
- Projected annual savings of up to £8 million if scaled borough-wide
- Return of £2.68 social value per £1 invested

3. Regulatory and Standards Framework

Technical and performance standards are critical for ensuring that any procured IoT monitoring solution is compatible with established industry best practices, regulatory reporting obligations, and evaluation methodologies. They should be referenced directly when setting technical requirements and evaluation criteria for potential suppliers during the procurement process to ensure the collected data is reliable, accurate, and fit for the purpose of demonstrating retrofit performance and compliance.

Compliance with Awaab’s Law and PAS 2035:2023 is mandatory for social landlords. This section ensures that any procured solution helps the organization meet its proactive safety obligations and remains eligible for government funding.

Who should be involved: Legal Services, Compliance Officers, and Retrofit Assessors.

3.1 Key Legislation

IoT monitoring solutions must support compliance with:

- **Social Housing (Regulation) Act 2023:** Establishes proactive safety obligations for registered providers.

- **Awaab's Law** (section 42 of the Social Housing (Regulation) Act 2023 - effective October 2025) : Requires investigation of reported hazards within 10 working days and commencement of safety works within 5 working days where immediate risk exists.
- **Housing Act 2004 / HHSRS:** Housing Health and Safety Rating System for hazard assessment.
- **Homes (Fitness for Human Habitation) Act 2018:** Fitness standards for rented properties.
- **Environmental Protection Act 1990:** Statutory nuisance provisions.
- **Landlord and Tenant Act 1985:** Repair obligations.

3.2 Technical Standards

Technical and performance standards are critical for ensuring that any procured IoT monitoring solution is compatible with established industry best practices, regulatory reporting obligations, and evaluation methodologies. They should be referenced directly when setting technical requirements and evaluation criteria for potential suppliers during the procurement process to ensure the collected data is reliable, accurate, and fit for the purpose of demonstrating retrofit performance and compliance.

Solutions procured should meet and adhere to:

- **PAS 2035:2023:** Mandates Heat Transfer Coefficient (HTC) measurement for every retrofit project. Includes Annex E requirements for ventilation assessment.
- **PAS 2030:** Specification for installation of energy efficiency measures.
- **BS 40101:** Building Performance Evaluation standard with three assessment levels (preliminary for full cohort, intermediate, and investigative single-building).
- **ISO 9869-1:2014:** In-situ U-value measurement requiring 72-96 hours minimum with ±14% uncertainty.
- **SMETER Programme:** Government-backed HTC estimation methodology using smart meter data combined with internal sensors over a minimum 3-week period in occupied properties.

3.3 Funding Requirements

The Department for Energy Security and Net Zero (DESNZ) has confirmed that only SAP-eligible technologies that enable Smart Meter Enabled Thermal Efficiency Ratings (SMETER) such as smart thermostats are considered eligible measures for Warm Homes Social Housing Fund Wave 3. This means that standalone temperature or humidity sensors are not eligible, unless they form part of an approved, SMETER-enabling technology.

Warmer Homes London is developing a subsidy scheme which will support boroughs and housing associations to fund their own sensor programme. Whilst in design, the below principles will be applied for eligibility:

- Subsidised sensors must be installed in homes being retrofitted under Warm Homes: Social Housing Fund 3.0.
- Boroughs and Housing Associations must share sensor data related to these homes with Warmer Homes London (London Councils is the data controller for WHL) and the GLA through a co-designed Data Sharing Agreement.

- Boroughs and housing associations must attempt to seek resident consent for accessing smart meter data in all homes with subsidised sensors - this is a separate explicit resident/bill payer consent which the government has mandated must be given before access is allowed to smart energy meter data. The borough / housing association must seek to obtain this consent, following proscribed language from Warmer Homes London.
- Sensors are procured with the minimum technology requirements outlined in this guidance

4. Technical Specifications

Defining precise measurement standards prevents the purchase of unreliable hardware. It ensures the sensors provide the specific metrics needed to evaluate thermal efficiency, such as Heat Loss Rate (HLR) and Time to Heat (TTH).

Who should be involved: IT/Digital Teams, Data Analysts, and Technical Retrofit Officers.

4.1 Core Measurement Requirements

All solutions must capture the following environmental parameters at minimum:

Parameter	Accuracy	Frequency	Standard Reference
Internal Temperature	±0.3°C (ASHRAE 55) or ±0.5°C (BS EN 60730)	15-minute intervals (default 60 min)	ASHRAE 55, BS EN 60730
Relative Humidity	±3% RH	15-minute intervals (default 60 min)	ASHRAE 55
Dew Point (calculated)	Derived from temp/RH	Per reading interval	BS 5250
Vapour Pressure Deficit	Derived	Per reading interval	PAS 2035
Heat Loss Rate (HLR)	Time to lose 1°C	Calculated from data	SMETER methodology
Time to Heat (TTH)	Time to gain 1°C	Calculated from data	SMETER methodology
CO2 (optional but recommended)	±50ppm or ±5%	15-minute intervals	PAS 2035 Annex E

4.2 Retrofit Evaluation Requirements

For retrofit performance evaluation, solutions should support:

- **Evaluation period:** 36 months total (minimum 12 months pre-retrofit, 24 months post-retrofit)

- **Heating season timing:** Minimum 2 weeks pre-retrofit data during heating season with 7-8°C temperature differential between internal and external. Ideal: full heating season pre and post retrofit.
- **Heat Transfer Coefficient (HTC):** Calculated metric for thermal performance comparison
- **Awaab's Law validation:** 28-day validation cycles for damp and mould risk assessment

4.3 Hardware Requirements

Connectivity

Solutions must not rely on resident WiFi or broadband. Acceptable connectivity options include:

- Cellular/GSM (4G/LTE-M)
- LoRaWAN
- NB-IoT
- Devices must be pre-configured or configurable via mobile app (not requiring resident WiFi for setup)

Power and Durability

- **Battery-powered preferred:** Minimum 3 year duty cycle for sensors (battery must be replaceable)
- **Mains-powered acceptable:** Where cost and installation methodology are clearly stated
- **Data retention:** Minimum 24-hour local data retention during connectivity disruption with automatic upload on restoration
- **Warranty:** Minimum 24 months

Heating System Compatibility

Where heating control functionality is required, solutions should support:

- Gas boilers (standard call for heat and hot water)
- Oil boilers
- Air source heat pumps (ASHP) and ground source heat pumps (GSHP)
- Heat Interface Units (HIUs) for district heating
- Electric boilers and compatible IR heat panels
- Boiler Plus Legislation compliance and ErP certification where applicable

4.4 Software Platform Requirements

An explicit reference to the following standards in all procurement documents should be made, ensuring that they are listed as essential criteria:

Dashboard and Analytics

- Multi-user (concurrent) web-based dashboard accessible
- Real-time and historic data visualisation
- Individual property and portfolio-level views
- Risk categorisation: Mould Risk, Fuel Poverty Risk, Overheating/Heat Stroke Risk

- Performance metrics: HLR, TTH, HTC benchmarking
- PDF and CSV/Excel export capability
- Open data export standards in time and frequency
- Minimum 30-day historical data available via interface

- Notification of sensor down-time or disconnection

Integration and API

- Open API (RESTful, SOAP or JSON WebHook) for integration with Housing Management Systems and pan-London data platform (where applicable)
- Unlimited API queries at no additional cost
- MCP or similar for agentic (AI) queries (optional)
- OAuth 2.0 or equivalent secure authentication
- API documentation provided
- Capability to direct data to alternative cloud ingestion endpoints

Alerts and Notification

- Configurable alert thresholds per property
- Notifications to specified user accounts for critical issues
- Escalation paths for high-risk conditions

5. Resident Engagement

This section outlines a "Rights-First" approach to build trust. It is vital for ensuring high participation rates and avoiding the perception of surveillance.

Who should be involved: Resident Engagement Teams, Communications Officers, and Housing Management.

5.1 Importance of Engagement

Research indicates 84% of social housing residents express privacy concerns about IoT monitoring. However, the University of Exeter Smartline study (6-year study, 280 homes) found acceptance increases significantly over time and with demonstrated benefits. Trust is crucial for successful deployment.

5.2 Resident Engagement Toolkit

Warmer Homes London has developed a Resident First Retrofit Toolkit. This will be developed further to include: Privacy Notice, Smart Meter Data Consent Form, and co-designed engagement materials.

5.3 Resident Access (preferred)

Solutions should provide:

- Resident access to their own property data via app or dashboard
- Clear user guidance on what data means for their home
- Advice on measures to improve home conditions based on data
- Information on how data is used and stored

5.4 Handling Refusals

When a resident chooses not to participate in sensor monitoring, staff must follow a "Rights-First" approach to ensure safety and service continuity.

1. Informed Choice & Documentation

- Respect Autonomy: Residents have the right to refuse monitoring without providing a reason.
- Zero Penalty: Explicitly assure the resident that refusing monitoring will not affect their housing status or eligibility for care.
- Formal Recording: Document the refusal clearly in the resident's file, noting that the implications of the refusal were explained.

2. Information Without Coercion

- Neutral Guidance: Provide a "benefits and risks" fact sheet so the resident can make an informed decision at their own pace.
- Avoid Pressure: Staff must present information objectively; repeated attempts to "convince" the resident should be avoided as this can be perceived as harassment.

3. Service Continuity (The "Equivalent Care" Principle)

- Alternative Methods: If digital monitoring is refused, implement manual alternatives (e.g., increased physical welfare checks or scheduled phone calls) to ensure safety.
- Equal Quality: Ensure that the lack of data from monitoring does not lead to a lower standard of personal care or responsiveness.

4. Statutory & Legal Obligations

- Safety Overrides: Continue to meet all health and safety regulations through traditional assessment methods.
- Duty of Care: If the refusal poses a significant risk to life, trigger a multi-disciplinary review which may include teams across housing, adult social care and legal.

6. Procurement Routes

This section maps out legal pathways, such as the Spark DPS or G-Cloud, to speed up the buying process (sometimes to as little as 3–10 days). It ensures the organisation stays within UK procurement thresholds and uses pre-vetted suppliers.

Who should be involved: Procurement/Purchasing Teams and Category Managers.

6.1 Procurement Thresholds

Current UK procurement thresholds (as of January 2024):

- Services: £214,904 (incl VAT)
- Works: £5,372,609 (incl VAT)

The Procurement Act 2023 (effective February 2025) introduces mandatory transparency notices and an 8 working day standstill period for direct awards.

6.2 Available Procurement Routes

1. **Formal Tender:** Open or restricted procedure through its own procurement team. Provides greatest control over evaluation criteria and specification.
2. **Framework/DPS Direct Award:** Compliant route where supplier is pre-qualified and ranked. Significantly faster than formal tender (typically 3-10 days).
3. **Framework Mini-Competition:** Competition among framework suppliers. Balances speed with competitive evaluation.
4. **Below-Threshold Direct Award:** For orders under £30,000 or genuinely unique one-off requirements. Requires internal waiver process.
5. **Existing Supplier:** Where an existing contractual relationship exists (e.g., through IT supplier, merchant, or contractor).

6.3 Relevant Frameworks

The following frameworks may support IoT monitoring procurement. This is not a definitive list, it is advised that a framework is selected with good representation from a number of suppliers:

Framework	Coverage	Expiry	Notes
Crown Commercial Service Spark DPS	Internet of Things	15/02/2029	Filter by IoT and then run a mini-competition
G-Cloud 14 (RM1557.14)	Cloud Hosting (Spark DPS - CCSLot 1), Cloud Software (Lot 2), Cloud Support (Lot 3)	28/10/2026	SaaS monitoring platforms
TePAS 2 (RM6098)	Technology Products and Services	09/10/2027	IoT sensors/gateways, 63% SME suppliers
LHC N9 Retrofit and Decarbonisation (sub-contract wholesaler)	Control and Management Systems Iot	February 2029	£660m framework value
PfH SHED4	Social Housing Emerging Disruptors	January 2028	Smart devices and monitoring
National DPS Smart Predictive Building Maintenance	Smart Predictive Building Maintenance, Green Spaces and Associated Services	3rd Jan 2029	£30-45m value

Framework	Coverage	Expiry	Notes
	Dynamic Purchasing System		

7. Recommended Implementation Approach

This section advocates for a four-phase approach from preparation to full scale. It helps avoid "pilot paralysis" and ensures alert workflows are ready before sensors go live.

Who should be involved: Project Managers, Transformation Teams, and Training Officers.

7.1 Phased Implementation

Phase 1: Preparation (Months 1-3)

1. Complete Data Protection Impact Assessment
2. Define technical requirements aligned with PAS 2035 and SHF
3. Engage with LOTI for lessons learned and best practice
4. Develop resident engagement strategy

Phase 2: Procurement (Months 3-6)

1. Select procurement route based on value and timescales
2. Apply 10% social value weighting
3. Specify data ownership, portability, and open API requirements in contracts
4. Use tender questions from Appendix A

Phase 3: Pilot (Months 6-12)

1. Co-design resident communications with tenant representatives
2. Deploy in 50-100 properties before full scale
3. Establish alert triage and response workflows before go-live
4. Train housing officers on data interpretation
5. Test integration with housing management systems
6. Complete project and DPIA review before planning programme expansion.

Phase 4: Scale (Year 2+)

1. Full integration with housing management systems
2. Combine with other datasets (fuel poverty indicators, stock condition)
3. Contribute to LOTI pan-London platform where appropriate
4. Measure and publish outcomes of delivery and key insights

7.2 Common Pitfalls to Avoid

- **Data overload:** Ensure clear action workflows are defined before deployment
- **Surveillance perception:** Frame monitoring as resident benefit and property care, not surveillance
- **Integration complexity:** Plan integration with existing systems from the outset

- **Weak post-installation pathways:** Define response workflows and accountability before deployment
- **Pilot paralysis:** Plan for scale from the beginning, not just a pilot
- **Full Property List:** It may not be necessary to have a full property list ready at the time of tender - sampling and use of existing data sources to determine priorities however a broad understanding of overall cohort to be included in scope will make tendering more aligned with actual delivery.

8. Information Governance and Data Protection

This section provides the legal basis (Public Task) and ownership principles to keep the organisation compliant with UK GDPR.

Who should be involved: Data Protection Officer (DPO), Records Manager, and Information Governance Leads.

8.1 Background

The use of Internet of Things (IoT) sensors to monitor environmental conditions in social housing properties, particularly in the context of retrofit projects, involves the processing of data that may be considered personal data. Social landlords, typically local authorities, must comply with the UK General Data Protection Regulation (UK GDPR) and Data Protection Act 2018 (DPA 2018).

The LOTI report on Drivers, foundations and data protection considerations for damp & mould-related data projects provides good context for this.

Summary of Regulations:

The primary legislative and guidance drivers impacting environmental data projects include:

- **Decent Homes Standard** (updated 2006): Requires homes to meet the statutory minimum standard, be in reasonable repair, have reasonably modern facilities, and provide a reasonable degree of **thermal comfort**.
- **Homes (Fitness for Human Habitation) Act 2018**: Amends the Landlord and Tenant Act 1985 to ensure rented accommodation is **fit for human habitation** throughout the tenancy, considering factors like freedom from damp, ventilation, and repair.
- **Awaab's Law** (section 42 of the Social Housing (Regulation) Act 2023 - effective October 2025): Requires investigation of reported hazards within 10 working days and commencement of safety works within 5 working days where immediate risk exists.
- **Housing Ombudsman Spotlight Report (2021)**: Recommends landlords move from being reactive to **proactive**, and from blaming tenants to **taking responsibility** for addressing underlying D&M causes.
- **Understanding and addressing the health risks of damp and mould in the home (2023)**: Non-statutory guidance emphasizing the need for landlords to act on D&M quickly due to significant health impacts.

8.2 Personal data

Processing in Tenanted Properties (New Leases): There is an argument that sensor output data alone is property data and not personal data. However, if the intention is to match sensor data to personal data like tenancy records or health assessments, or use it to engage tenants in discussions about behaviour changes to support the property changes, then it is more likely to be considered personal data. Even if the data is kept separate from the tenant's name, the landlord holds data that allows a match to an individual, making it personal data under data protection law.

In London, for the Warmer Homes work, we will in most cases treat the sensor data as personal data.

Processing in Void Properties: Sensor data from void properties (properties between tenancies, often for repairs/retrofit) is not personal data unless matched to a previous tenant or a tradesperson. However, we recommend planning for the use of sensors to be considered to be within tenanted properties, as landlords are unlikely to install and remove sensors between each tenancy.

London Building Stock Model (LBSM)

Sensor data can be matched to the London Building Stock Model to generate insights and identify themes for building categories. Sensor data only, matched to the building data alone, is likely not considered personal data.

8.3 Data Protection Impact Assessment (DPIA)

When procuring IoT sensors for monitoring in a retrofit context, the data generated needs careful assessment to ensure legal compliance and the achievement of the project's aims.

A DPIA is almost certainly mandatory for the use of sensors under Article 35 UK GDPR due to:

- Systematic monitoring.
- Processing of sensitive data (eg matching with health data).
- Processing data concerning vulnerable data subjects (eg children and vulnerable adults).
- Innovative technological solutions (D&M sensors included).

The DPIA should be undertaken before procurement begins and updated for the specific solution selected. A partially filled template is available for councils to use which covers all aspects of data protection. The table below specifically only covers the DPIA aspects relevant to the procurement process, with the next sections providing broader considerations.

Issues	What this means for your procurement
Personal data considerations	

<table>
<tr><td>Is it Personal Data?

Yes, likely. This means that the security standards of the contractor and any data processing systems they use must be appropriate for personal data.</td><td rowspan="3">• All data encrypted at rest and in transit
• End-to-end encryption capability
• Servers storing personally identifiable data located within EEA
• Minimum 99.5% availability (24/7)
• Cyber Essentials certification minimum (Cyber Essentials Plus preferred)
• ISO 27001 certification preferred
• ICO registration</td></tr>
<tr><td>Inference or tracking of behaviour If you plan to draw inferences about tenant behaviour and propose or require changes, the use of sensors is considered tracking an individual's behaviour eg inferring bathing from humidity spikes, or lack of heating from low temperature.

This is a higher privacy risk and the access to and security of systems should meet suitable standards.</td></tr>
<tr><td>Personal vs Special Category Data

D&M sensor data on its own is unlikely to be considered special category data.

Special category data is involved where D&M data is matched to health data (eg to prioritise support for vulnerable tenants) or to demographic data like ethnicity and religion. This requires a suitable level of security for systems processing data and the training of staff handling the data.</td></tr>
<tr><td colspan="2">Data ownership and access</td></tr>
</table>

Data ownership The landlord must own and have access to the sensor output data. It is not expected that the supplier will own the sensor data or use it for its own purposes. In data protection terms, this means: **Data Controller:** The landlord - local authority or housing provider **Data Processor:** The supplier/solution provider This aligns with the London IoT Declaration principle that public authorities should own the data, not technology suppliers. If this is not the case then all of the data protection aspects of your tender, contract, privacy information and operational processes will need to change.	Tenders and contracts must specify: • The commissioning body (council/housing provider) owns all data and can automatically extract the data from the supplier's systems without having to request it from them. • Supplier cannot use or sell data to third parties without express written permission. • Open access to all data at no additional cost via API. • Clear data portability provisions for contract exit.
Data access for tenants Tenants may wish to see the sensor outputs, much like using a smart energy meter. Proactively providing this data is more transparent, fits with the Housing Ombudsman's recommendations to build better relationships, and allows tenants to challenge the data or its interpretation. Where sensor data is matched to identifiable data, like a tenancy record, the tenant, and potentially anyone living in the property, has a right to access their personal data through a Subject Access Request (SAR). SARs will be avoided or more easily handled if the sensor data is proactively made available to tenants.	It is strongly recommended that the tender requires the supplier to provide access to the sensor data for tenants, through a suitably secure system access or app.
Retention of Data	

Retention periods must be set in consultation with the Data Protection Officer and Records Manager. The retention period will depend on the purpose for which the data is used. For example, data copied for social care purposes may follow social care retention schedules. For the sensor data itself, consider any statute of limitations on legal claims e.g. related to disrepair.	Build the established retention periods into your tender and describe them in the contract. • **Raw sensor data:** 12-24 months operational retention • **Aggregated analytics:** 3-6 years for compliance and performance trending Automated deletion is recommended to help you avoid more time-consuming manual processes.

8.4 Lawful Basis for Processing

For local authorities:

The recommendation is to adopt **Public Task** as the lawful basis for processing sensor personal data, while using transparency and information provision to maintain ethical and collaborative relationships with tenants.

1. **Use Public Task as Lawful Basis:**
    - Justify the collection and processing of sensor data based on statutory and regulatory duties, particularly the need to:
        - Improve and maintain the **quality of properties**.
        - Improve **health outcomes** and reduce risk of damp and mould related health concerns.
        - Improve **statutory compliance** (eg Decent Homes Standard, Awaab's Law).
        - Proactively identify and treat D&M issues to reduce costs for repair and compensation.
    - For Housing Associations, public task lawful basis should be investigated and assessed on a case-by-case basis.

2. **No Explicit Consent Requested for Data Processing:**
    - LOTI guidance explicitly advises against consent-based approaches for this use case, as consent is not the suitable lawful basis given the legal requirements for landlords to proactively improve properties. Consent limitations would also impact the proactive use of data to identify tenants at risk of fuel poverty or other similar proactive interventions.
    - **Please note:** accessing energy smart meter data does require resident consent.

For Housing Associations:

- **Legitimate Interests (Article 6(1)(f)):** Requires documented Legitimate Interest Assessment (LIA).

8.5 Tenancy agreements and privacy information

Tenancy Agreements

- **Update Lease Terms and Conditions** to state the landlord's right (under Public Task/Statutory Duty) to install sensors to monitor the condition of the property and its impact on the tenant's safety and health.Typically these conditions are included in new tenancy agreements rather than respectively updating existing agreements already in place. The landlord may still wish to ask for the tenant's agreement to the physical **installation** of the sensor however the terms and conditions of the tenancy agreement will dictate how this should be approached.

Privacy Information

- **Inform Tenants** by providing clear and accessible **privacy information** to tenants **prior to sensor use**, explaining:
  - **What** personal data is processed (e.g., sensor outputs, property data, and any matched data).
  - **Why** (the Public Task lawful basis and specific use cases, such as identifying properties for inspection, identifying and addressing fuel poverty, or measuring retrofit success).
  - **How** the data is used and how tenants can exercise their data protection rights (e.g., Subject Access Request (SAR)).

This transparency aligns with the Housing Ombudsman's recommendations to be open and honest. It also ensures compliance with data protection law which requires data controllers to give privacy information to data subjects. The information should also detail any circumstances where the landlord may take action against tenants (as a secondary purpose).

9. Expected Outcomes To Achieve

Success is measured by verified energy efficiency gains, achieving social value, and improving long-term health outcomes, alongside early hazard detection. This ensures the procurement is strategically aligned with overall objectives.

Who should be involved: Public Health Officers, Sustainability Leads, and Asset Management.

9.1 Expected Damp and Mould Outcomes

While government guidance confirms that risk notifications from monitoring systems do not in themselves trigger the legal timeframes, IoT sensors can support social landlords within a damp and mould context:

- Early Hazard Detection: Flagging risks before they become legal hazards.
- Preventative Maintenance: Guiding maintenance to prevent serious issues.

- Evidence and Accountability: Providing data on housing conditions and intervention effectiveness.
- Resident Engagement: Supporting conversations about property conditions and ventilation.
- Financial Benefits: Savings to overall costs associated with damp and mould management.

Reference Material - further details can be found in the evaluation reports of the Pan-London Damp and Mould project:

1. Internet of Things (IoT) Sensors for Damp and Mould A comprehensive review of insights and lessons across London boroughs (February 2025)
2. Internet of Things (IoT) Sensors for Damp and Mould (Follow-up) Insights from Winter Deployment and Borough Plans for the Future (July 2025)

9.2 Expected Retrofit Outcomes

Integrating IoT technologies into retrofit programmes ensures that capital investments result in measurable improvements to building performance and resident well-being.

- Performance Validation: Providing "before and after" metrics—such as Heat Transfer Coefficient (HTC) and Heat Loss Rate (HLR)—to verify the actual energy efficiency gains of retrofit interventions.
- Proactive Regulatory Compliance: Ensuring local authorities meet statutory obligations under the Social Housing (Regulation) Act 2023 and Awaab's Law by identifying damp and mould risks post-retrofit.
- Health and Wellbeing Assessment: Quantifying the impact of thermal improvements on indoor air quality and the overall health outcomes for residents.
- Investment Justification: Building a data-backed evidence base to justify public spending, evaluate value for money, and unlock new financing models for future works.
- Strategic Scaling: Contributing to a pan-London data platform that informs public health policy and accelerates the pace of the Warmer Homes London programme.
- Enhanced Resident Trust: Overcoming privacy concerns by providing residents with access to their own data, framing the technology as a tool for property care and comfort.

9.3 Procurement Outcomes Considerations

This guidance mitigates procurement risks by shifting from generic purchasing toward a specialized, outcome-focused tender process.

- Risk Mitigation Strategies:
    - Compliance and Standards: The guidance mandates adherence to PAS 2035:2023 and BS 40101, ensuring all solutions meet industry best practices and legal requirements (e.g., Awaab's Law).
    - Vendor Lock-in and Data Sovereignty: To prevent dependency on a single supplier, the guide requires Open APIs and clear data portability. This ensures

local authorities retain ownership of their data with no additional costs for cloud ingestion.
    - Technical Rigour: Specifications include non-negotiable hardware requirements—such as temperature accuracy of ±0.3°C and humidity accuracy of ±3% RH—to prevent the procurement of unreliable sensors.
- Tender Process Benefits:
    - Streamlined Evaluation: Utilizes a structured Tender Question Bank (Appendix A) featuring Mandatory Pass/Fail criteria and Scored criteria to ensure objective assessment.
    - Social Value and ROI: Aligns procurement with public sector goals by mandating a 10% social value weighting and providing a business case for a projected £2.68 social value return per £1 invested.
    - Procedural Efficiency: Identifies pre-vetted, compliant procurement routes (e.g., Spark DPS, LHC N9). This allows for flexible timelines, ranging from a 3-10 day Direct Award to more comprehensive competitive tenders.

Appendix A: Tender Question Bank

The next section provides example questions to ask suppliers as part of a formal tender process.

Who should be involved: Procurement (for Appendix A), Technical Leads (for Appendix B), and Legal Services (for Appendix C).

The following Information Governance For London material may be useful as wider context for any tendering:

- IGfL_01_Due Diligence & Contract Monitoring Guidance.docx
- IGfL_02_Due Diligence Instructions for Contractors.docx
- IGfL_04_Information Governance Due Diligence Questions.xlsx

In addition to the recommended questions by IGfL above, the following questions are organised into mandatory pass/fail questions and scored evaluation questions.

Depending on the context for your tender (supply and install, or install only), selection of questions should be made accordingly. You should also adapt weighting and specific thresholds to your requirements.

A.1 Compliance and Data Protection (Mandatory Pass/Fail)

Ref	Question	Response Type	Strongly Recommended
A1.1	Does your solution meet data protection requirements as outlined in the Data Protection Act 2018, including UK GDPR requirements?	Yes / No	Yes
A1.2	Does your solution allow for the processing of consent and/or documentation of a lawful basis for processing?	Yes / No	Yes
A1.3	Does your solution allow for the deletion of personally identifiable information on request (right to erasure)?	Yes / No	Yes
A1.4	Are all servers that store personally identifiable data located within the European Economic Area (EEA)?	Yes / No / N/A	Yes
A1.5	Is all data generated by your solution encrypted at rest?	Yes / No	Yes
A1.6	Is all data generated by your solution encrypted during transmission?	Yes / No	Yes
A1.7	Can you provide evidence that your solution delivers full end-to-end encryption of all sensitive data if required?	Yes / No	Yes

Ref	Question	Response Type	Strongly Recommended
A1.8	Does your solution have a target of 99.5% availability (24/7)?	Yes / No	Yes
A1.9	Is your organisation registered with the Information Commissioner's Office (ICO)?	Yes / No	Yes
A1.10	Does your organisation have a Health and Safety Policy that complies with current legislative requirements?	Yes / No	Yes
A1.11	Does your organisation have an Environmental Policy applicable to the performance of this contract?	Yes / No	Yes
A1.12	Does your organisation have a policy compliant with current equality legislation?	Yes / No	Yes

A.2 Data Ownership and Access (Mandatory Pass/Fail)

Ref	Question	Response Type	Strongly Recommended
A2.1	Does your solution give full ownership of all data to the commissioning body (council/housing provider)?	Yes / No	Yes
A2.2	Do you confirm that your organisation (and any affiliated companies) will NOT use or sell any data generated by the solution to third parties without express written permission from the Council?	Yes / No	Yes
A2.3	Does your solution offer access to all essential data via an open API?	Yes / No	Yes
A2.4	Does your solution provide open access to all of the Council's data at no additional cost (over and above costs outlined in this response)?	Yes / No	Yes
A2.5	Can data be stored anonymously (without personal resident data saved on the system)?	Yes / No	Yes

A.3 Hardware Functionality (Mandatory Pass/Fail)

Ref	Question	Response Type	Strongly Recommended
A3.1	Does the sensor hardware measure internal temperature with accuracy of ±0.5°C or better?	Yes / No	Yes

Ref	Question	Response Type	Strongly Recommended
A3.2	Does the sensor hardware measure relative humidity with accuracy of ±5% RH or better?	Yes / No	Yes
A3.3	Can the solution capture readings at minimum 15-minute intervals (with default 60-minute intervals acceptable)?	Yes / No	Yes
A3.4	Does the solution operate independently of resident WiFi/broadband (e.g., via cellular, LoRaWAN, or NB-IoT connectivity)?	Yes / No	Yes
A3.5	Does the solution retain data locally for a minimum 24 hours during connectivity disruption with automatic upload on restoration?	Yes / No	Yes
A3.6	Is the hardware CE marked and compliant with all relevant UK legislation?	Yes / No	Yes
A3.7	Does the hardware come with a minimum 24-month warranty?	Yes / No	No

A.4 Software Functionality (Mandatory Pass/Fail)

Ref	Question	Response Type	Strongly Recommended
A4.1	Does the solution attach the Unique Property Reference Number (UPRN) to every data point collected?	Yes / No	Yes

A.5 Retrofit Performance Evaluation (Mandatory Pass/Fail)

Ref	Question	Response Type	Strongly Recommended
A5.1	Does your solution calculate Heat Loss Rate (HLR) - time taken for property to lose 1°C of internal air temperature?	Yes / No	Yes
A5.2	Does your solution calculate Time to Heat (TTH) - time taken for property to gain 1°C of internal air temperature?	Yes / No	Yes
A5.3	Can your solution support a 36-month evaluation period (minimum 12 months pre-retrofit, 24 months post-retrofit)?	Yes / No	Yes

Ref	Question	Response Type	Strongly Recommended
A4.4	Does your solution calculate or derive Dew Point from temperature and humidity readings?	Yes / No	Yes
A5.5	Does your solution calculate or derive Vapour Pressure Deficit (VPD)?	Yes / No	Yes
A5.6	Can your solution support Heat Transfer Coefficient (HTC) calculation in accordance with SMETER methodology or equivalent?	Yes / No	Yes

B.1 Security and Compliance (Scored - Suggested 10%)

Ref	Question	Word Limit	Strongly Recommended
B1.1	Confirm which security standards your solution and/or organisation is certified with (e.g., ISO 27001, ISO 9001, Cyber Essentials Plus, or similar). Provide certificate numbers and expiry dates.	200 words	Yes
B1.2	Explain how your solution aligns or conforms to BSI standard PAS 185:2017 'Smart cities – Specification for establishing and implementing a security-minded approach'. Identify any areas of non-conformance.	500 words	Yes
B1.3	Outline what anti-malware defences and boundary firewalls are in place to protect your solution from external attack, including use of role-based security models secured using HSM (Hardware Security Modules) if applicable.	200 words	Yes
B1.4	Describe your approach to disaster recovery, including: full recovery capability from primary data centre, air-gapped backups, and evidence that supply chain supporting recovery has been tested.	200 words	Yes
B1.5	Describe how your solution meets the following encryption requirements: secure encryption of data on all devices, secure encryption of exported/archived data, secure encryption of backups, secure encryption of all data transfer and integration, data movement encryption within and to/from data centres.	200 words	Yes
B1.6	Outline how your system's information management will comply with UK GDPR and how you will ensure compliance with any future legislative changes.	200 words	Yes

B.2 Data and Integration (Scored - Suggested 10%)

Ref	Question	Word Limit	Strongly Recommended
B2.1	Describe the extent of data available through your API: how is data accessed, which datasets are available, what documentation is provided, and what authentication methods are used?	200 words	Yes

Ref	Question	Word Limit	Strongly Recommended
B2.2	Is it possible to direct data from your sensor devices (and gateways) to an alternative cloud ingestion endpoint? Explain what options exist for this.	200 words	Yes
B2.3	Do you subcontract the provision of data processing services to a third party? If so, outline the circumstances and provide evidence of subcontractor suitability including minimum security requirements.	200 words	Yes
B2.4	Explain how your organisation makes use of data collected and stored by your solution, including which datasets are stored, why, how, and if any data is used by third parties.	200 words	Yes
B2.5	Describe what datasets contain Personal Identifiable Data (if any), what the retention period is for each, and whether data can be deleted for individual records on request.	200 words	Yes
B2.6	Describe your solution's capability to integrate with Housing Management Systems through secure web services API. Provide examples of successful integrations.	200 words	Yes

B.3 Technical Solution (Scored - Suggested 20%)

Ref	Question	Word Limit	Strongly Recommended
B3.1	Describe your sensor hardware including: sensors incorporated, measurement accuracy, connectivity method, power source, expected battery life (if applicable), and physical dimensions.	300 words	Yes
B3.2	Explain what level of control you have over the sensors once deployed. Provide details on the type of sensors used, how they connect to the platform, and connectivity options (LoRaWAN vs NBIoT vs LTE-M vs other).	200 words	Yes
B3.3	Describe your solution's capability for heating system compatibility including: gas boilers, oil boilers, ASHPs, GSHPs, Heat Interface Units (district heating), and electric heating systems.	300 words	Yes

Ref	Question	Word Limit	Strongly Recommended
B3.4	Describe your dashboard/platform functionality including: data visualisation, risk categorisation (mould, fuel poverty, overheating), performance metrics, alerting capabilities, and reporting functions.	400 words	Yes
B3.5	Explain how your solution calculates mould/damp risk, including the methodology used, data inputs, and how risk levels are categorised (high/medium/low).	300 words	Yes
B3.6	Explain how your solution calculates fuel poverty risk, including the methodology used, reference to relevant standards (e.g., PHE 18°C recommendation), and risk categorisation.	200 words	No
B3.7	Explain how your solution calculates overheating/heat stroke risk, including methodology, relevant thresholds, and alignment with NHS England guidance.	200 words	No
B3.8	Describe how your solution supports retrofit performance evaluation in accordance with PAS 2035, including HTC estimation capability and comparison of pre/post retrofit data.	300 words	Yes
B3.9	Does your solution offer optional CO2 monitoring for ventilation assessment in accordance with PAS 2035 Annex E? If yes, describe the capability.	200 words	No
B3.10	Does your solution offer optional energy monitoring (e.g., via energy clamps or smart meter integration)? If yes, describe the capability and any additional costs.	200 words	No

B.4 Delivery and Support (Scored - Suggested 10%)

Ref	Question	Word Limit	Strongly Recommended
B4.1	Provide a high-level delivery plan from date of order including all key milestones. Set out when (how quickly) your solution can be delivered, implemented and go-live.	500 words	Yes
B4.2	Describe your installation approach including: safe installation methodology, installer	300 words	Yes

Ref	Question	Word Limit	Strongly Recommended
	qualifications/training, average installation time per property, and any resident access requirements.		
B4.3	Describe your training provision for: (a) installers/contractors if the Council uses its own workforce, (b) housing officers for data interpretation and response workflows, (c) customer service/repairs teams.	300 words	Yes
B4.4	Describe your ongoing support provision including: technical support hours, fault diagnosis and resolution, hardware replacement process, and escalation procedures.	300 words	Yes
B4.5	Describe your Customer Success approach: how you will support the Council throughout the contract lifecycle to ensure project objectives are delivered, including proactive data analysis, reporting cadence, and best practice recommendations.	400 words	Yes
B4.6	Describe your off-boarding process and steps at contract end to decommission the solution and its data. Include: data migration to another platform, deletion of data where necessary, and decommissioning of infrastructure.	200 words	Yes

B.5 Resident Engagement (Scored - Suggested 10%)

Ref	Question	Word Limit	Strongly Recommended
B5.1	Describe how your solution provides resident access to their own data, including: app functionality, dashboard access, what information is visible to residents, and how they can use this to improve their home environment.	300 words	Yes
B5.2	Describe any communication functionality within your solution (e.g., messaging via device, surveys, appointment scheduling) and typical response rates achieved.	300 words	Yes
B5.3	Describe the user guidance materials you provide to residents including: how the solution works, what data collected means for their home, advice on improving home conditions, how data is used and stored.	200 words	Yes

Ref	Question	Word Limit	Strongly Recommended
B5.4	How do you support residents with limited technical expertise or digital access? Consider: user-friendly design, non-digital alternatives, support for vulnerable customers.	200 words	No
B5.5	Describe how residents can deactivate their account or request removal from the system in the event of tenancy change.	100 words	Yes

B.6 Pricing (Scored - Suggested 20%)

Ref	Question	Word Limit	Strongly Recommended
B6.1	Provide an indicative quote for your solution showing all possible costs and options. Include: hardware unit cost, installation cost per property, SaaS/platform annual cost, any connectivity charges, maintenance costs, and optional extras. Use suggested quantities: 100 properties (pilot), 500 properties, 1000 properties.	Attachment	Yes
B6.2	Confirm what is included in your pricing and identify any costs that may be charged separately (e.g., additional user licences, API access, reporting, training).	200 words	Yes
B6.3	Describe any volume discounts available and how pricing scales with deployment size.	100 words	Yes

C.1 Expected Outcomes (Scored - Suggested 20%)

Ref	Outcome	Word Limit	Strongly Recommended
C1.1	Describe all expected damp and mould benefits the solution will deliver	400 words	Yes
C1.2	Describe all expected retrofit benefits the solution will deliver	400 words	Yes

Appendix B: Technical Measurement Standards Reference

B.1 Risk Calculation Methodologies

Mould Risk

Mould risk should be calculated using real-time data from temperature and humidity sensors to predict conditions conducive to mould growth. Risk categorisation:

- **High risk:** Mould risk value peaks at >66% at any point over the last 12 months
- **Medium risk:** Highest mould risk value between 33% and 66% over the last 12 months
- **Low risk:** Maximum mould risk value less than 33% over the last 12 months

Properties require at least 4 weeks of data with minimum 80% data presence before mould risk can be reliably calculated.

Fuel Poverty Risk

Following Public Health England recommendation that homes should be heated to at least 18°C:

- **High risk:** Average of recent internal temperatures below 18°C
- **Medium risk:** 25-50% of temperature readings below 18°C across occupied days over last 3 months
- **Low risk:** <25% of temperature readings below 18°C across occupied days over last 3 months

Overheating/Heat Stroke Risk

Calculated using air temperature and relative humidity to calculate heat index ('feels like' temperature):

- **High risk:** Heat index >32°C for 2+ hours on at least 5 separate days in last 12 months (increased risk of heat exhaustion and heat stroke)
- **Medium risk:** Heat index >26°C for 2+ hours on at least 5 separate days (aligned with NHS England threshold for vulnerable groups)
- **Low risk:** Does not meet criteria for medium or high risk

B.2 Performance Metrics

Heat Loss Rate (HLR)

Time taken for property to lose 1°C of internal air temperature when heating is off. Benchmark thresholds:

- **High Heat Loss Rate (poor performance):** <2 hours 55 minutes to lose 1°C
- **Medium Heat Loss Rate:** 2 hours 55 minutes to 5 hours 31 minutes
- **Low Heat Loss Rate (good performance):** >5 hours 31 minutes to lose 1°C

Time to Heat (TTH)

Time taken for property to gain 1°C of internal air temperature when heating is on. Benchmark thresholds:

- **High Time to Heat (poor performance):** >2 hours 30 minutes to gain 1°C
- **Medium Time to Heat:** 1 hour to 2 hours 30 minutes
- **Low Time to Heat (good performance): <1 hour to gain 1°C**

B.3 Awaab's Law Compliance

IoT monitoring solutions should support compliance with Awaab's Law timescales:

- **Investigation:** Within 10 working days of hazard being reported or identified
- **Safety works:** Within 5 working days where there is an immediate risk to health
- **Validation cycles:** 28-day monitoring cycles for ongoing risk assessment

B.4 Connectivity Independence

To ensure continuous monitoring in void and tenanted properties, the Solution must utilise a managed Wide Area Network (WAN) connection (e.g., Cellular/LTE-M, NB-IoT, or LoRaWAN). The Solution must **not** rely on the resident's private internet connection (Wi-Fi) or mains power for data transmission.

B.5 Hardware Lifecycle and Battery Management

Battery-powered sensors must have a minimum operational life of 3 years at the specified reporting frequency. There must be a facility to remotely monitor battery health and the battery must be replaceable.

B.6 Reference Standards

- ASHRAE 55 - Thermal Environmental Conditions for Human Occupancy
- BS EN 60730 - Automatic Electrical Controls
- BS 5250 - Code of Practice for Control of Condensation in Buildings
- PAS 2035:2023 - Retrofitting Dwellings for Improved Energy Efficiency
- PAS 2030 - Installation of Energy Efficiency Measures
- BS 40101 - Building Performance Evaluation
- ISO 9869-1:2014 - In-Situ Measurement of Thermal Resistance
- SMETER Programme - Smart Meter Enabled Thermal Efficiency Ratings
- PAS 185:2017 - Smart Cities Security-Minded Approach

Appendix C: Sample Contractual Terms & Conditions

Local Authorities and housing organisations should adopt a unified contractual template to enforce these specific requirements. The clauses below focus on the unique issues pertaining to IoT data, superseding or supplementing standard local authority service contracts (e.g., using terms like "Council", “housing organisation” and "Service Provider" consistent with procurement documentation). These clauses are not sufficient to completely replace sections within the standard template and will need to be adjusted accordingly.

Clause 1: Data Ownership and Usage

1.1. **Organisation Data Ownership.** All "Base Data" (defined as unaltered sensor readings, environmental measurements, and UPRN associations) shall at all times remain the exclusive property of the Council or housing organisation. The Service Provider assigns all present and future rights in the Base Data to the Council or housing organisation.

1.2. **Intellectual Property and Derived Data.** The Service Provider retains ownership of all "Background IP," including proprietary algorithms, risk scoring methodologies, and analytical models used to generate "Derived Data" (e.g., mould risk scores, fuel poverty indicators). The Service Provider grants the Council or housing organisation a perpetual, irrevocable, royalty-free, non-exclusive licence to use, reproduce, and share the Derived Data for its statutory duties, housing management, and strategic reporting purposes.

1.3. **Use Restriction**. The Service Provider shall not disclose Council or housing organisation Data to any third party for external commercial purposes without prior written consent. Notwithstanding this, the Council or housing organisation grants the Service Provider the right to use aggregated and anonymised Council or housing organisation Data solely for the purpose of training machine learning models, benchmarking, and the continuous improvement of the Services, provided that no individual property or any personal information of a resident can be identified.

[Note: this retains the Organisation’s ownership of the resident’s data, but recognises in the world of AI that it is in the organisation's interest for the supplier to continuously refine and improve their model]

Clause 2: Data Protection (UK GDPR and DPA 2018)

2.1. **Controller and Processor Status.** The Council or housing organisation shall remain the Data Controller in relation to all Personal Data processed under this Contract, and the Service Provider shall act strictly as the Data Processor, following the direction of the Council or housing organisation.

2.2. **Compliance.** The Service Provider shall comply with all relevant Information Legislation, including the UK GDPR and the Data Protection Act 2018 (DPA 2018).

2.3. **Data Residency.** The Service Provider shall ensure that Council or housing organisation Data is stored and processed exclusively within the UK and/or the EEA. The processing or storage of Council or housing organisation Data outside the EEA is strictly prohibited without the full, prior written consent of the Council or housing organisation.

2.4. **Sub-processing.** Where processing Personal Data, the Service Provider shall not procure the services of any other agent or sub-provider without the explicit written consent of the Council or housing organisation.

2.5. **Data Subject Access Requests (SARs).** The Service Provider shall provide the Council or housing organisation with all requested Personal Data and related information for a Subject Access Request (SAR) in good time (ideally 3-4 days) so that the ten working days time limit of instruction can be met by the Council or housing organisation.

Clause 3: Interoperability and Exit Arrangements

3.1. **UPRN Mandatory Linkage.** The Service Provider shall ensure that every data point, measurement, and record collected and stored under this Contract is reliably linked to the unique property location using the **Unique Property Reference Number (UPRN)** associated with the property address.

3.2. Data Extraction and API Standards. Upon expiry or termination of this Contract, or upon request during the term, the Service Provider shall provide the Council or housing organisation with Council or housing organisation Data in a structured, open format (e.g., JSON, CSV). Data transfer shall be facilitated via a documented RESTful API, OGC SensorThings API, **or an equivalent open standard** capable of automated ingestion by the Council or housing organisation's systems

3.3. **Data Decommissioning.** The Service Provider shall securely destroy all Council or housing organisation Data upon termination or completion of decommissioning, save for any data required by the Council or housing organisation to be retained under statutory or contractual obligations.

3.4. End of Life Disposal. The Service Provider acts as the "Producer" for the purposes of the Waste Electrical and Electronic Equipment (WEEE) Regulations 2013 and shall be responsible for the compliant collection, treatment, and recycling of all hardware at the end of the contract or equipment lifecycle

Clause 4: Indemnities and Liability

4.1. **Data Indemnity.** The Service Provider shall be liable for and shall indemnify the Council or housing organisation against each and every action, proceeding, liability, cost, claim, loss, expense (including reasonable legal fees and disbursements) and demands incurred by the Council or housing organisation which arise directly from a breach by the Service Provider or its sub-providers of its obligations under the Information Legislation (including DPA 2018 and UK GDPR).

4.2. Calibration and Accuracy Liability. The Service Provider warrants that the monitoring equipment shall meet the accuracy standards set out in the Technical Specification (e.g., ±0.5°C for temperature, ±3% for RH). The Service Provider shall indemnify the Council or housing organisation against direct losses arising from the Service Provider's negligence or failure to maintain these accuracy standards.

4.3. Limitation of Liability. The Service Provider's aggregate liability under this Clause 4 shall be capped at [150%] of the total Contract Value. The Service Provider shall not be liable for consequential losses, or for legal claims under the Landlord and Tenant Act 1985 or the Social Housing (Regulation) Act 2023, except where such claims are directly and solely proven to be caused by the Service Provider's provision of data that failed to meet the agreed technical specifications.