National Existing Buildings Database

Built Environment – Smarter Transformation

Construction Leadership Forum

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This report, named the 'National Existing Buildings Database,' aims to collate and assess the quality, usefulness, and validity of data currently held by a variety of building owners across Scotland. It explores how automation can assist in pulling data from an array of sources and compiling it in a central location so that complex data can be displayed in a live, legible, and useable interface.

This report is the first phase of a larger programme of work where a national buildings database, which property owners could in future access to model and test retrofit plans for their properties, would be developed in line with the findings of the report. The report is calling for organisations and stakeholders who would like to be involved in working with BE-ST to take the next steps to development of the database, to get in touch with Gavin Johnston at BE-ST (see email below).

The report was informed through a series of engagement sessions, a survey, and face-to-face discussions with stakeholders in relevant fields of research. In these workshops stakeholders emphasised comprehensive, interoperable data, covering building conditions, environmental factors, and occupant behaviour as criterion for a successful and holistic database should the database be developed. These criteria would allow the database to enhance planning and management for retrofit programmes aligned with carbon, economic, and social goals, as well as asset management, maintenance and investment programmes.

The stakeholders identified current data gaps, reliability concerns, and the need for a centralised, cyber-secure platform which integrates real-time data, supporting risk assessment, local supply chains, and climate-resilient planning as a significant challenge to delivery of a database.

A National Existing Buildings Database would be a cornerstone for sustainable development, offering economic, social, and environmental benefits while helping Scotland progress toward a fair and just transition to a low-carbon economy. This report emphasizes the clear need for an existing buildings database or data set for building owners across Scotland to utilise to make decisions and investments with confidence. BE-ST and the CLF Data Working group are supportive of any workstream which seeks to build upon this opportunity to develop the process, platforms or resources needed to realise this much needed resource.

To find out more about the recommendations, next steps, research findings, and more, read the full report here: National Existing Buildings Database - Full Report

If you have any questions or would like to express interest in taking any aspect of the development of the database forward, please contact: gjohnston@be-st.build

Outputs

In delivering the report, we identified:

- An agreed definition of a National Existing Buildings Database, defining what data it might hold, what the useful application for this may be, and an indication of how this is managed.
- Opportunities to align with other workstreams in data capture, archetype analysis, and modelling.
- A blueprint for the function of a database, which may draw data from other open or private sources.
- Sources of data which can feed and enhance a central source of knowledge.
- An agreed definition of the function of the database, i.e. a dataset which can be utilised in other programmes or a design/modelling tool for planning. All of this is within the context of Social Housing, with some scope for expansion to all Housing.
- The data and the database have wider and useful applications to all buildings, something which is agreed to be important at this stage.
- A digital twin framework and an approach to de-risking the project for scalable implementation.
- The need to support archetypal pattern books which will support and accelerate Retrofit at scale.
- A ‘building passport’ approach encompassing a range of existing databases and data, is preferred. A building passport is a digital record storing comprehensive information on a building’s design, materials, systems, and maintenance history for lifecycle management and full retrofit.

Obstacles identified

Several obstacles were identified through the process of writing the report and the stakeholder engagement. These included obstacles around data gaps, data protection and confidence, supply chain, and general concern of how the data may be used and how inter-operable it may be.

The report identifies that central government controlling the database, with accessibility arranged through a level of expertise, would be preferred. This suggests the adoption of a blockchain approach to the development of any potential database.

Data visualisation also was a concern and how this interface may be used by different stakeholders.

Methodology

National Existing Buildings Database report was informed by a literature review, stakeholder workshops, a survey and 1-2-1 interviews.

Workshops

The Stakeholder Engagement Group, consisting of professionals in the construction and social housing sector, met in three virtual workshops to discuss the development of digital existing building database for social housing.

The discussions in the first workshop concerned current practice and approach that could support decision making. The second workshop focused on aspirations and future development of a potential database or dataset. Workshop three centred on discussing ancillary factors identified in the previous workshops and survey as obstacles, and the discussion was around how data is currently managed and how this may be overcome.

Survey and 1-2-1 interviews

The survey questions were derived from the first two interactive stakeholder engagement workshops, with questions reflecting discussions, recommendations, and recognised limitations of a database. The survey attracted 59 respondents with diverse backgrounds. This was followed up by several one-to-one follow up meetings to discuss the survey results with a range of social housing landlords, local authorities and stakeholders from academia, architecture, project management, software development, government, and community development.

Work Packages

Following from the survey, workshops 1-2-1 interviews with stakeholders, a total of ten research themes/work packages, the report proposes ten work packages.

The goal of these work packages is to:

- Develop the case-based methodological approach to this form of research and development.

- De-risk the overall research strategy to ensure all research undertaken as part of the work packages:
  - Relates to research currently undertaken;
  - Is valuable research within their own packages meaning there will be meaningful obstacles and challenges overcome in the undertaking of each work package;
  - Is arranged as sequentially as possible to ensure a manageable and cost-effective approach to the development of the Existing Buildings Database should the package(s) be fully developed.

The development of work packages for future research into the creation of a social housing database requires coordinated oversight by a primary stakeholder, ideally one with a public funding background to ensure impartiality and long-term stability. Each work package, while contributing to the overarching goal of establishing a comprehensive database, also presents distinct research opportunities that can be pursued independently. These work packages are designed to explore various aspects of data capture, platform development, and stakeholder engagement, aligning with Scotland's net-zero ambitions.

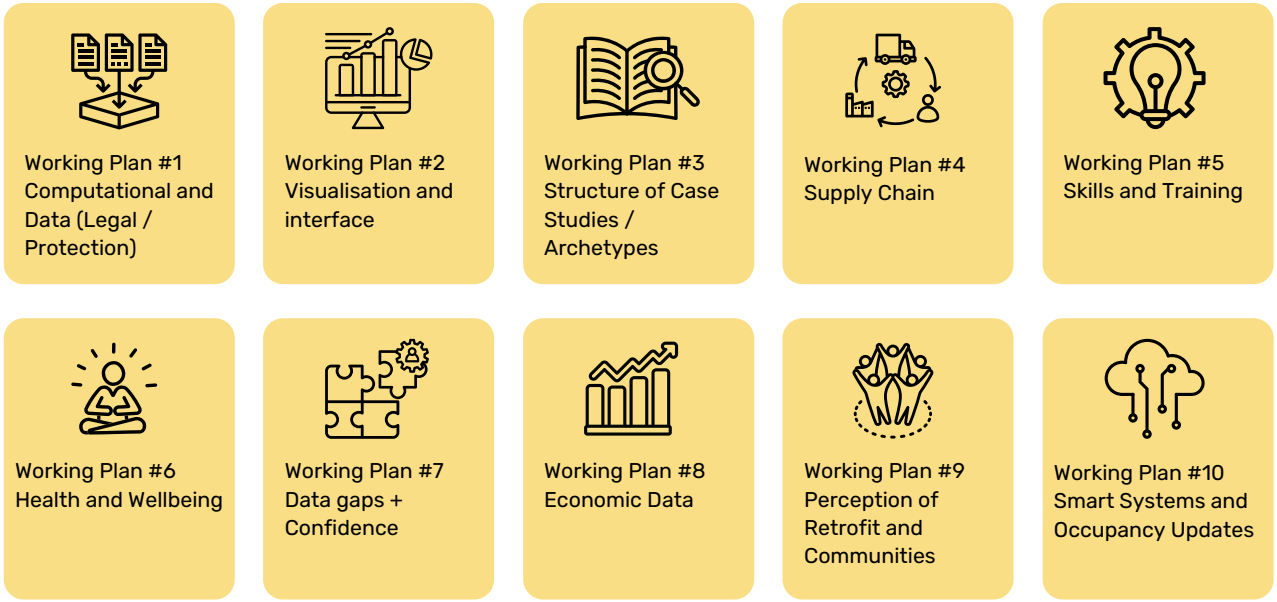
Through collaborative efforts with organisations such as BE-ST, these work streams can address key challenges in retrofitting, digital twinning, and building performance analysis in the social housing sector. This approach ensures that each phase of the project contributes to broader economic and employment benefits, while fostering innovation in construction technology and sustainable housing. Through the research project several of these work packages build on national and localised work currently being undertaken.

The aim of the future development is for the research lead to bring together this body of research under a single umbrella of research in this area.

Packages are tailored to overcome perceptions and ongoing changes to regulations, materials, systems, and occupancy data. They are aimed to minimise obstacles to the adoption of the database and encourage use. These working packages within themselves will be valuable to the body of knowledge around retrofit and have identifiable needs within themselves as well that will build up a body of knowledge around retrofit that can be used to impact most sustainable goals. By adopting this approach therefore, it de-risks any perceived value to their funding. It should be noted no timeframe is added to these work packages, albeit the work packages are broadly aligned sequentially.

Several of the work packages builds on national and localised work currently being undertaken and the aim of the future development is for the research lead to bring together this body of research under a single umbrella of research in this area. It is a suggestion of this research that a body such as BE-ST is best placed to act as a catalyst for the development of a digital twin or database should the research need co-ordination of the various working packages moving forward.

The work packages are outlined as follows:



Outcomes

Overall, the project aims to develop a National Existing Buildings Database to centralise and improve access to building data with the goal of supporting informed decision-making, collaboration, and large-scale retrofit efforts.

By identifying data gaps, aligning supply chains, and enabling coordinated investment, the database would drive economic growth, create jobs, and help achieve net zero and retrofit targets. It will empower individuals, communities, and industries by facilitating efficient, cost-effective retrofits, enhancing building safety, and ensuring long-term sustainability. Additionally, it will support risk management by tracking material performance and enabling swift government action when needed.

The project's intended outcomes are as follows:

- Improved understanding of building data: Identifying what information is held, how and where it is stored, and gaps in knowledge across various building archetypes, initially focusing on domestic buildings.
- Development of a combined register or database: Defining an appropriate format for a unified database, enabling shared learning and collaboration among estate managers.
- Creation of a National Existing Buildings Database: Establishing a single point of access and truth by integrating data from multiple sources to provide an accurate picture of the building estate.
- Support for retrofit planning and investment: Enabling individuals and organisations to evaluate and test retrofit measures suited to their buildings, potentially facilitating larger scale coordinated investment.
- Empowerment through open-source data: Allowing individuals to make informed decisions, benefit from economies of scale, and provide a clear pipeline of work for the construction sector.
- Alignment of supply chain and demand: Helping coordinate decision-making, smooth demand fluctuations, and maximise economic and employment benefits of public funding.
- Optimisation of energy-saving measures: Identifying the most effective retrofit interventions, supporting indigenous suppliers in meeting demand for energy-efficient materials and systems.

- Strengthening local economies and skills: Enabling the establishment of local manufacturing and distribution centres, creating jobs and upskilling opportunities.
- Progress tracking for net zero: Providing government with clear insights into progress against Net Zero targets, allowing timely adjustments to policy and delivery plans.
- Public-Private collaboration: Facilitating cooperation between public bodies, private sector stakeholders, and utility companies to deliver net zero projects.
- Risk management and futureproofing: Allowing for rapid identification and response to material failures, ensuring building safety and preventing past mistakes from being repeated.
- Economic, social, and environmental benefits: Supporting efficient, sustainable retrofits, improving living conditions, and ensuring long-term resilience in the built environment.

Representative and supporting organisations

The following organisations supported the delivery of the National Existing Buildings Database report:

- Argyll & Bute Council
- Chartered Institute of Building
- Construction Leadership Forum (Data Working Group)
- Dundee City Council
- Edinburgh City Council
- Eildon Housing Association
- Glasgow City Council
- Grampian Housing Association
- Health & Safety Executive
- Historic Environment Scotland
- HUB North
- HUB West
- Loughborough University
- Novoville
- Robert Gordon University
- Scene Community
- Scottish Borders Council
- Scottish Building Standards
- Scottish Government
- Scottish Futures Trust
- University of Edinburgh

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