Oxfordshire County Council – Smart Infrastructure Pilot Programme (SIPP) Closure report

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1. Foreword

The Smart Infrastructure Pilots Programme (SIPP) represents a significant step forward in enhancing connectivity and digital infrastructure within Oxfordshire. This initiative, led by the Department for Science, Innovation and Technology (DSIT), has provided an invaluable opportunity for local authorities to explore and demonstrate the benefits of advanced wireless technologies. Oxfordshire County Council is proud to have participated in this programme, leveraging innovative solutions to improve public services and community engagement. This report outlines the achievements, challenges, learnings and future Smart Infrastructure considerations from the project, showcasing our commitment to creating a smarter, more connected future for our residents and visitors.

2. Executive Summary:

The Smart Infrastructure Pilots Programme (SIPP) aimed to enhance the understanding and benefits of using street furniture and other assets for mobile network deployment. Oxfordshire County Council secured £250,000 in funding to purchase and test 14 smart, multi-purpose lighting columns from Signify. These columns were installed along a 1.5km 'connected corridor' from Oxford train station to the city centre, providing free Wi-Fi and improving connectivity for tourism, local commerce, education, and transport. The project tested various use cases, including public Wi-Fi, private connectivity for CCTV, and IoT sensors for traffic and parking management. The successful implementation of these technologies aligns with the Government's UK Wireless Infrastructure Strategy and OCC's Placemaking & Digital Infrastructure Strategy. The pilot sets the stage for potential expansion and integration with other Digital Infrastructure projects such as the England's Connected Heartland (ECH), contributing to the vision of a Smart County.

3. Introduction

3.1. Background

The Smart Infrastructure Pilots Programme (SIPP) is an initiative led by the Department for Science, Innovation and Technology (DSIT). The programme ran a competition from

5 June to 7 July 2023, offering £1.5 million in funding for six local authority-led pilots. These pilots aimed to enhance the understanding and benefits of using street furniture and other assets for mobile network deployment.

3.2 Objectives

The primary goal of SIPP is to demonstrate the advantages of 5G and advanced wireless connectivity for people, businesses, and public services. By leveraging smart infrastructure, the programme seeks to improve connectivity, support local commerce, enhance public services, and contribute to the overall digital transformation of communities.

4. Project Overview

4.1 Funding and Competition

Oxfordshire County Council successfully secured £250,000 in funding through the SIPP competition. This funding was allocated to purchase, install and test 14 smart, multi-purpose lighting columns, and provision wireless connectivity hardware onto these new structures These columns were planned to be installed as replacements to existing columns in Oxford to provide mobile and wireless connectivity services.

4.2 Initial Project Plan & Supplier Changes

OCC initially partnered with Freshwave as the connectivity provider (for mobile small cells) and Zeta specialist lighting as the column supplier. Freshwave pulled out of the project due to a lack of demand from their key customers (Mobile Network Operators). OCC engaged with other connectivity/neutral host suppliers such as BT Wholesale and Vodafone, but none were willing to support the match-funding requirement of the grant. Signify's proposal to provide a turnkey solution, including 14 PAS191 multipurpose columns and integrated Broadband Luminaires was approved by the OCC Strategic Capital Board. The change of supplier and use case was fully acceptable to DSIT.

4.3 Oxfordshire's Participation

The Innovation Service & the Digital Infrastructure team at Oxfordshire County Council led the project, focusing on creating a 1.5km 'connected corridor' from the Oxford train station to the city centre. This corridor offers free Wi-Fi for visitors and residents, enhancing connectivity for tourism, local commerce, education, and transport.

4.4 Other project Stakeholders:

- Signify is the main supplier and will deliver the project as a turnkey solution. Signify will also supply the Broadband luminaires which will enable the Wifi corridor with gigabit wireless backhaul. Signify will also provide the match funding for the project.
- Ember Networks is subcontracted by Signify for the delivery and management of the Wifi corridor for a period of 12 months. They will also test a 5G small cell with private 5G for a 12-month period as part of the match funding from Signify.
- Milestone Infrastructure is contracted for the installation of the columns.
- Neos is contracted to provide the fibre connection to the columns.

5. Project Implementation

5.1 Plan and Installation

The smart columns were strategically placed to create a seamless connected corridor. The installation process was done in March 2025. The columns were equipped with advanced wireless technology to provide robust and reliable connectivity.

5.2 Use Cases Tested

The project tested various use cases, including:

Broadband Luminaire: Technology that enable the creation of virtual fibre backhaul. This eliminates trenching fibre to every column and requires only a fraction of time and costs compared to traditional methods of extending broadband connectivity. For the current pilot, 3 fibre connections are used for the entire network rather than one fibre connection in each column. (OCC is funding the implementation and service costs of the three gigabit fibre connections).

Public Wi-Fi: Providing free internet access to residents and visitors. This service will be fully managed by Ember Networks for a period of 12 months as part of the match funding.

Private Connectivity for CCTV: Enhancing security and surveillance capabilities.

IoT Sensors for Traffic and Parking Management: Improving traffic flow and parking efficiency.

5.3 Installation and Operation Phases

After the installation was completed, Ember Networks installed the connectivity hardware and provides the wireless services (helpdesk, maintenance etc) of the Wi-Fi corridor for one year. Their managed service includes a dedicated portal for monitoring and evaluating the success of various use cases.

5.4 Communication & Stakeholder Engagement

Once the installation is complete, OCC will communicate with the public and engage with colleges and business owners in the area to encourage them to utilize the Wifi service and provide feedback. The focus for the first 6 months from the launch is to get the maximum number of users in the area and engage in creating secondary use-cases enabled by the Wifi network.

6. Expected Outcomes:

The demand for greater capacity and coverage, particularly for 5G services, will require increased network densification. To support this, operators are increasingly looking to deploy 5G small cells on infrastructure owned (or overseen by) local authorities. These include assets such as lamp posts, traffic lights, signposts, CCTV columns, benches, bins and bus stops, as well as on buildings. These assets can also be used to help local authorities meet other local needs, for example around electric vehicle charging points, CCTV cameras and Internet of Things (IoT) sensors.

The OCC pilot's expected outcomes were:

- Evaluate the impact of multipurpose lighting column & Broadband luminaires in enabling effective Digital infrastructure.
- Develop scenarios in which smart columns would be preferred over standard columns.
- Test procurement route for smart columns
- Formalizing the maintenance lifecycle of smart columns

7. Procurement

7.1 Approach:

Volker Highways (VH) holds the service & maintenance contract for highways and streetlights managed by OCC. It was agreed with VH that the columns can be procured from Signify through VH by doing a change control to the existing contract in April 2024. This arrangement was considered compliant from a procurement perspective as the existing services contract provided a mechanism for change, the proposed change did not materially alter the original scope that had been advertised for the existing contract and the value of the change was within an acceptable tolerance. Similarly, this procurement route was preferred to other options which were likely to take longer or would be sub-optimal in terms of business fit.

When the PO was raised in June 2024, the commercial & legal team at Volker challenged the procurement route as they were not consulted before providing their internal approval. This led to delays in the process. VH commercial team came back with a new procurement route including another wholesaler, as this was the usual

preferred supplier for all OCC works. In September 2024, Signify confirmed that this procurement route was not commercially viable to deliver the project.

After consultation with our procurement team, it was evident that a procurement exemption request was now the only complaint route available which would recognise the delivery timeline, business need and benefit realisation objectives.

The procurement exemption procedure is limited to a value of £179,000 + VAT and Signify provided for a revised quote for this value with a reduced scope of the project.

The Digital Infrastructure team have meanwhile contracted AWTG via a public procurement, for the build of a 5G mobile network in Oxfordshire and Buckinghamshire. This project known as England's Connected Heartland is also funded by DSIT under the 5G IR programme. There is ample headroom in the contract to include the provision of lighting columns (which are frequently used for the purpose of transmitting 5G mobile small cells), and will facilitate a pass-through of the remaining PAS191 lighting columns to Signify to complete the payment

7.2 Timeline:

The procurement process took almost 15 months from start to finish. Initially, change in suppliers did not significantly affect the procurement route and it was thought to be finalized by April 2024. But negotiations with VH took significant time in back and forth between the legal & commercial teams of each stakeholder. All stakeholders were working towards finding an amicable solution towards a complaint procurement route which in hindsight took a significant amount of time.

Once the exemption was approved, our initial approach to procure for the remainder of the funding was to create a procurement framework for PAS191 columns which would have also taken significant amount of time. But the AWTG route was identified in the meantime. OCC is still interested in creating a wider procurement framework in the future taking into consideration all connectivity & digital infrastructure requirements.

8. Lessons Learned

The project highlighted the importance of collaboration between local authorities and technology providers. It also underscored the need for robust planning and execution to ensure the successful deployment of smart infrastructure.

8.1 EV charging in columns

EV charging use-cases were not considered for the current project due to the location of the corridor. OCC has already tested the technology in Oxfordshire, and it was learned that power at the base of the column along the corridor would not be sufficient

for EV charging. The EV team within the innovation service was consulted for further feedback and it was suggested that EV chargers on columns work well with sufficient power in new development locations. This would mean that engagement with the developers must be done well in advance such that power supply requirements are considered in the early design stage.

8.2 Non-standard columns lifetime maintenance

The PAS191 column are categorized as non-standard columns are not part of the existing highway maintenance contract. A change control is hence required to be made to the existing contract to include the PAS191 columns. Currently, these columns will follow the same protocol for maintenance as the other small cell columns across the county. We have also procured one column that will be stored in Volker depot as a replacement column.

8.3 Procurement

As mentioned, procurement has been the biggest challenge over the course of the pilot. In hindsight, it would have benefitted the project timelines if we had dropped the change control route through Volker Highways route instead of looking at possible ways to make it work. Exemption approvals also take significant time due to higher approval levels. Considering the benefits of these columns in the wider digital infrastructure applications, OCC are interested in creating a procurement framework that would enable faster procurement lead-times.

8.4 Operational delays

It was also learned that festive period and operational errors delayed the delivery of the project significantly. The delivery of the columns was initially delayed due to the festive season. Once delivered, it was noted that the columns were painted in the wrong colour than what was ordered. Hence, it was sent back to the supplier for repainting. One of the columns which had a closer fibre delivery date was installed to avoid postponing fibre installation and will be painted in-situ.

9. Future Plans

9.1 Strategic vision

The SIPP pilot is one of the key building blocks of OCC's Digital Infrastructure capabilities to Deliver Economic, Social & Environmental benefits for Oxfordshire residents & businesses

Together with the outcomes of the England's Connected Heartland (ECH) project, as part of the 5GIR project also funded by DSIT, train passengers & tourists will experience seamless connectivity along their travel and into the city from the train station.

The usage of these services will be validated over the course of the next 12 months and feed into the decision of renewing the Wifi corridor and assess if the network should be extended. If successful, the connected corridor could be extended to cover additional strategic routes across Oxford and in market towns. This expansion would further enhance connectivity and contribute to the vision of a Smart County.

The SIPP PAS191 column & broadband luminaires solution is already being assessed as a viable option in locations where high-speed fibre connections are problematic, especially in market towns such as Abingdon.

Once a procurement framework is created and maintenance contract agreed, new locations that would require a small cell or multiple monitoring devices like CCTV, sensors could also be considered for the deployment of the PAS191 columns.

9.2 Success Metrics

The project aims to successfully demonstrate the benefits of smart infrastructure, including improved connectivity, enhanced public services, and support for local businesses. Key metrics that will be tested during this period includes

- Wi-Fi usage along the corridor,
- Increased investments through small cell deployments
- Additional use-cases developed
- power usage,
- positive feedback from residents, businesses and visitors.

9.3 Future Use-cases:

Once the WiFi network is operational, secondary use-cases enabled by the network will be examined in collaboration with the relevant stakeholders. Discussions with the city council include smart tourism applications and augmented reality for landmarks in the area. Additional considerations involve smart bins, connectivity within buses, and bus shelters.

10. Conclusion

The Smart Infrastructure Pilots Programme (SIPP) has demonstrated the transformative potential of advanced wireless technologies. Oxfordshire County Council's participation has paved the way for a smarter, more connected future, benefiting residents, businesses, and public services. We look forward to continuing our efforts to enhance digital infrastructure and support the vision of a Smart County.