PlaceTech Innovation Lab

Pilot Project Summary Report

November 2024

Foreword

Our built environment accounts for 39% of global energy related carbon emissions[1] and is experiencing radical change in how we plan, deliver and maintain our buildings and infrastructure to meet ambitious climate change targets. In addition, the growing demand on public services and enabling inclusive economic growth is placing enhanced demands on existing and new infrastructure. This challenge in compounded by the need to deliver more with less resources and funding. So how do we make best use of the resources we have to deliver the built environment of tomorrow?

The decisions we make today will support and inform our future built environment and realise its potential to meet our ambitious climate and economic targets. The decisions of today will require a new approach and capability to ensure we make best use of the resources we have in how we plan, deliver and manage our built environment. This new capability in decision making will be underpinned by the innovative use of data and insights to better inform decision makers and improve collaboration in how we decide on the most efficient and effective ways to improve and invest in our built environment.

The piloting of a PlaceTech lab places data and collaboration as key enablers to improve decision making and ultimately deliver the outcomes we seek within our built environment. The pilot PlaceTech lab has tested the benefits and new ways of working in how we define, curate, visualise and then collaborate around data led decisions to better inform decisions for public sector asset owners.

The success and lessons from this pilot process was only possible through the engagement and commitment by all stakeholders and public sector partners. The lessons from the process will be vital to scale this new capability across the public sector. Through improved data led decisions within our built environment & infrastructure, we will deliver improved outcomes for our society

[1] World Green Building Council. (2019) Bringing embodied carbon upfront. Available at: https://worldgbc.s3.eu-west-2.amazonaws.com/wp-content/uploads/2022/09/22123951/WorldGBC_Bringing_Embodied_Carbon_Upfront.pdf

Acknowledgement

This report was produced by Ramboll in partnership with Scottish Futures Trust & the Scottish Government. We would also like to thanks the project partners who have supported the development of the projects and learnings.

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ABOUT THE AUTHORS

RAMBOLL is a foundation-owned multidisciplinary consultancy specializing in built-environment engineering, design, and consultancy services. It combines a global knowledge base with local expertise. Within Ramboll, the pilot projects have been a collaborative endeavour, led by the UK's Regenerative Cities and Digitalisation team.

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Overview

Overview

Place Tech Innovation Lab

The Scottish Government's Digital Planning Programme Transforming Places Together: digital strategy for planning set out a significant ambition in how the planning system of tomorrow will embed and adopt digital and leverage data to drive improved outcomes. Within Mission 5 of the Digital Planning strategy, there was a commitment to establish a PlaceTech Lab for Scotland.

"Establish the PlaceTech Innovation Lab to support green recovery and sustainable place-making; research, test and implement new technologies in planning realising potential and continuous improvement"

In 2023-2024 The Scottish Government in partnership with Scottish Futures Trust ran a pilot programme to test the application of data, technologies, and workflows to improve decisions within planning, placemaking, infrastructure investment and performance. This programme formed part of the research and development phase of the PlaceTech Lab. The pilot projects were delivered virtually and within a physical environment and a technology resource at Scottish Futures Trust's new office premises. In addition, consultancy support has been secured through the appointment of Ramboll.

The research and development for the PlaceTech Lab aimed to deliver four key objectives:-

1. Develop and establish a physical resource to pilot and apply innovative technology in planning, urban design, placemaking, infrastructure investment and performance.
2. Develop and test the workflows for the application of data sets, data analytics, GIS and 3D visualisation techniques to support better outcomes and decision-making.
3. Support and test the concept within an innovation pipeline for 3 projects.
4. Demonstrate benefits of enhanced data and visualisation/GIS capabilities to improve decisions and outcomes for place and infrastructure.

The PlaceTech Lab has a four-step approach to value creation through data and aims to test the process via the pilot projects.

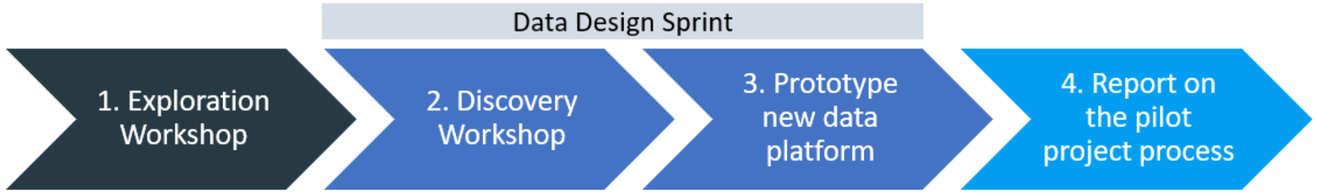
1. Define: define the place & infrastructure opportunity or challenge
2. Data: Identify, curate, coordinate and model relevant data from national platform
3. Discovery: Explore data insights to inform place & infrastructure challenges & opportunities
4. Decision: Improve decision-making process in how we plan & invest in place and infrastructure

Overview

Pilot Process Methodology

The pilot process aimed to improve an existing digital tool or workflow to better support the Local Authority in the delivery of its policy objectives. The pilot projects have been identified as they may require specialist digital skills to further develop, the Local Authority lacks the resources to develop the digital tool or process, or the digital tool or process requires digital consultancy onset of roadblocks to development. The three chosen pilot projects are as follow:

1. Glasgow City Council - City Centre Living Strategy
2. Perth and Kinross Council - Cultural Quarter
3. Comhairle nan Eilean Siar (Western Isles Council) - Infrastructure Investment Impact Model



The pilot process has been through four stages; Stage 1: Exploration Workshop; Stage 2: Discovery Workshop; Stage 3: Prototype new data platform; and Stage 4: Report on the pilot project process.

This report is the outcome of Stage 4: Report on the Pilot Project Process.

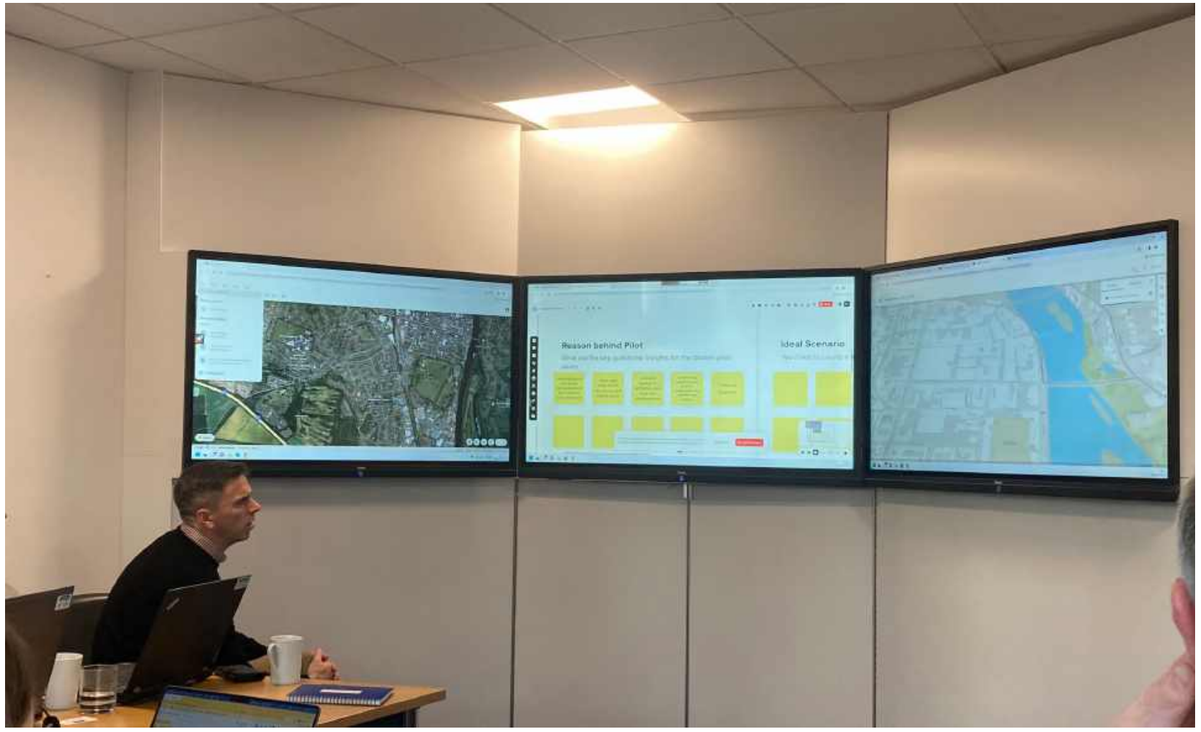
Overview

Technology Solutions to Enhance Collaboration

A foundational element to support improved decision making within the planning process is the ability to effectively collaborate with the data and insights generated from the pilot projects. The pilot projects were supported by a suite of technologies to enable enhanced collaboration.

In relation to hardware, the pilot projects benefited from the semi-immersive Mission Room technology. Mission Room provides a unique, interactive and immersive display which are ideal collaboration tools that allow project teams to understand issues, gain insights and develop solutions quicker. This technology was put in place for the pilot process and situated within Scottish Futures Trust offices.

In relation to software, the pilot projects utilised a stack of technologies to support the curation, management and visualisation of data for the pilot projects. This included geo spatial software such as Esri (ArcGIS) to visualise place based datasets, Vu.City 3D modelling software provided an interactive platform to represent a 3D model of Glasgow, Power BI apps provided the platform for interactive dashboards and the projects utilised a host of database systems to curate value led datasets from systems such as the Improvement Services Spatial Hub.



Pilot Projects

Glasgow City Council

Social infrastructure data analysis and visualisation of placemaking opportunities

The Glasgow City Centre data and visualisation tool, based on ArcGIS Experience Builder compiles geospatial data sets to provide insights on social infrastructure provision across the city centre. It then enables visualisation of these insights along with placemaking and potential future scenarios in a 3D environment to support decision making and provide a single data baseline for policy development.

Vision for the City of Glasgow

The Glasgow City Centre Strategy (CCS) 2024-2030, brings together the “Big Moves” intended to transform Glasgow’s city centre in the short to medium term. It creates a unified vision supported by the transformative actions to be delivered by 2030. The CCS is based around three thematic pillars; Magnetic Experience, Front Door for Innovation, and A Place to Live.

The CCS sets out the context and ambitions for thematic pillar of A Place to Live and the following diagram sets out how this fits into the wider strategy.

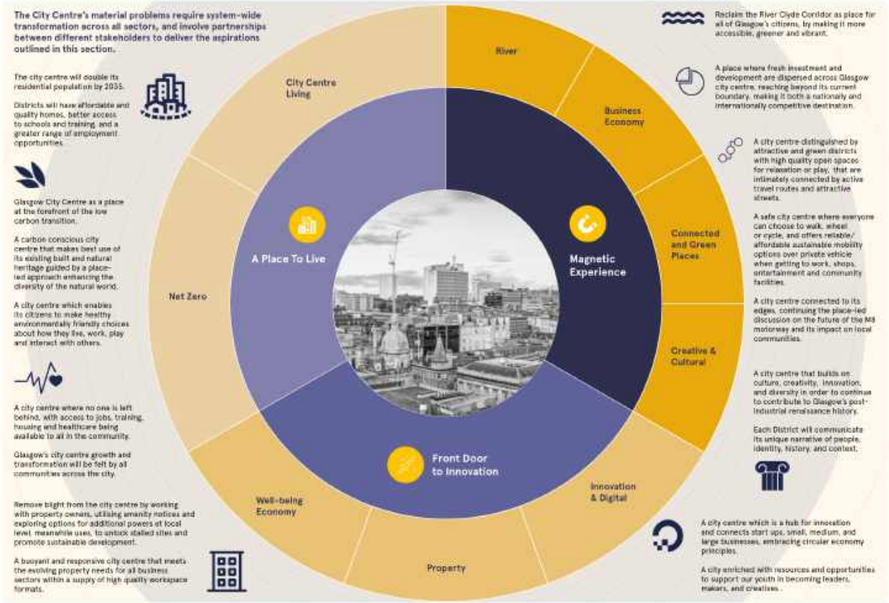
Pilot Project Vision

In order to support the Council in realising the CCS, the pilot phase of the Place Tech Lab aims to improve the existing data hub and visualisation to streamline assessment of and decision making for investment in key city centre infrastructure. The pilot specifically focuses on the education and health social infrastructure due to availability of data.

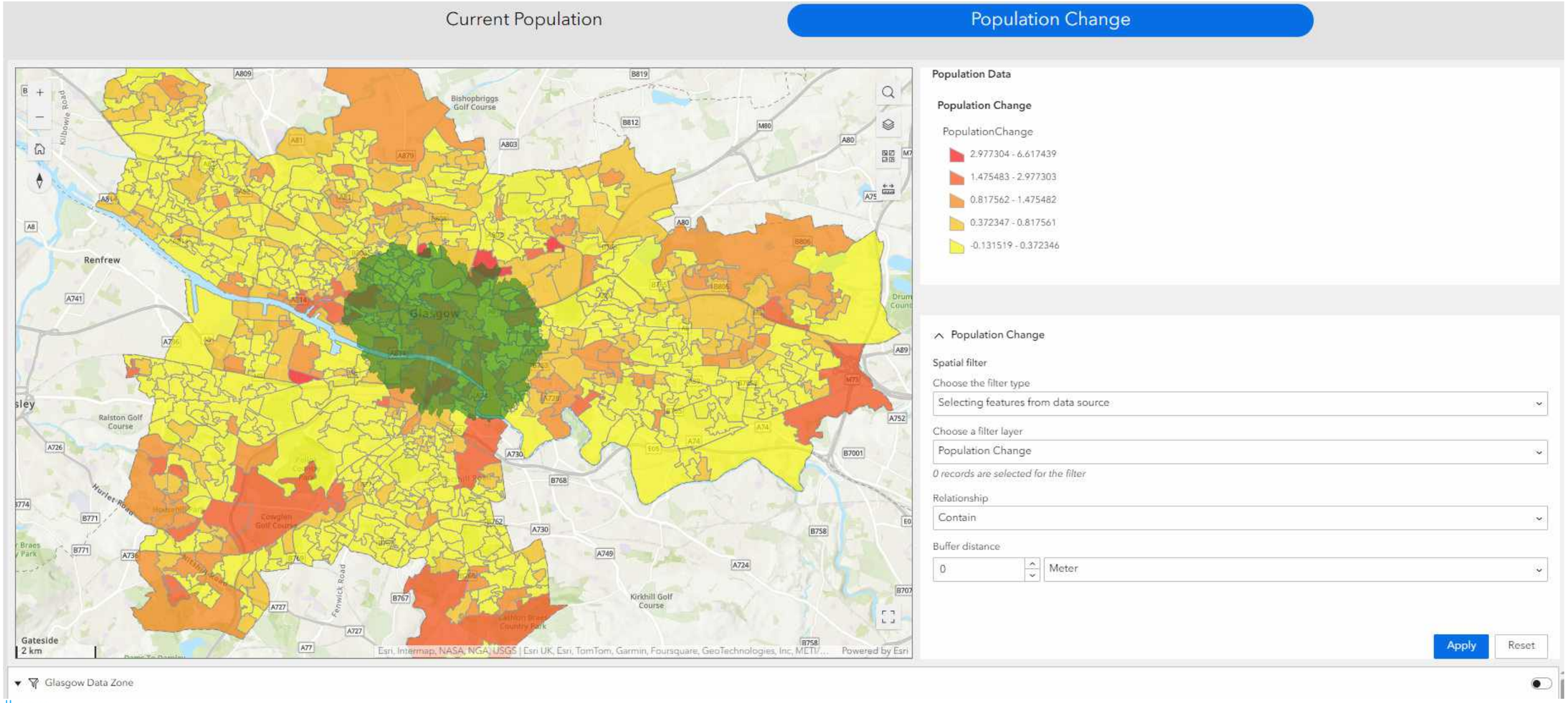
Key Questions

In the delivery of the pilot project, key questions to be addressed through the enhanced application of data and technology include:

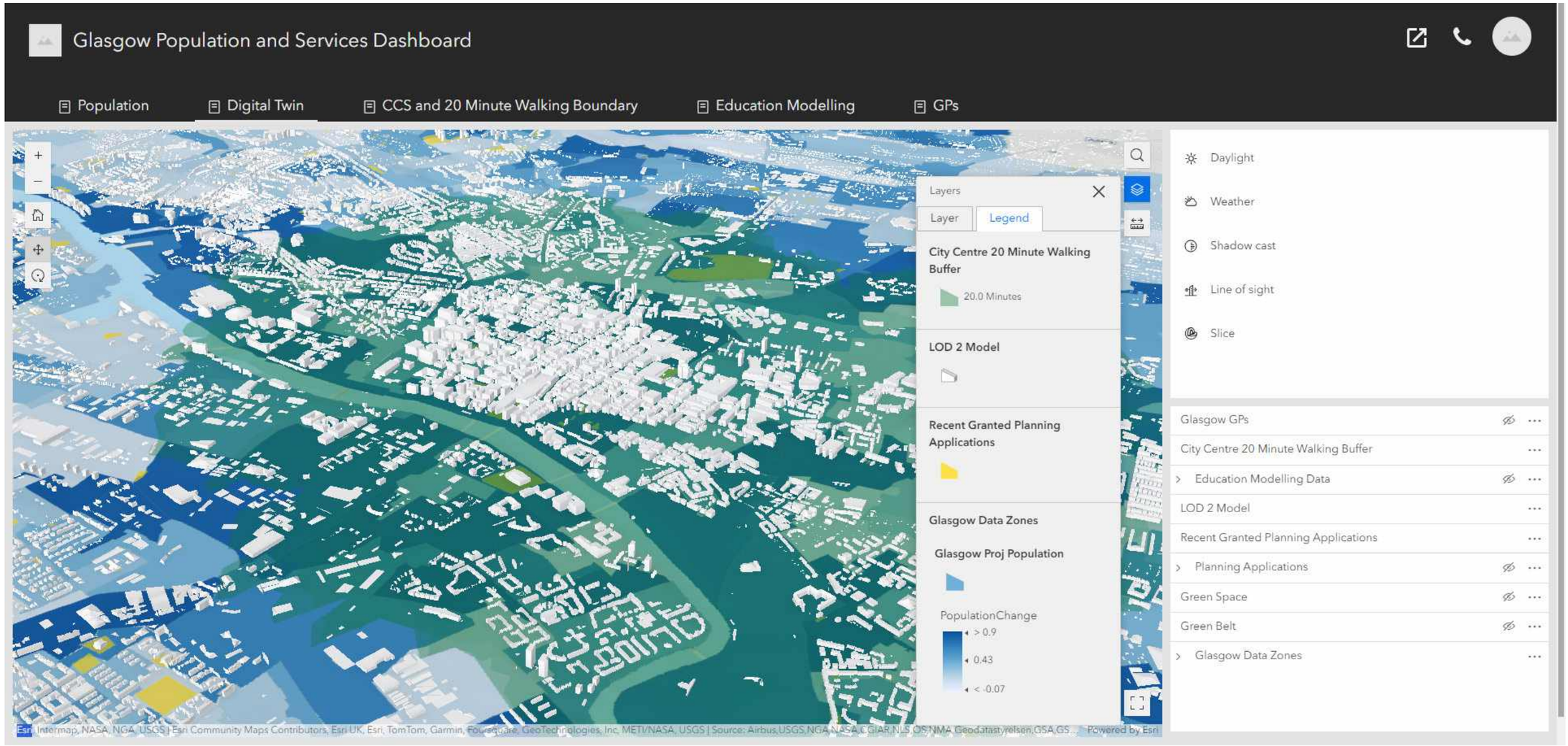
1. What does the predicted population growth in the city centre look like spatially?
2. How does that compare to the location, connectivity and capacity of education and healthcare provision?
3. Overlay with existing social infrastructure. Can we identify gaps as the population grows?
4. Can different scenarios of growth and timelines for infrastructure delivery be visualised?
5. What are the issues and data gathering required that will best inform the Infrastructure Audit which will feed into the city centre Social Infrastructure Plan?



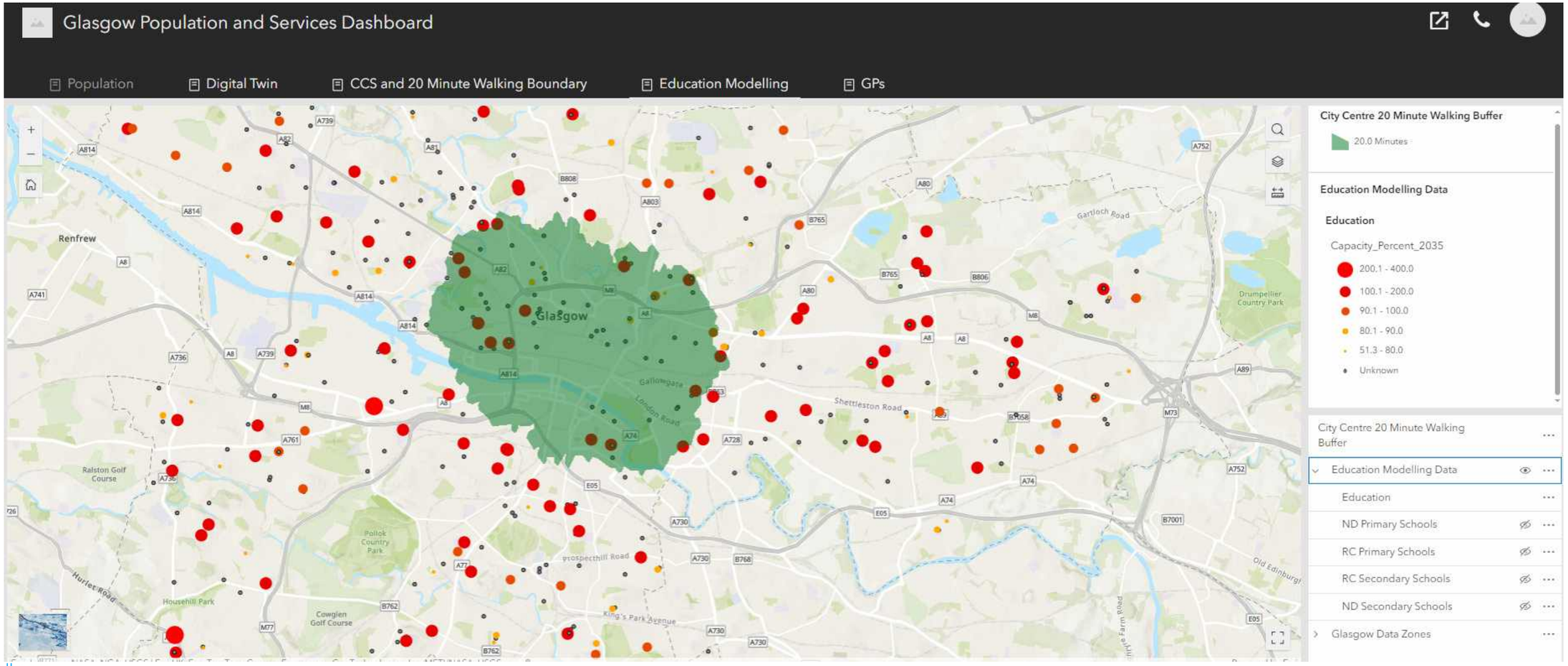
A non-generative AI (Arima) model was used to predict population growth in Glasgow. The model can accommodate significant changes and provide projections based on major events, both past and future, if that data is provided. Results are then imported to GIS and visualised through ESRI's Experience Builder as shown below. Map queries and filters are available to streamline analysis, data can also be visualised in charts. On average, the predicted increase in the city centre is just below the target of doubling the population. Analysis of the impact of policy intervention envisaged by the Place to Live Strategy should provide further insights on when and how the population targets will be achieved. The platform can be used to assess and quantify the impacts of new developments and policy intervention by repeating the Arima model with different historic events, proposed policies or proposed future development data.



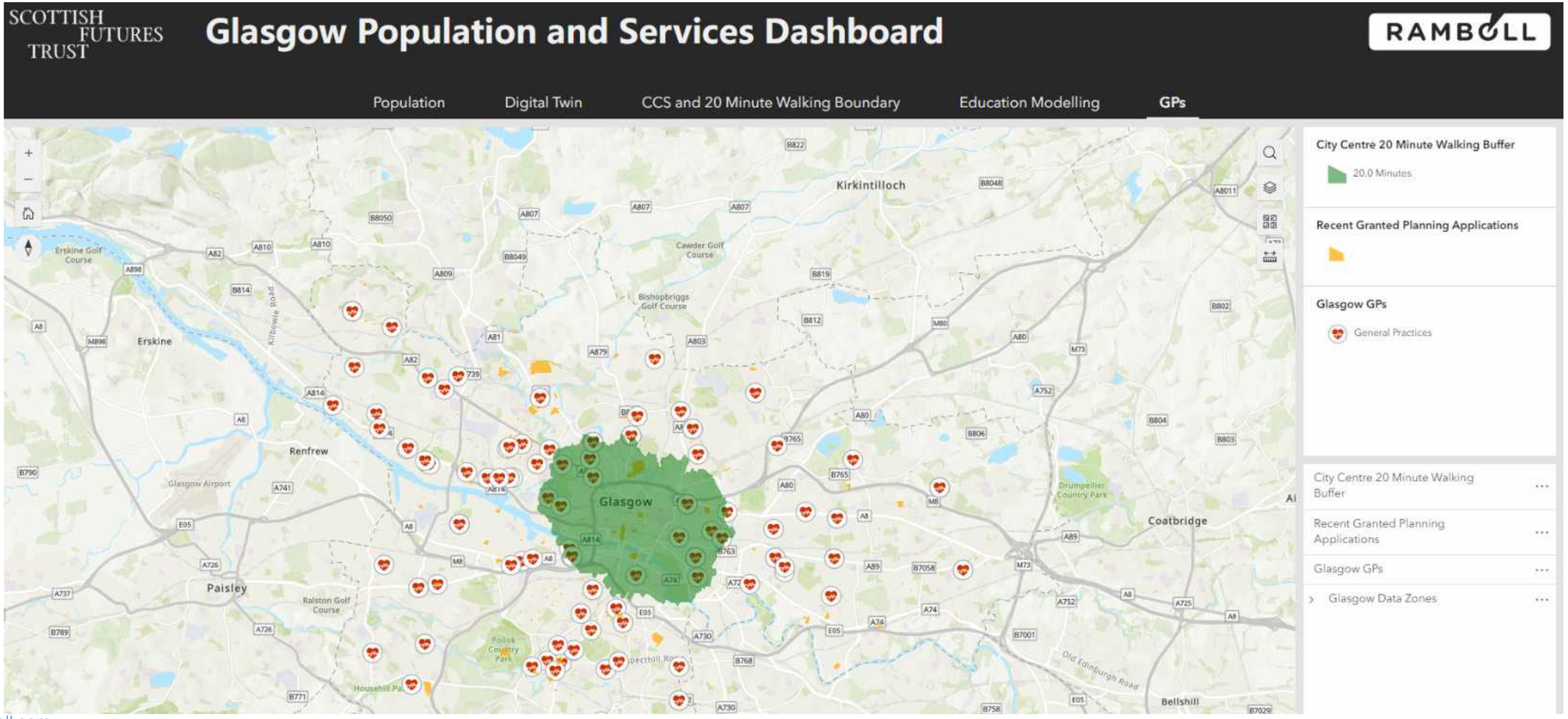
The Digital Twin tab is developed based on the current Glasgow LOD2 Digital Twin platform. This tab acts as the master map and visualises data in 3D. Users can look at the predicted population growth data alongside planning application data and education modelling data to identify potential pinch points. Other available digital twin tools include weather and daytime simulation as well as 3D slicing. Python or similar programming language scripts can be written to automate the process of loading planning permission data to the data platform and towards being a true digital twin platform.



Education was chosen as the social infrastructure to test and demonstrate feasibility due to data already available on capacity and catchment area. The estimated capacity data is based on permanent population projection for 2035. The data can also be viewed as catchment areas and filtered by types of schools. Within the city centre, 14 schools are predicted to be at over 100% of their capacity by 2035 with the highest predicted to be at 200%. Representatives from Glasgow City Council noted that their education department has conducted a similar exercise, but the data has not yet been compared. The platform allows users to see how population growth links to over and under capacity of infrastructure in an easy-to-understand way.



The prototype data platform has visualised the location of existing GPs and is currently showing a lack of provision within the central city centre areas. Instead of using the city centre boundary, the platform uses an 800m isochrone catchment taking into account the notion of local living and 20-minute neighbourhood. The Scottish Government's definition uses 800m as walkable distance taking accessibility into account and isochrone maps show places that are reachable via networks of streets and spaces and not just radical distance. It prompts the Council to question the boundary of the City Centre Strategy and links infrastructure provision to transport strategies. With the target for population growth in the city centre, there could therefore be potential gaps. However further analysis of estimated healthcare capacity has not been undertaken as due to time constraints and the availability of data.



Perth and Kinross Council

Perth Cultural Quarter

The Perth City Centre data platform and visualisation tool is based on ArcGIS Experience Builder. The platform brings together layers of data, visualises them in both 2D and 3D environments and enables data analytics functionality to support investment decision-making processes in the cultural quarter of Perth. Architecture and Design Scotland participated the Perth Cultural Quarter pilot, leading the place-based briefing workshop.

Vision for the City of Perth

The city has a clearly defined vision to become one of the most sustainable small cities in Europe. This vision serves as a central pillar in the strategic planning, development, and investment efforts of the Perth and Kinross Council. To contribute to the realisation of this vision, the rejuvenation of the city centre plays a crucial role by being bold and ambitious in attracting investment, ensuring the city remains resilient and vibrant. The development of this digital tool supports this vision for the city of Perth.

Pilot Project Vision

The pilot specifically focuses on the ‘cultural quarter,’ which is centred around the newly established Perth Museum. The museum just opened in Spring 2024 following a £26.5 million investment in a major redevelopment project.

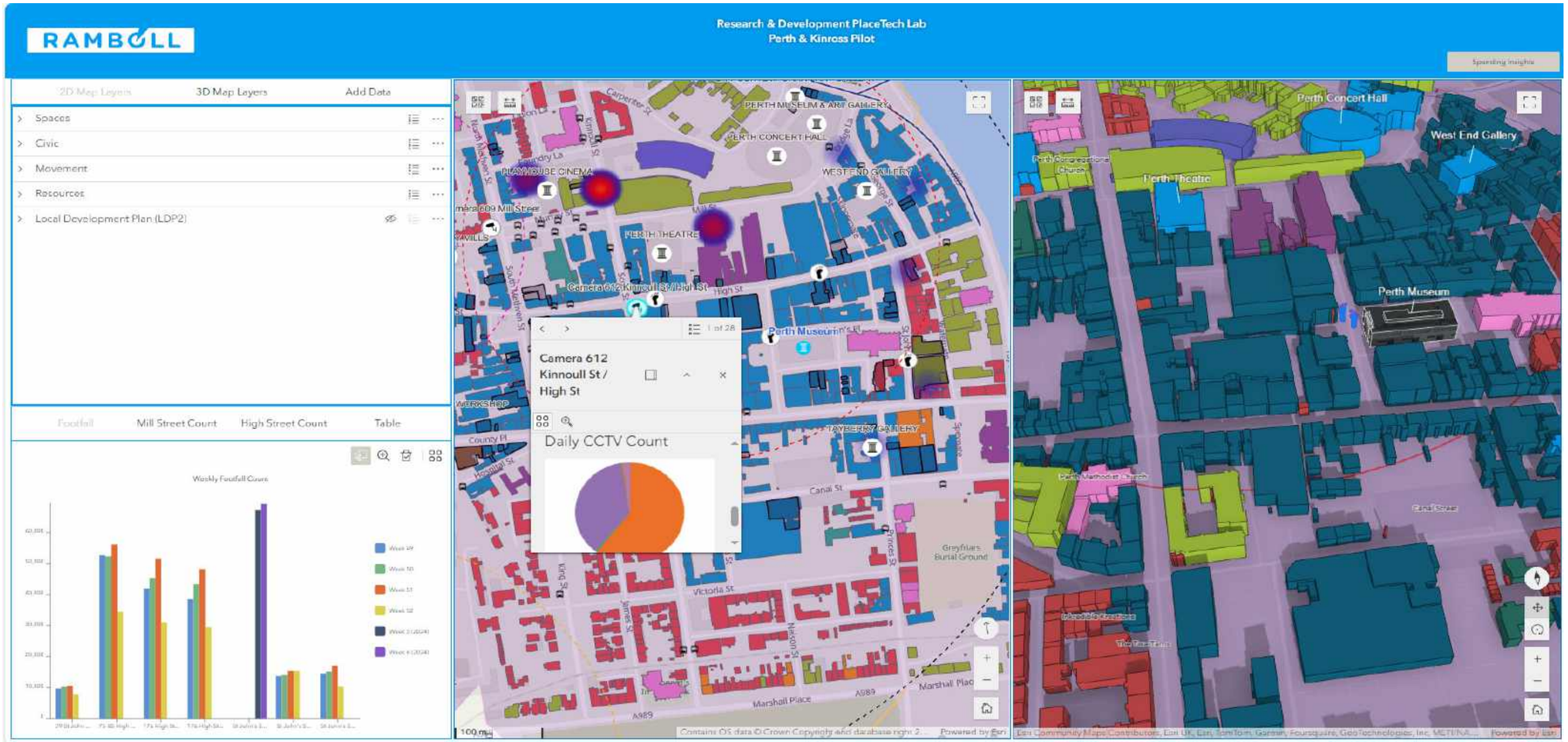
Through the use of data and visualisations, the pilot aims to explore the broader value of this investment, identify opportunities to strengthen connections with other cultural facilities and the creative sector in the city, and create a platform to help assess any additional interventions that may be necessary (and the phasing of these) to lever greater benefits and contribute to the overall vision.

Key Questions

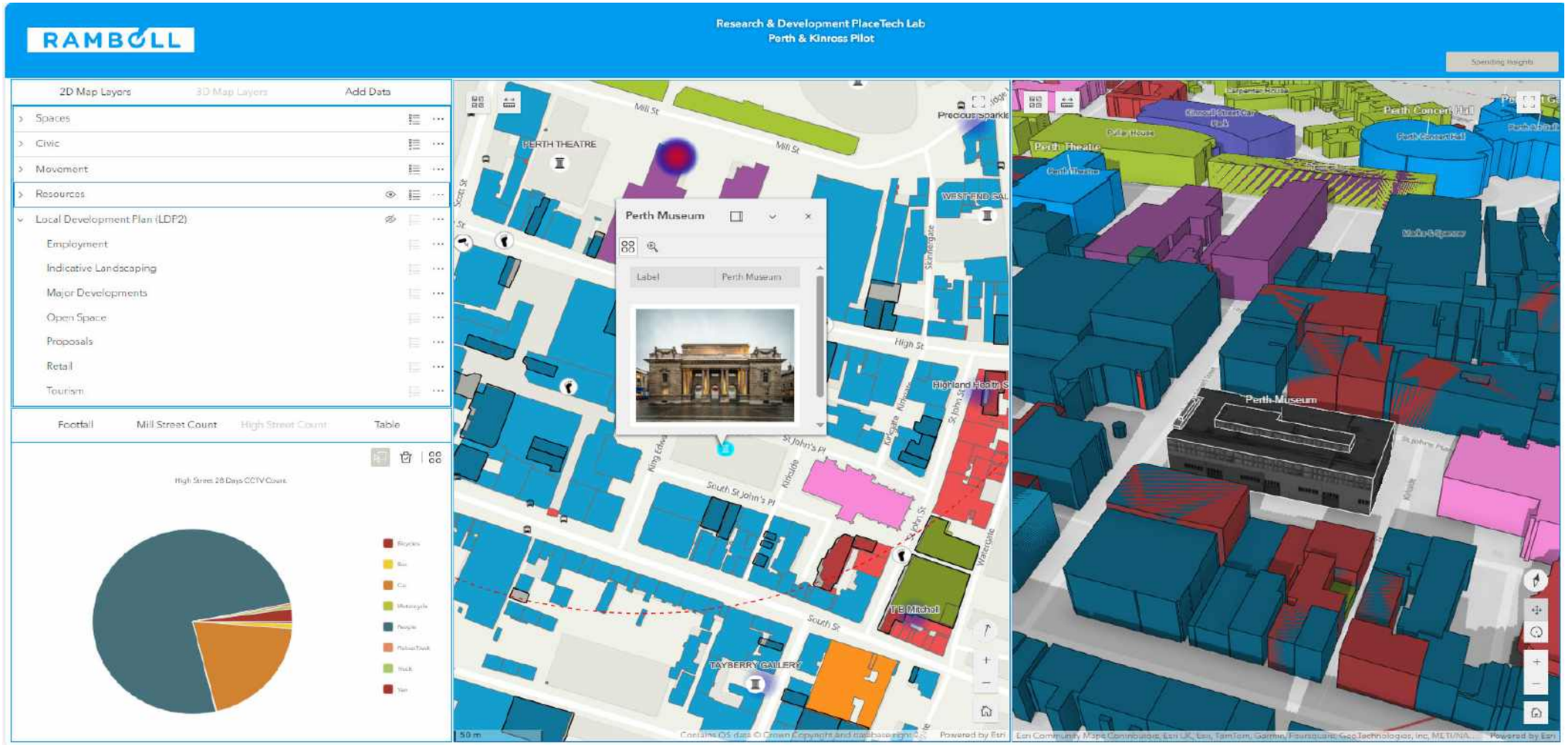
In the delivery of the pilot project, key questions to be addressed through the enhanced application of data and technology include:

1. What is the baseline visualisation for the cultural quarter?
2. What do the available data layers reveal?
3. What available data can be linked effectively?
4. What will inform the case for investment in the city centre?

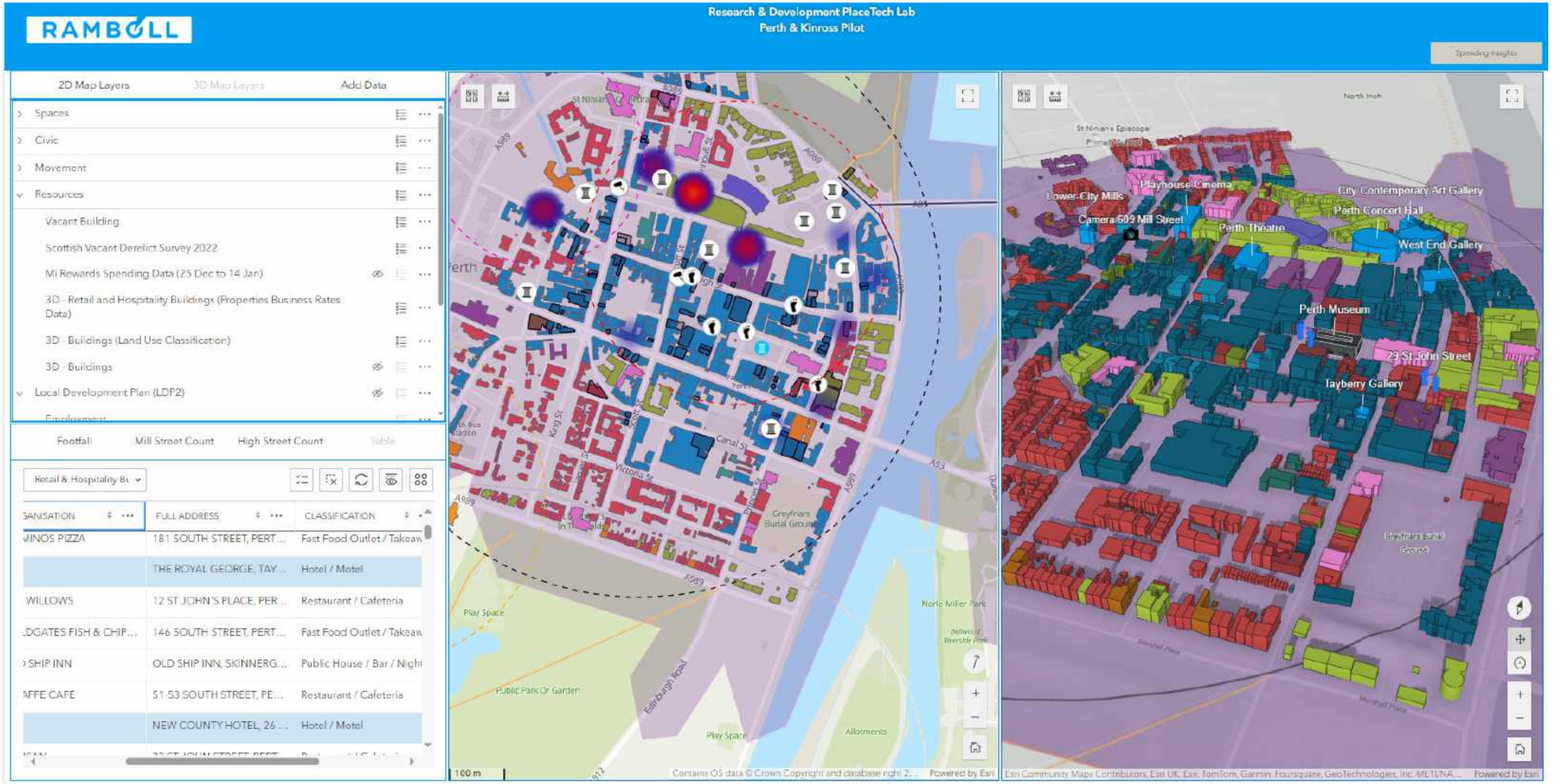
Data provided by the Council was treated to facilitate baseline visualisation, enable data to be linked spatially and to support decision-making. The data are shown in 2D and 3D Map with CCTV and footfall data also shown in charts and tabular format. The charts, table and map views are linked with selection and data analysis tools, such as column filters, statistical functions and export to spreadsheet enabled. There are three footfall counter surrounding the Perth Museum which will enable comparison of footfall before and after the re-opening of the museum once the data is available. Once linear movement data is available and loaded onto the platform, it can allow users to identify key routes and inform strategies for place-making, public transport and active travel improvements. By updating a heat map, it can allow users to understand patterns and demonstrate the effects of investing in cultural assets.



The layers in the 2D and 3D Maps are categorized based on the ‘Scottish Government Place Standard’ - which includes Spaces, Civics, and Resources. This will enable PKC to use this platform alongside Place Standard Tools in the delivery of local living and 20-minute neighbourhoods. Both 2D and 3D maps offer users basic GIS capabilities, including zoom, selection, measurement, and Basemap selection. With the focus being on the cultural quarter, when a cultural asset is clicked, the name, photo of the asset and other information are shown on screen. The Cultural Quarter boundary currently does well to encompass most of the major cultural assets within city centre, with three galleries sitting just outside the boundary. All cultural assets are in close proximity to each other with the furthest being less than 600m away. There are currently a number of vacant buildings within the Cultural Quarter which present development investment opportunities.

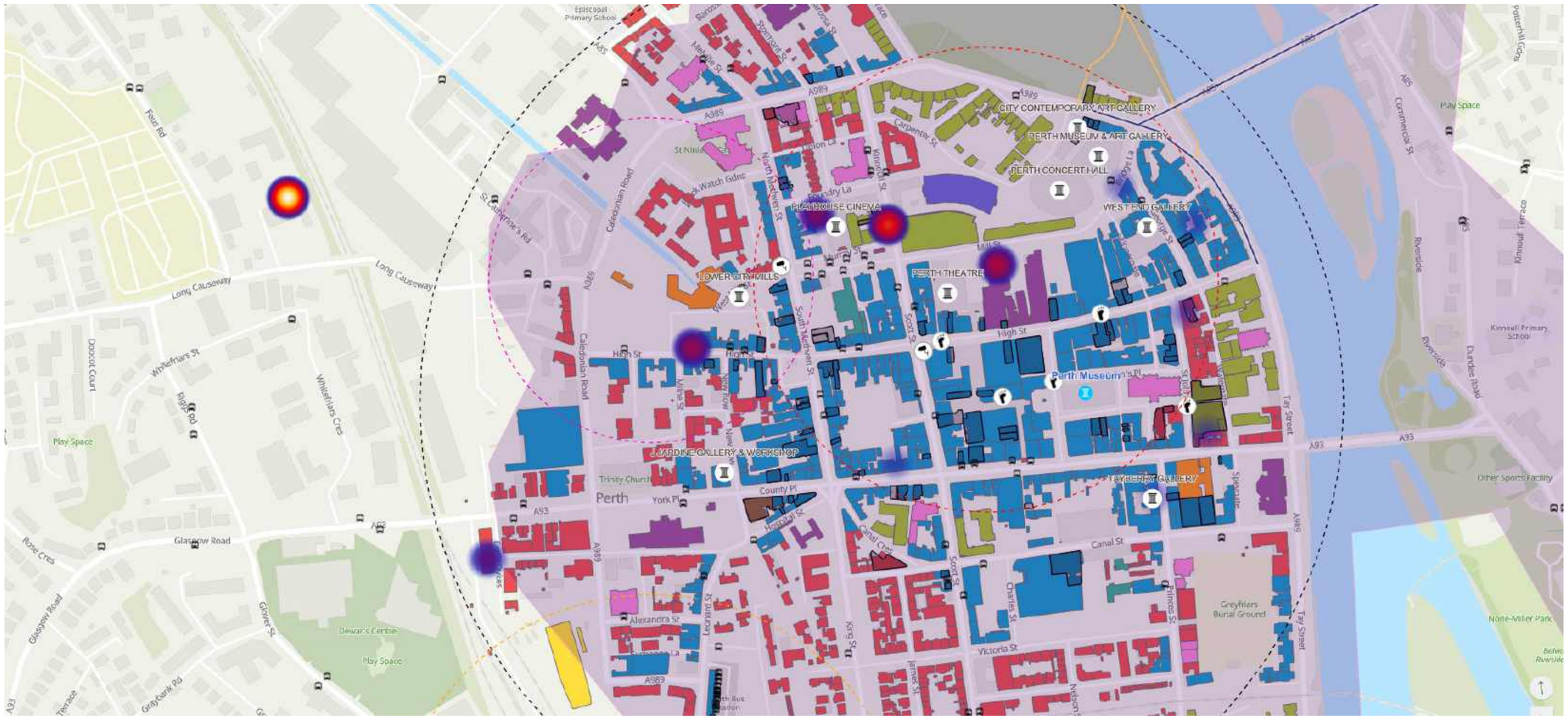


Buildings are rendered in 3D using the height field. Some cultural assets, like the Perth Museum is rendered to a higher Level of Detail (LoD). For investment analysis of the cultural quarter, Retail and Hospitality use data from the Properties Business Rates is visualised in 3D. The data layers revealed that Perth Museum is surrounded by restaurants, however the only hotels available in the cultural quarter are by the Perth Concert Hall. Due to data and time constraints, Land use data has not been shown floor by floor but building as a whole. By showing land use data split by floor and upper floor vacancy, it allows the Council to understand need/type of investment and where opportunity areas are concentrated.



To enable swift access to spending data for investment analysis, a separate tab has been created for Spending Insights. Symbology for the spending data is chosen to assist in analysis where the more vibrant the colour and bigger the point, the higher the spending is. The spending in the north of the cultural quarter is currently significantly higher than that of the south and east. With the Perth Museum located in the north-east, spending effect of the Museum can be observed once the data is available.

The pilot project demonstrated that there are opportunities to develop a strategic future for the cultural quarter within which the new Perth Museum will play a pivotal role. Data collected regarding its impact can potentially assist in making the case for future investment in complementary activity e.g. working with hotel investors etc.



Comhairle nan Eilean Siar

Western Isles Infrastructure Investment Impact Model

The Western Isles Infrastructure Investment Impact Model is a digital Power BI platform utilising data and lessons from SFT's construction pipeline forecast tool. The updated platform aims to enhance its geospatial capability to provide insight and understand implications of potential infrastructure projects across the region. The platform supports investment decision making by multiple sets of information easier to analyse.

Pilot Project Vision

There is a significant amount of investment proposed within and around the Western Isles. This includes offshore renewables, onshore renewables, port improvement, tourism infrastructure and enabling infrastructure in addition to ongoing public sector reform. Success is about more coordination of opportunities to manage impacts and maximise place-based benefits for communities, supporting sustainable populations and inclusive growth.

The Comhairle nan Eilean Siar pilot project sought to develop an improved visibility and holistic picture of the proposed pipeline of infrastructure investment. Once established, this new investment pipeline platform can be used to explore and identify the consequential impact of planned infrastructure on services, tourism, and existing infrastructure. These new insights can enable preventative action to be identified to improve efficiency of delivery and mitigate negative impacts.

Key Questions

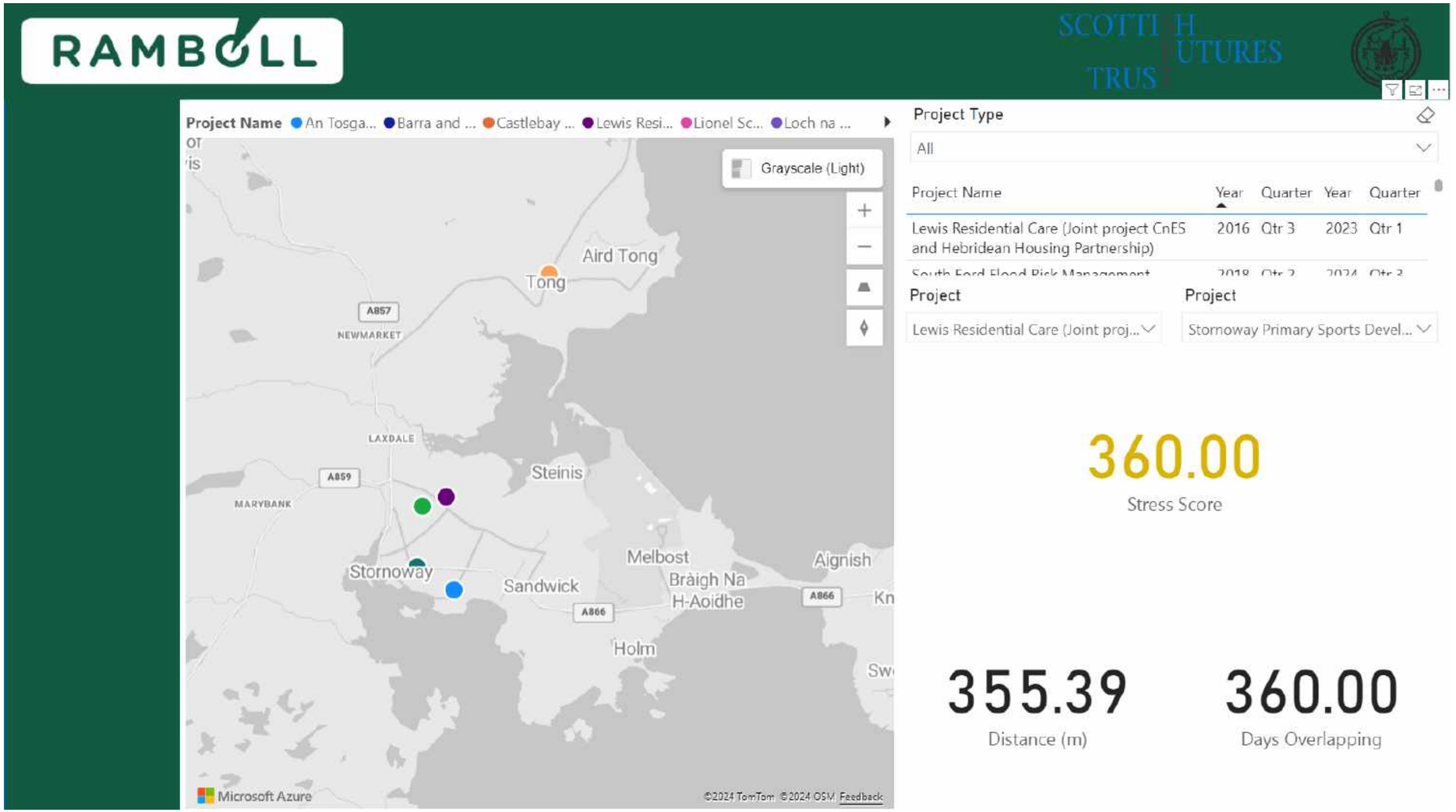
In the delivery of the pilot project, key questions to be addressed through the enhanced application of data and technology include:

1. What is the planned pipeline of projects?
2. What are the timeframes for the proposed investment?
3. What is the timeline for delivery to identify bottlenecks?
4. What services will be affected?
5. What is the labour profile of proposed projects and their impact on the Western Isles?
6. What is the access strategy to pipeline projects? (Bridge, road use and improvement)?
7. What are the opportunities for integrated approaches to environmental baselines and impact assessment to support the Planning Authority across multiple projects?
8. What is the framework for identifying and co-ordinating place-based community benefits?
9. What preventative action can be taken to reduce the impact on infrastructure delivery?

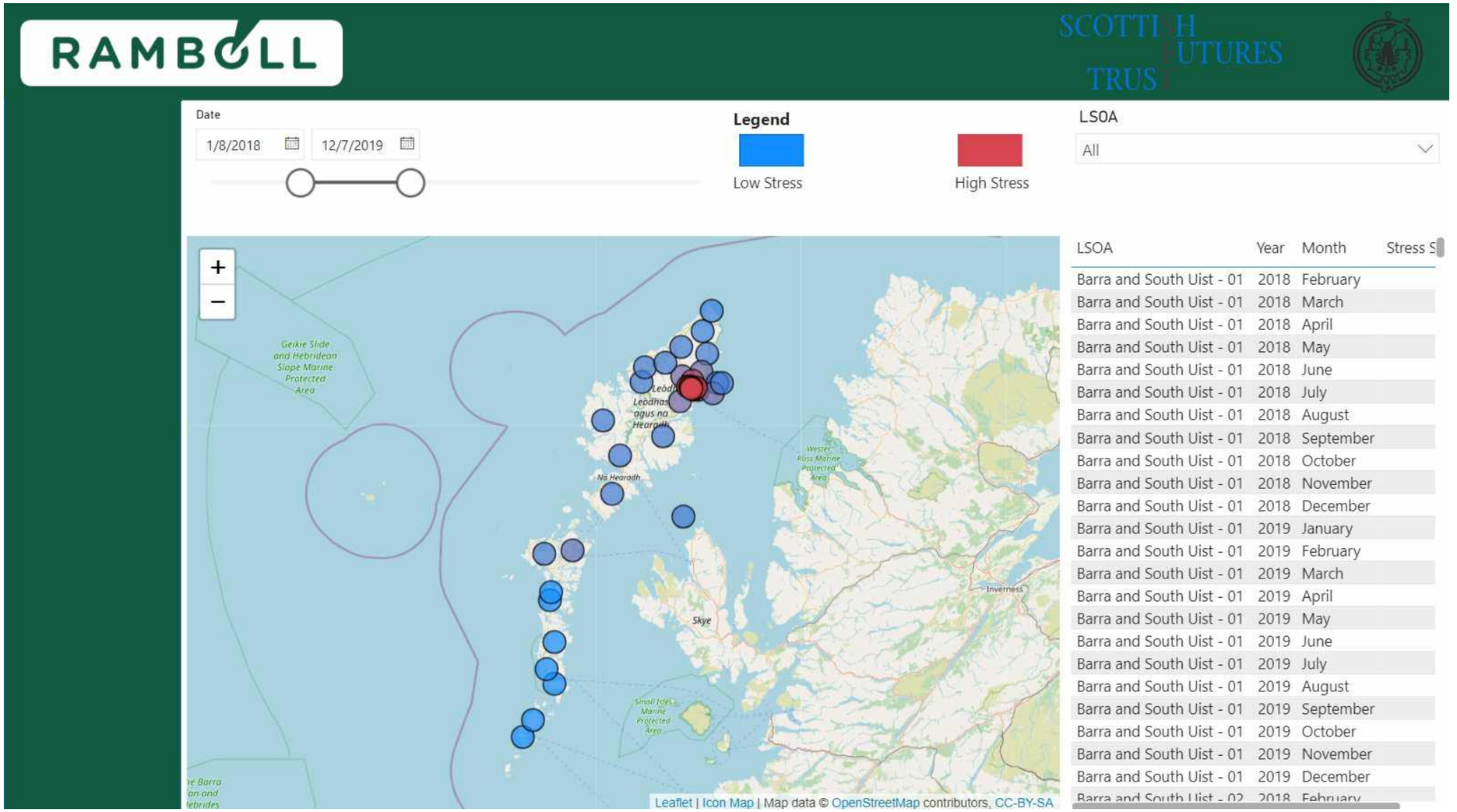
Recalibrating Pilot Project due to Data Restrictions

At the early stages of the pilot process, the team were made aware of the emerging and ongoing challenge the local authority faced in the sharing and collection of data. This included obtaining data from third parties (Utility companies) as well as an emerging and ongoing data security incident that was being resolved in parallel to the pilot process. Due to data constraints that occurred during the project programme it was established that it was not possible for the development of the Western Isles Infrastructure Investment Impact Model to meet all of the key questions within the required timeframe. Therefore, three priority challenges to address by the prototype were identified: information mapping, storytelling, and decision support.

Building upon SFT's construction pipeline forecast tool, the pilot project data platform added a compare projects and stress score function. Under the project information table, it is possible to select two projects to compare and the stress score will automatically update. The distance and days overlapping between projects which contribute to the stress score will also automatically update.



The added clash detection function is also viewable under data zone (LSOAs) to better understand implication to an area. In this view, a new timeline function has been enabled where the stress score will update depending on timeframe selected. The timeline function is also available in SFT's Construction Pipeline Forecast Tool as a filter function under the filter panel.



LSOA	Year	Month	Stress S
Barra and South Uist - 01	2018	February	
Barra and South Uist - 01	2018	March	
Barra and South Uist - 01	2018	April	
Barra and South Uist - 01	2018	May	
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Barra and South Uist - 01	2018	September	
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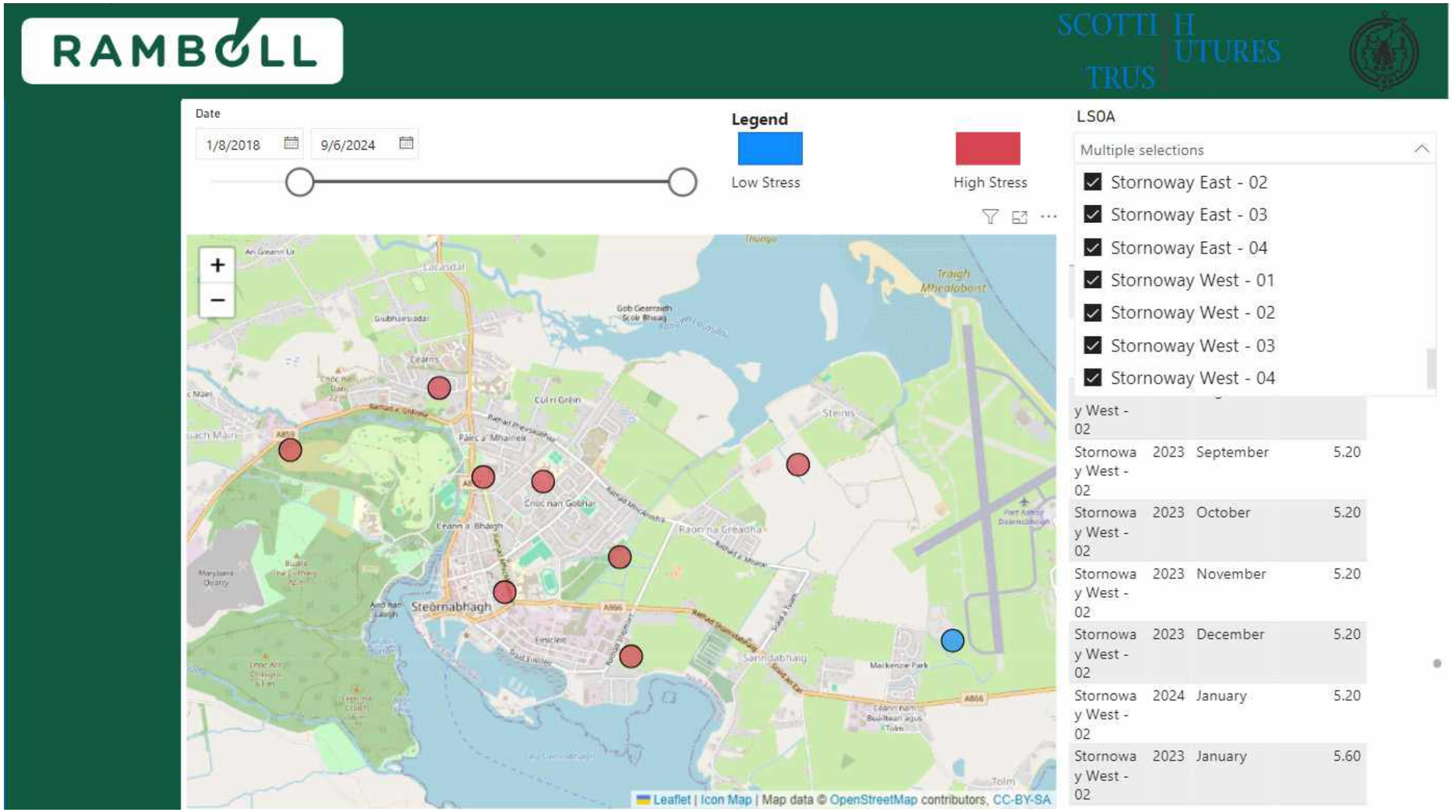
Barra and South Uist - 01	2018	November	
Barra and South Uist - 01	2018	December	
Barra and South Uist - 01	2019	January	
Barra and South Uist - 01	2019	February	
Barra and South Uist - 01	2019	March	
Barra and South Uist - 01	2019	April	
Barra and South Uist - 01	2019	May	
Barra and South Uist - 01	2019	June	
Barra and South Uist - 01	2019	July	
Barra and South Uist - 01	2019	August	
Barra and South Uist - 01	2019	September	
Barra and South Uist - 01	2019	October	
Barra and South Uist - 01	2019	November	
Barra and South Uist - 01	2019	December	
Barra and South Uist - 02	2018	February	

Instead of filter by project, filter by LSOA is enabled in this tab. The map and table are linked and will zoom to show the right LSOA for more detailed investigation. For example, with data provided at the time of the pilot project, it is clear that with 2 - 4 infrastructure projects over Q2 2018 to Q3 2024, Stornaway will be under pressure to accommodate the workforce during this period. Additional data and further analysis and planning are required to manage these pressures.



y West - 02			
Stornoway West - 02	2023	September	5.20
Stornoway West - 02	2023	October	5.20
Stornoway West - 02	2023	November	5.20
Stornoway West - 02	2023	December	5.20
Stornoway West - 02	2024	January	5.20
Stornoway West - 02	2023	January	5.60

Lessons Learnt and Next Steps

Lessons Learnt

This section provides Ramboll, SFT and the Scottish Government's collective lessons learnt from the evaluation of all three pilot projects. During the Exploration Workshop, Ramboll captured the ideal scenarios the respective Councils would like to achieve in their vision. Pilot project specfic lessons and recommendations have been provided separately to the relevant Councils.

1. Benefit of Workshops

Three workshops were delivered through the delivery process for each pilot project. Depending on availability and proximity, the workshops were run in-person, virtually or hybrid. It was concluded that in-person or hybrid were the preferred and more beneficial method. Informal conversation in between planned activities during in-person workshop is invaluable in gaining knowledge. Hybrid then provides a virtual option for participants that are restricted due to location proximity or accessibility. Digital whiteboards were used for hybrid and virtual sessions to ensure interactivity and inclusivity.

Stakeholders noted the workshops was a crucial part of the pilot project being a collaborative process. It has given the Councils an opportunity to generate ideas and receive recommendations to achieve those ideas, to realise what they need to do to achieve evident and place-based decision-making. The workshop also provided an opportunity for different internal departments within a Council to come together.

2. Working in Collaboration

The data collection process of the pilot projects generally took longer than anticipated. Due to the sprint nature of pilot projects and programme restrictions, there were some limitations on gaining full data access before developing the prototype data platforms. There was a shared observation that data access could be restricted due to internal departments working in silos or not having a shared vision on what insight the data can offer.

However, stakeholders noted that the pilot projects have successfully sped up internal cross-collaboration and shown how digital tools can offer wider place-making and investment insight when data were brought together. Stakeholders believe that the pilot projects are a good case study on what can be achieved when departments work collaboratively. The pilot projects also show the benefit of sharing and modelling data to address spatial challenges.

3. Data Management and Governance Plan

The process helped the stakeholders understand the more effective way of data organisation and accommodation is to have a vision for how the data can be used to understand spatial challenges and support decision-making. Through the pilot process, stakeholders understood the data gaps and data handling actions required to achieve their wider strategy and vision. To ensure the prototype data platform can be maintained and carried forward, there is a need for stakeholders to review their digital data management plan. Resources will need to be dedicated to updating and develop the data platforms.

4. Chosen Data Platform

Other than functionality, the Council's existing resources and license agreement were taken into account when choosing the right software as the respective prototype data platform. In the long term, it is crucial to understand cost associated with the software, features included in respective subscription levels, training and time required to tailor the software to specific needs for a full comparison.

Next Steps

This report reflects the Scottish Government and Scottish Futures Trust intention to publish the findings and disseminate lessons learned from the three use-case studies forming the initial pilot phase of the Place Tech Lab.

During this initial pilot phase of the PlaceTech Innovation Lab, the Scottish Government's Digital Planning Programme was closed at the end of March 2024.

Further development of the Place-Tech Lab concept is now being facilitated by Architecture and Design Scotland following the relocation of A&DS to the Edinburgh Futures Institute (which is part of Edinburgh University) in May 2024. New opportunities to build on this first phase of pilot work for the PlaceTech Innovation Lab are currently being explored and developed. Further detail of future work to support digital innovation and the role of data and analysis in supporting the planning system and infrastructure investment more generally will be provided in due course.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