Live Lab Programme Review
&
Final Project Evaluations

April 2022

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Preface

Proving Services Ltd is a research-based consultancy formed in 2003. In 2016, Proving founded the Future Highways Research Group (FHRG) which currently comprises members from 35 highways authorities. The aim was to create a forum for members to share ideas, knowledge and experience. Over the last five years Proving has observed that although local authorities and their private sector partners are keen to explore the opportunities that innovation may offer, the source of funding, allocation of the required space and time to develop the innovation, and ownership of associated risks and rewards, can be difficult to resolve.

The Live Labs programme is unique in providing the funding, structure and environment for developing and testing innovations that have the potential to benefit the whole sector. Through its role in the monitoring and evaluation of the Live Labs programme, Proving has observed a real energy and enthusiasm for innovation; encouraging equitable and effective collaboration between local authorities, large private sector providers, SME's, academia and government agencies such Connected Place Catapult.

As highlighted in this report, there are some key lessons and suggested changes for future, similar initiatives. This is not unexpected given the ambition and originality of the programme. If addressed, Live Labs provides a solid foundation for successfully delivering future innovation that will help tackle the challenges facing the sector, including carbon reduction. The momentum gained in this new way of cross-sector funding and working should not be lost.

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Introduction

This report is in two sections.

1. **A review of the Live Labs Programme.**
2. **The final evaluations for each Live Lab, including a summary of the lessons learnt during the process of assessments.**

SECTION 1: Live Lab Programme Review

1   Scope of Review

The Live Labs programme officially ended in November 2021[1]. The Live Labs Commissioning Board requested a programme review, to consider the following:

1. **Have the objectives of the Live Labs programme been achieved?**
2. **Programme Management & Governance - what worked well or could be improved if a Live Labs 2 or similar research programme is funded?**

The review was conducted through a series of interviews with members of the Commissioning Board, the programme management team, and the project managers and Senior Responsible Officers (SROs) from the respective Live Labs. (*Refer Section 3.10 for a list of interviewees*). The observations of Proving, acquired as part of its monitoring and evaluation role, have also been included.

2   Achievement of the Live Lab Programme Objectives

The primary objective of the Live Labs programme was to trial and accelerate the adoption of new solutions and technologies to deliver improved outcomes for the highways sector. Live Labs and their delivery partners were expected to focus not only on delivery and associated benefits, but also on the underlying commercial factors that enable success, and are vital for achieving a wider step change. Live Labs were required to collect the technical, commercial and other supporting data to allow others to construct future business cases for their geographies.

The overall consensus is that the programme has been a success. Many innovations have been successfully trialled and are benefiting the host authority (*Refer Section 2: Live Lab Final Evaluations*).

During the interviews the following comments were made by members of the Commissioning Board:
- *'Live Labs has stimulated excitement for innovation across local government and private sector, creating partnerships that would never have happened before'.*
- *'Live Labs has highlighted to DfT and the sector, the need for innovation to be funded. Innovation needs to be pump-primed'.*

When asked, the Live Lab representatives all expressed their appreciation at being involved in the programme with time to work on interesting and relevant innovations which have benefited their authority and the wider sector.

At the time of this report (February 2022) the full profile of learning from each Live Lab and across the programme has not yet been fully captured, documented and shared in a consistent format that is of value to the sector. However, it is understood that the programme management team are currently making good progress in building a comprehensive and accessible repository of learning[2].

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[1] A number of Live Labs have continued into 2022, focusing on the capture of learning from trials and the development of the respective business and benefits cases for dissemination across the highways sector.

[2] This being developed in conjunction with BSI.

The Live Labs programme has also had the following successful outcomes:

1. **Live Labs have raised the profile of innovation within their host local authority and the wider highways sector.**
   a. For several authorities (Kent, Central Bedfordshire and Staffordshire), the Live Lab Project Board has transitioned into an extended Innovation and Technology Board that is tasked with exploring how technology can be used across sectors to tackle the mobility, sustainability and environmental challenges facing the authority. Additional funding for innovation also appears more forthcoming from these authorities.
   b. The flexibility and agility of the programme allowed Live Labs to explore how the technologies trialled may benefit other sectors. An example was the use of sensors within adult social care to support vulnerable people (Bucks and Suffolk). Looking to the future, innovation will need to become less siloed and support joint initiatives that deliver benefits across sectors.
   c. The publicity of the Live Lab programme has resulted in discussions between Live Labs and other authorities. As an example, Staffordshire (Live Lab) and Hertfordshire (non-Live Lab) are exploring how 'Living Walls' can be included with their local bus strategies.
   d. The Cumbria Live Lab, with associated work with WSP, have aggregated knowledge on plastic in roads from across the sector.
   e. A member of the Commissioning Board (who visited all Live Labs, except one) commented that '*Live Labs has clearly opened the box to innovation within the authorities, attracting individuals of high calibre and enthusiasm*'.

2. **Live Labs has clearly demonstrated the tangible benefits of true collaboration between the private and public sectors.**
   a. This included SMEs, who for the more successful Live Labs[3] (Suffolk & Staffordshire) were given an equitable role and voice, alongside the larger organisations. This was achieved through strong, effective project management.
   b. The Staffordshire Live Lab 'Dragons' Den' approach to selecting the innovations for its air quality and mobility challenges generated considerable interest, with over 130 SME submissions. The Live Lab created a database of submissions of potential interest to other sectors, authorities or industry partners. This is a good example of a Live Lab building useful partner and industry linkages.
   c. Many SMEs were interviewed during the Live Lab evaluation waypoints. All expressed their appreciation at being given the opportunity and funding to trial their respective technologies and benefit from the guidance and experience of more established organisations.

3. **The COVID-19 pandemic provided the Live Labs with real-time opportunities and interventions that allowed them to capture valuable data relating to air quality and the mobility choices of the travelling public.**
   a. Several Live Labs (Suffolk, Thames Valley Berkshire and Staffordshire) extended their trials to include and assess this data.
   b. The programme director commented that one of the successes for him has been '*how the Live Labs have coped with adversity and uncertainty*.'

2.1 DfT Endorsement

Given that the Department for Transport (DfT) funded the programme, their endorsement of Live Labs' success would be well received by the sector, encouraging other authorities to investigate and explore how the innovations trialled may be of benefit to them.

DfT should also give some consideration as to how successful and proven trials should be incorporated into future highways standards and policies. The programme director suggested that the approach to producing or

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[3] As evaluated by Proving (*Refer Section 2*)

changing standards when evaluating innovation needs to be re-considered, perhaps using a risk-based approach.

It is understood that there is a task pending to review all the respective business cases and to evaluate the quality, relevance and independence of the research findings. Once completed, recommendations can be made to DfT.

3 Programme Management & Governance

3.1 Live Labs Project Selection

The success of any innovation programme will depend on the quality of the individual projects chosen and their collective benefits as a portfolio. With hindsight, the optimal programme might not have been selected. It is understood that a structured process was adopted with clear selection criteria. However, it has been suggested by members of the Commissioning Board that there may have been insufficient technical due diligence and business challenge with the innovations put forward, and that the knowledge and expertise of the sector could have better informed the selection of projects. Views were expressed that some of the innovations were not new (e.g. plastic in roads), although one of the objectives was to operationalise and test innovation already in the sector, with a view to embedding it as business as usual (BAU). Another concern was that there appeared to be some duplication of trials (e.g. air quality sensors). However, this was deliberate and agreed by DfT and the Commissioning Board. When the respective business cases are submitted, it is important that the context of the trial is clear: the technologies themselves may not be distinctly unique but the differences in purpose and geolocation should be documented and compared.

Although included within the original selection criteria, it has been suggested that if a Live Labs 2 proceeds there should be increased focus on achieving a more balanced portfolio that considers:

- **The complexity of innovation and therefore the spread of risk.**
- **The timing of outcomes, delivering some early wins and learning which give the programme momentum and can inform other projects.**
- **The technological maturity of the innovations.**
- **The behavioural and structural changes needed to successfully embed innovation.**
- **Geographical location, ensuring all nations and regions are involved.**
- **Encouraging the participation of smaller authorities, including, if required, collaboration with larger councils and providers.**

3.2 Project Seed Funding & Business Case Development

The 'Dragons' Den' approach to project selection is considered to be successful in identifying potential candidates based on a well-thought through pitch and proposal. At this early stage, evidence of support and engagement from key political representatives of the authority is a critical indicator of future success.

It was agreed by all those interviewed that if Live Labs 2 proceeds, the process for funding needs an additional stage of scrutiny and approval. It is proposed to retain the 'Dragons Den' approach to initial selection and award an amount of seed-funding to enable the authority to develop a comprehensive business case, ensuring that adequate consideration is given to:

- **The availability, readiness and willingness of key partners and providers to participate in the project.**
- **The process of efficient and timely procurement for good and services.**
- **An initial assessment of the viability of the technology proposed.**
- **Understand and commit to the obligations and responsibilities linked to the award, including:**
  - Communication expectations and protocols.
  - Stability and quality of project management team.
  - Full and continued political support and engagement.

- **The Commissioning Board must review the business cases carefully, bringing in their own knowledge and expertise, and challenging those projects that they consider unrealistic in ambition and / or demonstrate critical issues of achievability. It should be prepared to halt those projects that fail to meet the agreed criteria.**

3.3   Live Lab Procurement

The ease upon which the respective Live Labs could initially procure goods and services varied significantly. This largely depended on the procurement and contractual rules and processes imposed by the host authority. Some authorities were better at recognising the flexibility needed to procure for research and innovation (Suffolk) or had established mechanisms (TfWM). Difficulties resulted in significant delays to the commencement of several Live Labs and / or a sizeable administrative charge to procure goods and services through an established partner. The programme director commented, *'there is still a gulf between the innovation and delivering actual outcomes, often due to contractual constraints.'*

Given the uniqueness of the programme and funding mechanism, the Live Lab programme team were unprepared for these problems and their resolution often proved challenging.

- **For future, similar initiatives, adequate support, guidance and time must be provided to enable all projects to quickly establish their agreed procurement channels, providing the host authority with the necessary assurance that any risks will be addressed.**

3.4   Changes in Scope

The Live Labs programme was designed to be flexible and agile, adapting to challenges and changes in the project environment. As the new technologies and solutions identified were consistent with the original project objectives, the Live Labs were able to quickly assimilate them into their projects without going through a lengthy approval process.

However, significant changes in scope or ambition should have been presented to, and approved by, the Commissioning Board. There are two Live Labs (Bucks and Thames Valley Berkshire) where the final scale and nature of activity and innovation does not reflect the original ambition of the project upon which the funding was awarded. Both Live Labs were ambitious and complex, with many workstreams that aimed to build connected technologies and datasets within a specified location. As the projects progressed, they became a series of discrete trials rather than an integrated project. With hindsight, this should have been recognised and discussed more fully by the Commissioning Board.

- **The evaluation process and programme management team should identify where significant changes of scope have occurred and report it to the Commissioning Board.**
- **Individual projects should be prepared to present the case for any changes in scope that are not aligned to its original strategic ambition.**

Overall, the Live Labs coped well with COVID-19 and the transition to virtual working. The six-month extension was welcome and used by most Live Labs to extend the period for trial evaluations. There were no major changes to scope as a result of the pandemic. However, two Live Labs experienced significant supply problems (Central Beds and Bucks) where difficulty in finding alternative solutions contributed to delays to their projects.

3.5   Capturing Programme Learning

As mentioned, a single repository of learning is currently being developed. Throughout the programme, an extensive series of blogs and white papers have been published with all Live Labs encouraged to contribute. It is understood that initially, it was rather difficult to get some of Live Labs to actively participate, however, as the programme advanced the volume, quality and range of output improved significantly.

The programme team understood the need to capture the learning across those Live Labs where similar or related trials were being tested (e.g. air quality sensors), giving a programme perspective. The private sector secondees played a significant role in supporting communications work, including writing some of the blogs and white papers. Those secondees interviewed commented on what valuable experience and skills this gave them.

Overall, the use of academia brought rigour, clarity and assurance to the Live Lab programme. The University of Suffolk, Keele University (Staffordshire) and the University of Reading were regarded as invaluable partners. Central Bedfordshire has had less success, in part due to COVID-19 and a delay in the implementation of trials, but also a lack of clarity as to Cranfield University's scope of work. Several Live Labs had no academic input, but the quality and independence of the trial was still comparable with those that had.

- **Ensure the repository of learning is available for the start of the programme.**
- **Agree standards and templates to be used to capture learning and develop business cases.**
- **Ensure the project team and partners understand and commit to the responsibilities in capturing and documenting the learning to a required standard.**
- **Ensure that the learning from trials that did not have the anticipated outcome is still captured. These are not 'failed' trials but provide useful information and learning for future, similar initiatives.**
- **When involving academia, the role, scope of work and required outcomes must be clearly defined and agreed from the outset. Also, as potentially an expensive cost, ensure that the use of academia adds value to the project.**

3.6 Programme Management

For a programme of this size, the management team was very lean and the costs low. The consensus of the Live Labs project managers was that the programme management team were actively involved, accessible and helpful. This included Matt Eglinton, Head of Local Highways Maintenance, Innovation and Resilience at DfT, with several project managers mentioning his keen interest and support for their projects.

All agreed that the programme would have benefited from an administrative-focused programme manager, reporting to the programme director. This role would help ensure the more proactive management of internal communications, identify and encourage greater collaboration and shared learning, manage the secondees and provide an additional skilled resource to support those projects facing difficulties. The programme director role is still important in building and maintaining the vision and focus of the programme.

The secondment of ADEPT private sector partner employees to support the programme was considered a good idea and helped to keep the administrative costs of the programme low. However, it was agreed that better use could have been made of the secondees. Proving interviewed three of the secondees and all stated it was a positive and useful experience that enhanced their career development. Specific praise was given by those who were involved in the communications activities, appreciating the opportunity and support provided by Coast Communications.

- **With the addition of a programme manager, it is recommended that this low-cost model for programme management and governance is adopted for future, similar initiatives.**

The activities to close the programme could have been more fully considered at an earlier stage, giving the Live Labs more information as to what would be required and when. As mentioned, the capture, assessment and access to a repository of learning acquired is still work-in-progress. The quality of business cases produced to-date vary and many are still in draft form. For several of the projects, the monitoring of outcomes will continue well into 2022 and even longer (e.g. plastic in roads).

3.7 The Live Lab Commissioning Board

It is appreciated the structure and composition of the Commissioning Board reflects the rather organic early development of the programme. However, the general perception was that it was rather detached from the individual Live Labs and that several members did not appear to take an active interest in the projects. Proving

believes that there could have been better leverage of the members' respective skills, expertise and connections to raise the profile of the programme within the highways sector, and also provide insight and guidance to the individual Live Labs.

For reasons of independence and possible vested interests, private sector members of the Commissioning Board were not fully involved in the Live Lab selection. Members of the Commissioning Board have expressed reservations as to the value to the sector of some of the projects selected. Ideally, any Commissioning Board should be fully supportive of the entire programme they are expected to oversee.

- **Given the proposed scope and ambition of Live Labs 2, the composition and structure of its Commissioning Board will need further consideration.**
  - o **Suggestions included: different skillsets and backgrounds (i.e. not just engineering but sustainability and behavioural expertise), rotating Board members and allocating specific areas of responsibility.**
- **All proposed members should commit to an agreed Terms of Reference, which documents their respective roles and responsibilities.**
- **The two-stage approach ('Dragons Den' and business case) should allow the Commissioning Board to have a more significant input into final project selection.**

3.8   Monitoring & Evaluation

The consensus was that the 'light-touch' and trust-based approach to Live Labs monitoring and evaluation was successful, providing a structured and consistent assessment without being too intrusive and bureaucratic. The process adopted by Proving identified the key issues, highlighting the progression of individual projects and the programme as a whole.

Valid comments were expressed that Proving may have been over generous to one Live Lab (Bucks) in the early stages of the programme. As a result, Proving involved partners and providers in later assessments to capture broader views as to actual progress and the challenges faced.

Proving encouraged all stakeholders to be involved in the evaluation workshops and describe in turn the progress and challenges faced. One Live Lab project manager commented that this approach, *'provided one of the few opportunities for the whole team to get together and really understand what was happening across all the workstreams.'*

The timing of the independent evaluations (every six months) worked well. Live Labs were expected to complete self-assessments in between the Proving reviews. Some Live Labs took this responsibility seriously and provided a thorough and evidence-based assessment involving the whole project team. For several of the Live Labs, the self-assessment appeared to be done in relative haste by just the project manager, with minimal explanation as to the scores. As would be expected, the self-assessment evaluations were usually more positive than the independent reviews, but not significantly so.

Proving was not responsible for monitoring financial spend. During the evaluations there was no evidence of mis-spend but the light-touch approach does have some risks:

- **Without becoming too controlling and burdensome, Proving would recommend increased financial scrutiny for future Live Labs type projects.**
- **Consideration should also be given to releasing funding in stages, against agreed milestones and criteria.**

3.9   Programme Communications & Dissemination of Learning

3.9.1   Individual Live Lab Communications

The importance of active communications to the success of the programme was not initially appreciated by many of the Live Labs. The use of SLACK as the internal communication hub was not successful and early

collaboration and shared learning between the Live Labs was limited. Communications activity did begin to improve six months into the programme as the Live Labs started to make progress with their projects and fortnightly virtual calls were instigated.

TfWM (Network Resilience) was an example of a Live Lab that adopted a professional approach to its communications, with an experienced and dedicated officer that was allocated sufficient funding for the workstream. From the start of the project, the importance of communications, and shared and disseminated learning, was seen as integral to success.

A number of suggestions have been put forward to ensure any future Live Labs programme adopts a successful communications strategy from the start, but they may have an associated cost:

- **Establish a contractual communications protocol to which all projects sign up to.**
    - Ensure all projects understand their respective duties and responsibilities.
- **Ensure all projects appoint a communications officer.**
- **Provide early training and on-going support.**
- **Ensure all key partners understand their obligations and conditions regarding communications.**
    - Build into contractual arrangements.
- **Consider the learning and associated communications that can be shared at the early stages of the programme to build momentum and interest.**
- **Consider the internal communication protocols necessary to improve projects collaboration.**
- **Ensure all stakeholders, specifically the Commissioning Board, DfT and local authorities understand and meet their responsibilities in raising the profile of the programme.**

3.9.2 Communication Activities & Events

The Live Lab programme adopted a variety of channels (blogs, white papers, trade articles, social media, conferences, webinars and presentations at various meetings) for publicising and disseminating progress and achievements. A member of the programme management team commented that, '*I have never been involved in a project where we have done so much communication.*'

The series of events at the end of the programme (the ADEPT Conference, Highways UK and Live Labs Expo) were all well attended and considered a success in building awareness and interest within the sector. It was fortunate that the events could be held live, allowing discussion and debate amongst the attendees. Several participants from individual Live Labs reported a sense of pride and achievement in presenting their successes at these events. One Live Labs commented that they were, '*pleasantly surprised at level of interest and range of questions asked,*' at the events.

- **Live / face-to-face events generate more interest and engagement from both the presenters and attendees.**
- **The project teams must understand and commit to their responsibilities in promoting their respective project across a variety of communication channels.**

3.9.3 Live Lab Collaboration

As mentioned, effective collaboration between the Live Labs was initially quite slow to develop. A member of the programme team commented, '*I didn't realise how difficult it would be to get the Live Labs to collaborate, but we got there eventually. They are now a really close unit.*'

The programme management team was always keen to emphasise that the projects were not in competition with each other and that an ethos of shared learning should be adopted. Throughout the programme some Live Lab collaborated better than others. It did appear that the Live Labs with women project managers tended to be more willing to request, offer and accept, support and guidance.

The private sector partners played a limited role in facilitating collaboration between Live Labs, although there was good support within each Live Lab.

Improved collaboration was achieved through bi-weekly Live Labs meetings initiated and facilitated by the Programme Director. At the Proving evaluations, the majority of Live Labs commented on the difference this made to their sense of being part of a programme and bigger team, appreciating the work of other Live Labs and identifying opportunities for shared learning.

In the final year, the Suffolk Live Lab initiated 'Commonality' meetings to complement the bi-weekly meetings. These were more informal discussions where Live Labs were encouraged to highlight problems and ask for advice from their colleagues without the programme management team being present.

Although the Live Labs coped well with the impact of COVID-19 restrictions, the reduced opportunity to meet face to face did affect collaboration between Live Labs and their respective partners.

- **Effective collaboration needs encouragement and facilitation, especially in the early stages of the programme. However, it cannot be forced. The programme environment needs to be one of support and a collective ambition for all projects to be successful.**
- **All partners should recognise their role and responsibilities in collaborating across the programme.**
- **Although virtual meetings are an efficient use of time, more informal get-togethers provide an invaluable forum for exchanging ideas and building networks.**

3.10 Programme Review: Interviewees

1. Hannah Bartram - ADEPT
2. Giles Perkins – Programme Director (WSP)
3. Neil Gibson – Chair of Commissioning Board
4. Matt Eglinton- Department for Transport
5. Phil Skegg - Commissioning Board (Eurovia)
6. Jason Pavey – Commissioning Board (Atkins)
7. Andrew Cook – Commissioning Board (Essex County Council)
8. Yogesh Patel - Commissioning Board (Eurovia)
9. Julie Everett – Coast Communications
10. Deborah Fox – Transport for West Midlands
11. Lewis Kelly - Transport for West Midlands
12. Brigitte Sodano-Carter – Suffolk County Council
13. Richard Webster – Suffolk County Council
14. Andrew Loosemore – Kent County Council
15. Carol Valentine – Kent County Council
16. Jake Harrison – Staffordshire County Council (Amey)
17. Louise Clayton – Staffordshire County Council
18. Paul Mason – Central Bedfordshire Council
19. Jack Bowers – Central Bedfordshire Council
20. Matt Waning – Cumbria County Council
21. Paul Waite – Buckinghamshire Council
22. Rob MacDonald – Reading Borough Council (Stantec)
23. Sam Shean – Reading Borough Council
24. Katie Metcalf – Secondee (Atkins)
25. Richard Evans – Secondee (Atkins)
26. Ayo Jenrola – Secondee (WSP)

SECTION 2 – Live Lab Final Individual Evaluations

1. Introduction

The final Live Lab evaluations were completed between November 2021 and February 2022. With the exception of Buckinghamshire and Thames Valley Berkshire, all Live Labs have completed their respective trials and were in the process of closing their projects, preparing the required business cases and agreeing the transition of successful trials into BAU. The TfWM Network Resilience Live Lab has been formally closed.

It has been noted that Buckinghamshire Live Labs unfortunately experienced a fatality on site during the installation period and this resulted in a complete shutdown of all Live Labs site work for a prolonged period of time - it has been estimated that this has resulted in a 6-9 month delay to the Buckinghamshire Live Labs programme.

Table 1: Final Evaluations Dates & Participants

Authority	Evaluation Date	Participants
Buckinghamshire	2 Feb	Paul Waite (Jacobs), Mark Fell (WSP)
Central Beds	13 Dec	Jack Bowers (CBC), Paul Mason (CBC), Nathan Kirwan (CBC)
Cumbria	9 Dec	Matthew Waning (Project Manager). *Andy Brown (SRO) was not available for the evaluation meeting.*
Kent	8 Dec	Andrew Loosemore (SRO), Carol Valentine (Project Manager), Seb Corby (Amey Project Manager), Joe Kimberley (Amey), Mark Fisher (Amey), Katherine Porter (Project Support)
Staffordshire	14 Jan	Louise Clayton (SRO), Jake Harrison (Amey)
Suffolk	8 Dec	Brigitte Sodano-Carter (Project Manager), Richard Webster (Project Director)
TVB	26 Jan	Sam Shean (RBC), Rob MacDonald (Stantec, Programme Manager), Ben Kirley (Smarter Solutions), Andrew Williams, Ian Mercer (Telefonica), Charles Gaudoin, Graham Ault, Tim Dixon (University of Reading), Chris Weedon, Josh Welch (Shoothill), Rob Curtis (Wokingham) Marc Allen (Bracknell), Phil Coker (Reading)
TfWM	23 Nov	Deborah Fox (Programme Manager), Lewis Kelly (Project Manager) + 8 other representatives from individual workstreams, communications and partners (Solihull & Birmingham City)

Each Live Lab was assessed against the agreed performance criteria. The assessment factor weightings reflected the final stage of the programme, with the emphasis on learning acquired, benefits to be realised and the future of the trials post Live Lab closure. These factors are highlighted in red in the following evaluation tables.

2. Summary of Evaluations

Table 2 highlights that overall, the Live Lab programme has been a success with the majority of projects achieving their original strategic objectives and delivering valuable learning and insight for the sector.

The Live Labs and their delivery partners were expected to focus not only on implementation but the wider benefits and commercial factors that would achieve a step change for the sector. The Live Labs were required to build business cases that could be used with confidence by other authorities and organisations wishing to deploy similar technologies. There is still much work needed for this activity to be completed well. The business cases seen by Proving vary in completeness and quality. There is also an inconsistency in format and content. For the programme to be of value to the sector, the programme team need to ensure that the business cases are reviewed, curated and stored in a single repository that is easily accessible by the sector.

Buckinghamshire, due to the 6-9-month closure to all the Live Labs site works, and to a lesser extent Thames Valley Berkshire (TVB), have yet to fully implement all their trials. Both have been given a deadline by ADEPT of 9 June 2022 to complete. Central Bedfordshire has installed all their technologies but given the delays in two of the trials, insufficient data has yet been captured *(Refer Section 4 Individual Live Lab Reviews).*

All Live Labs will continue some form of monitoring well into 2022. Many trials have already transitioned into BAU operations. It is important that any future results or findings are fed into the repository of learning.

Many of the Live Labs stated that a valuable outcome has been the increased recognition within their authority of the importance of innovation in meeting both immediate and future challenges. For Kent, Staffordshire, Central Beds and TfWM, the Live Lab Project Board has transitioned into a wider Innovation and Technology Board, exploring how future, integrated innovation can benefit the highways and adjacent sectors.

All Live Labs participated in the end of programme events (the ADEPT Conference, Highways UK, Live Labs Expo). Many of those interviewed commented on what a positive experience this was given the level of interest at the event and the opportunity to present and discuss their Live Lab achievements.

When asked during the evaluations, nearly all said they would welcome the opportunity to participate again in a similar initiative, building on the wealth of experience and knowledge they have gained from their respective Live Lab projects.

Table 2 provides a summary of all the final Live Lab evaluations. The factors highlighted in red have the highest importance at this stage of the programme.

Table 2: Live Labs Final Evaluation Summary

Live Lab	Bucks	Central Beds	Cumbria	Kent	Stafford	Suffolk	TfWM	TVB
Attractiveness								
Strategic Alignment	Good	Good	Good	Excellent	Excellent	Excellent	Excellent	Good
Learning Objectives Clarity	Satisf.	Satisf / Good	Good	Good	Good	Excellent	Excellent	Good / Satisf.
Future Benefits Analysis	Req Imp /Satisf.	Satisf.	Good	Good	Good	Good	Excellent	Satisf.
Constraints Analysis	Satisf /Good	Good	Good	Good	Good	Good	Good	Good
Scalability & Flexibility of Project	Good	Satisf.	Good	Good	Good	Good	Good	Good
Providers & Partners	Good	Good / Satisf	Good	Good	Good	Good	Excellent	Good
Stakeholder Support	Satisf	Good	Good	Excellent	Excellent	Good	Excellent	Good
Prog. Consistency & Coherence	Satisf.	Good	Good	Good	Good	Excellent	Good	Good
Achievability								
Complexity (Inherent Risk)	Moderate	Mod-Low	Mod-Low	Mod-Low	Moderate	Mod-Low	Mod-Low	Moderate
Governance & Accountability	Req Imp/ Satisf.	Satisf/ Good	Satisf.	Good	Good	Excellent	Good	Excellent
Partner Management	Satisf.	Satisf /Good	Good	Good	Good	Excellent	Good	Good
Resources Competence & Capacity	Req Imp/ Satisf.	Good	Good	Good	Good	Good	Good	Good
Communications Strategy	Req. Imp	Good	Satisf.	Good / Satisf	Good	Good	Excellent	Satisf.
Alternatives Certainty	Satisf	Good	Good	Good	Good	Excellent	Good	Good
Future Affordability & Transferability	Req. Imp	Req Imp /Satisf.	Good	Satisf/ Good.	Good	Good	Excellent	Satisf.

- * The assessment criteria (e.g. Future Benefits Analysis) is made up of a number of individual factors (*Refer Appendix B*).
- '**Satisf/ Good** 'is closer to an overall assessment of Satisfactory, therefore coloured Yellow, **'Good / Satisf'** is closer to an overall assessment of Good, therefore coloured Green.

4 Individual Live Lab Performance

4.1 Buckinghamshire (Bucks)

Figure 1: Bucks Live Lab Evaluation Progression

Bucks Live Lab Final Evaluation Feb 2022

Table 3: Bucks Live Lab Evaluation Progression

Buckinghamshire								
Attractiveness	Jan 20	Jun 20	SA Sept 20	Dec 20	SA March 21	Jun 21	SA Sept 21	**Feb 22**
Strategic Alignment	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Good**
Learning Objectives Clarity	Good	Good	Good	Good	Good	Satisf. / Good	Satisf.	**Satisf.**
Future Benefits Analysis	Satisf.	Good	Good	Satisf	Good	Satisf.	Satisf.	**Req Imp /Satisf.**
Constraints Analysis	Good	Good	Good	Good	Good	Satisf.	Good	**Satisf /Good**
Scalability & Flexibility of Project	Excellent	Excellent	Good	Good	Good	Good	Good	**Good**
Providers & Partners	Good	Satisf.	Good	Good	Good	Satisf.	Good	**Good**
Stakeholder Support	Good	Good	Good	Good	Good	Satisf.	Good	**Satisf**
Prog. Consistency & Coherence	Good	Good	Good	Good	Satisf.	Satisf.	Satisf.	**Satisf.**
Achievability								
Complexity (Inherent Risk)	Mod-High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	**Moderate**
Governance & Accountability	Good	Good.	Good	Good	Good	Satisf.	Req Imp/ Satisf.	**Req Imp/ Satisf.**
Partner Management	Good	Satisf.	Satisf.	Good	Satisf.	Satisf.	Req Imp/ Satisf.	**Satisf.**
Resources Competence & Capacity	Good	Good	Good	Good	Good	Satisf.	Req Imp/ Satisf.	**Req Imp/ Satisf.**
Communications Strategy	Good	Good	Satisf	Satisf	Satisf / Good	Satisf.	Req. Imp	**Req. Imp**
Alternatives Certainty	Good	Good	Good	Good	Good	Good	Good	**Satisf**
Future Affordability & Transferability	Satisf.	Satisf	Satisf.	Satisf / Req. Imp	Satisf / Good	Req. Imp	Req. Imp	**Req. Imp**

The Bucks Live Lab has been subject to significant delays in the installation of its trials due to the fatality on site (June '21), this resulted in a complete shutdown of all Live Labs site work in Buckinghamshire for an extended period of time. The majority are now installed or in the final stages of being installed, but the capture and analysis of associated data and completion of the required business cases will be ongoing well into 2022. The Bucks Live Lab has been given a fixed extension until 9 June 2022 to complete all these activities and has stated that they are currently on track to achieve this deadline. The continued decline in assessed performance reflects the current status of the project, the scale of outstanding activities and available time remaining.

The original ambition of the Bucks Live Lab was to combine a range of technological solutions that complemented each other and helped the authority to deal with a range of complex and inter-related needs, all within a defined setting (Fairford Leys). However, the Live Lab has become a series of rather disparate trials that, at best, will become a proof of concept for the individual technologies.

WSP have produced 'lessons learnt' reports which will be useful for similar, future installations. The stated benefits are currently at a high level and still describe the objectives and potential of the technology. They are not as yet, a detailed analysis of actual outcomes and the benefits realised from the Live Lab trials. Bucks has stated that they are confident that a detailed analysis of the actual outcomes will be available once all the data has been received.

The ambition of the Bucks Live Lab was promising. The original SRO clearly had a vision and energy for the project which was somewhat lost when he moved on. The transition of Buckinghamshire into a unitary authority resulted in changes in the project team at critical stages in the project. The current project manager (from Jacobs) is of high calibre and is clearly committed to achieving the best outcomes possible, given the challenging circumstances and time remaining. The current SRO is due to retire at the end of March.

As proposed, (*Refer Section 1, 4.2*) for future, similar initiatives, there should be closer scrutiny and challenge of the innovations proposed. During the evaluations, concerns were raised by partners as to the viability of the technologies trialled (e.g. composite lighting columns). It is important to provide the sector, through the Commissioning Board, with the opportunity to share their knowledge and expertise in informing the selection process. The proposed seed-funded stage for detailed business case development can also be used to undertake an initial assessment of the viability of the technology proposed and ensure the authority understands and commits to the obligations and responsibilities linked to the award.

4.2 Central Bedfordshire

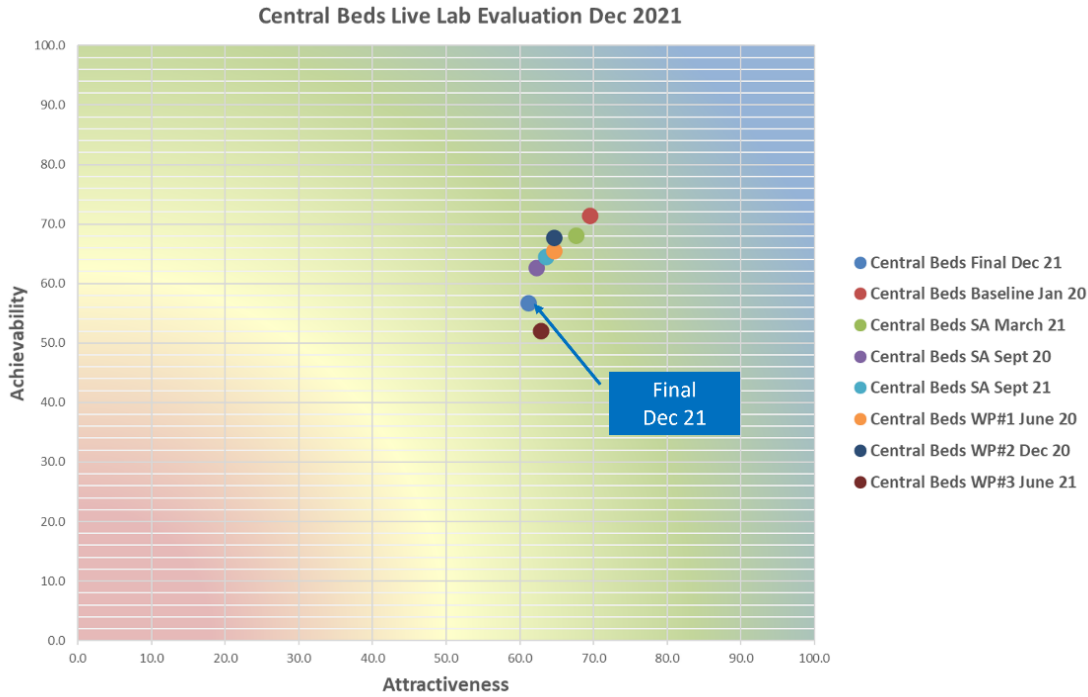**Figure 2: Central Bedfordshire Live Lab Evaluation Progression**

Central Beds Live Lab Evaluation Dec 2021

Table 4: Central Beds Live Lab Evaluation Progression

Central Bedfordshire								
Attractiveness	Jan 20	Jun 20	SA Sep 20	Dec 20	SA March 21	Jun 21	SA Sept 2021	**Dec 21**
Strategic Alignment	Good	Good	Excellent	Good	Good	Good	Good	**Good**
Learning Objectives Clarity	Good	Good	Satisf.	Good	Good	Good / Satisf.	Good	**Satisf / Good**
Future Benefits Analysis	Satisf.	Satisf	Satisf.	Satisf.	Satisf	Satisf.	Satisf.	**Satisf.**
Constraints Analysis	Good	Satisf	Satisf.	Satisf.	Good	Good	Good	**Good**
Scalability & Flexibility of Project	Satisf.	Satisf.	Satisf.	Satisf.	Good	Satisf.	Good	**Satisf.**
Providers & Partners	Good	Satisf.	Satisf.	Good / Satisf	Good / Satisf	Good / Satisf	Good	**Good / Satisf**
Stakeholder Support	Good	Good	Good	Good	Good	Good	Good	**Good**
Prog. Consistency & Coherence	Good	Good	Good	Good	Good	Good	Good	**Good**
Achievability								
Complexity (Inherent Risk)	Mod-Low	Mod-Low	Mod-Low	Mod-Low	Mod-Low	Mod-Low	Mod-Low	**Mod-Low**
Governance & Accountability	Good	Good	Good	Good	Good	Satisf.	Good	**Satisf/ Good**
Partner Management	Good	Good	Req. Imp	Satisf.	Satisf.	Satisf.	Satisf /Good	**Satisf /Good**
Resources Competence & Capacity	Good	Satisf.	Satisf.	Satisf.	Good	Satisf	Good	**Good**
Communications Strategy	Good	Good	Good	Good	Good	Satisf	Good	**Good**
Alternatives Certainty	Good	Good	Good	Good	Good	Good	Good	**Good**
Future Affordability & Transferability	Satisf.	Satisf.	Satisf.	Satisf / Req. Imp	Satisf.	Req. Imp	Satisf.	**Req Imp /Satisf.**

All three trials of the Central Beds Live Lab are now installed and being monitored. The kinetic trial is live at Leighton Buzzard station and the thermal trial is installed at the Thorn Turn depot carpark. At the time of the evaluation workshop (13 Dec 2021), the solar panels had been installed (also at Thorn Turn), although a

problem with the panel seals was due to be resolved that week. As mentioned in previous evaluations, the scope of all three trials has been reduced from the original plan with alternative locations found.

Cranfield University has received some data, but is yet to undertake any detailed analysis or provide any reports. It was stated that a full 12 months' worth of data is required for the analysis to be of the necessary rigour and value. Given the delay in two of the trials, the monitoring of the programme will continue to the end of 2022. Working with Cranfield has been more challenging than anticipated and the final value of their involvement is unclear, which is an area of concern. Given the level of interest in these trials, the availability and usefulness of these reports is critical to the sector in extrapolating the results with confidence, and in assessing the suitability of the technology in different locations and to a greater scale.

Across the authority there has been interest in how the technologies could be further deployed. This includes the Central Bedfordshire Council (CBC) sustainability team who are exploring the potential integration with EV chargers and the CBC asset teams looking at deployment within schools and care homes. Pavegen (partner of the kinetic trial) has developed an app which aims to encourage active travel. Central Beds is considering whether to participate and is exploring the contractual implications. The authority is keen to continue to raise the profile of the trials and generate increased engagement amongst business and communities.

4.3   Cumbria

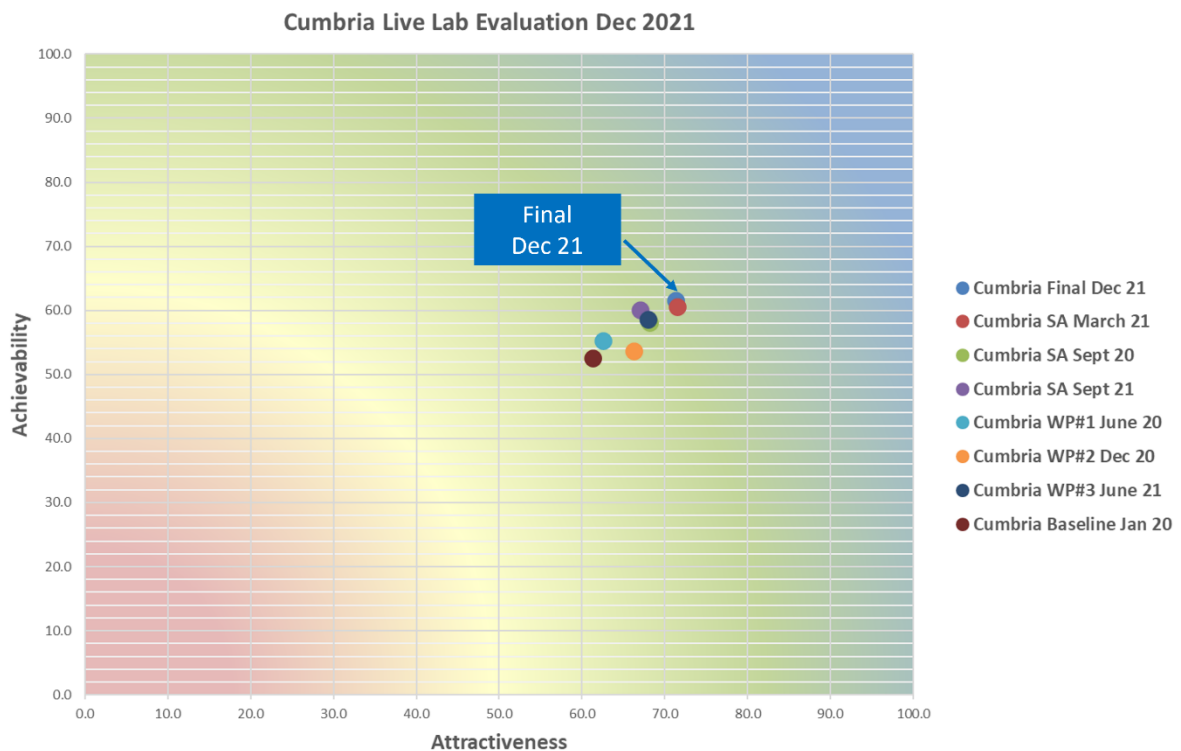**Figure 3: Cumbria Live Lab Evaluation Progression**

Table 5: Cumbria Live Lab Evaluation Progression

Cumbria								
Attractiveness	Jan 20	Jun 20	SA Sept 20	Dec 20	SA March 21	Jun 21	SA Sept 21	**Dec 21**
Strategic Alignment	Good	Good	Good	Good	Good	Good	Good	**Good**
Learning Objectives Clarity	Satisf.	Satisf.	Good / Satisf.	Good / Satisf.	Good	Good	Good	**Good**
Future Benefits Analysis	Satisf.	Satisf.	Satisf.	Satisf.	Good / Satisf	Good / Satisf	Good / Satisf	**Good**
Constraints Analysis	Req. Imp	Satisf.	Good	Good	Good	Good	Good	**Good**
Scalability & Flexibility of Project	Good	Good	Good	Good	Good	Good	Good	**Good**
Providers & Partners	Good	Good	Good	Good	Good	Good	Good	**Good**
Stakeholder Support	Good	Good	Good	Good	Good	Good	Good	**Good**
Prog. Consistency & Coherence	Good	Good	Good	Good	Good	Good	Good	**Good**
Achievability								
Complexity (Inherent Risk)	Mod-Low	Mod-Low	Mod-Low	Mod-Low	Mod-Low	Mod-Low	Mod-Low	**Mod-Low**
Governance & Accountability	Satisf.	Satisf.	Req. Imp	Satisf.	Satisf.	Satisf.	Satisf/ Req. Imp	**Satisf.**
Partner Management	Good	Good	Good	Good	Good	Good	Good	**Good**
Resources Competence & Capacity	Good	Good	Good	Good	Good	Good	Good	**Good**
Communications Strategy	Req. Imp	Req. Imp	Satisf	Req. Imp /Satisf	Satisf.	Satisf.	Satisf.	**Satisf.**
Alternatives Certainty	Satisf.	Satisf.	Good	Good	Good	Good	Good	**Good**
Future Affordability & Transferability	Satisf.	Satisf.	Satisf.	Satisf / Req. Imp	Satisf.	Satisf.	Satisf.	**Good**

The Cumbria Live Lab has progressed well and although the Live Lab has officially finished, the monitoring of the trials will continue for the foreseeable future. Cumbria County Council is looking to fund and develop similar schemes, exploring how private / public partnerships can be developed. Seven trials are now installed - four with the MacRebur product and three with a Shell product. Cumbria has also undertaken and is monitoring a three-way test with MacRebur, Shell and control sections on a single stretch of road in a three-part trial.

The partnership with WSP has performed very well. Cumbria commented on the invaluable knowledge and expertise they have brought to the project and the strength of the working relationship.

WSP has produced an independent end-of-project report including findings to-date and results from literature reviews and laboratory tests. Cumbria has had no editorial input given the potential commercial value of the research to the suppliers. The only input from Cumbria has been on factual and technical accuracy. The conclusions of the report are very positive for both products overall, with some suggestions where improvements could be made. There still seems to be some uncertainty whether the University of Nottingham will be asked to review the report and conclusions, even though they are regarded experts in this field

A key area of learning was to include an additional product (and supplier) into the Live Lab. It has added rigour, credibility and depth to the trial.

Given the nature of this Live Lab, monitoring will continue for several years. The reporting will need to be regularly updated and published through ADEPT.

4.4   Kent

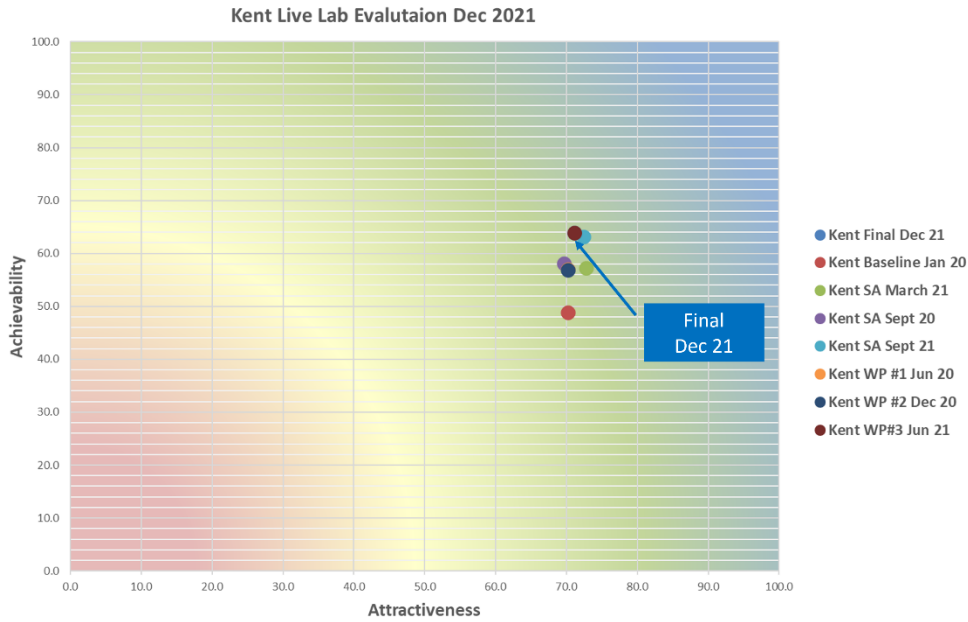**Figure 4: Kent Live Lab Evaluation Progression**

Kent Live Lab Evalutaion Dec 2021

Legend:
- Kent Final Dec 21
- Kent Baseline Jan 20
- Kent SA March 21
- Kent SA Sept 20
- Kent SA Sept 21
- Kent WP #1 Jun 20
- Kent WP #2 Dec 20
- Kent WP#3 Jun 21

Table 6: Kent Live Lab Evaluation Progression

Kent								
Attractiveness	Jan 20	Jun 20	SA Sept 20	Dec 20	SA March 21	Jun 21	SA Sept 21	**Dec 21**
Strategic Alignment	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Learning Objectives Clarity	Good	Good	Good / Satisf.	Good / Satisf	Good / Satisf	Good	Good	**Good**
Future Benefits Analysis	Good	Good	Satisf.	Good / Satisf	Satisf	Good	Good	**Good**
Constraints Analysis	Good	Good	Good	Good	Good	Good	Good	**Good**
Scalability & Flexibility of Project	Excellent	Excellent	Good	Good	Good	Good	Good	**Good**
Providers & Partners	Good	Good	Excellent	Good	Good	Good	Good	**Good**
Stakeholder Support	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Prog. Consistency & Coherence	Good	Good	Excellent	Good	Good	Good	Good	**Good**
Achievability								
Complexity (Inherent Risk)	Mod-High	Moderate	Moderate	Moderate	Moderate	Mod-Low	Mod-Low	**Mod-Low**
Governance & Accountability	Satisf.	Good	Good	Good / Satisf	Good / Satisf	Good	Good	**Good**
Partner Management	Good	Good	Good	Good	Good	Good	Good	**Good**
Resources Competence & Capacity	Good	Good	Good	Good	Good	Good	Good	**Good**
Communications Strategy	Req. Imp	Satisf	Satisf	Satisf	Satisf	Good / Satisf	Good	**Good / Satisf**
Alternatives Certainty	Good	Good	Good	Good	Good	Good	Good	**Good**
Future Affordability & Transferability	Satisf.	Satisf.	Satisf.	Satisf / Req. Imp	Satisf.	Satisf / Good	Satisf.	**Satisf/ Good.**

This has been a successful Live Lab, delivered through a strong and effective partnership between the authority and Amey. The Kent Live Lab formally closed in December 2021. All the trials are now completed although work is still ongoing to develop many of them into BAU activities (*Refer Table 7*).

The HADMS system continues to be developed providing a useful visual platform that incorporates datastreams from many operations and functions within the highways service. As the functionality and scope has increased, stakeholder confidence and use of the system has improved. It is intended that the system will form a critcial operational tool for monitoring and improving service performance.

A summary of the status of all the other Kent Live Lab Workstreams is shown in Table 7.

Table 7: Kent Live Lab Innovations

Innovation	Project Details	Status
Kent Digital	A research piece to determine what would make our fault reporting tool easier to use. Research has been done by surveying our parishes and members of the public to find out what is most important to them when reporting a fault and monitoring.	Completed Summer 2021
Smart Gullies - Asset Management System	To trial different gully asset management systems and compare to see which one works the best for potential future use.	Completed but ongoing development
Smart Gullies - Sensors	To trial different gully sensors with the aim of making our gully cleansing schedule more cost effective and efficient. The data received from each company's sensors will be compared to see which gives the best results.	Completed but ongoing development
Smart Gullies - Plastic Covers	To trial the use of plastic gully covers with the potential of swapping from cast iron to plastic across the board.	Completed but ongoing development
Smart Gritting	To optimise gritting routes, rework domains and use road temperature sensors to achieve better gritting performance in the most cost-effective way.	Completed but ongoing development
Network Risk	To develop a platform / system which looks at different aspects of road safety using collision data to help plan future safety schemes.	Completed but ongoing development
Pothole monitoring (Route Reports Trial)	To trial a camera device in the vehicles of highway inspectors to see how they notice defects and compare the results to inspectors. To additionally develop a platform where defects can be monitored.	Completed but ongoing data monitoring into 2022
Traffic monitoring (Vivacity Trial)	To trial cameras which can detect different classes of vehicles / movements, i.e. pedestrians, cyclists, cars and HGVs. The use of these cameras is to help with scheme planning and monitoring.	Completed
Drone Trials	Phase 1 - to trial the use of drone technology in a car park of the Kent showground, to detect potholes and road degradation. Phase 2 - to trial the technology over the A20 near Lenham to detect potholes, utility asset and canopy coverage over different seasons.	Phase 1 & 2 completed, scoping phase 3 in 2022
Bacteria	To trial the use of a bacteria tablet which breaks down spillages on the carriageway and silt in blocked drains.	Put on hold due to safety concerns
Biofuels	To trial the use of reused vegetable oil in gritting vehicles, to test the emissions and air quality and compare with testing from the use of red diesel.	Started Dec 2021 will run throughout 2022

Graphene Enhanced Asphalt (Gipave)	To trial the use of graphene enhanced asphalt on a stretch of road in Dartford to see how it compares to our normal resurfacing material. Tests to be run (pavement design analysis) to confirm the lifespan of the asphalt	Completed 2020, potential of further trials in 2022

Summaries of benefits identfied, lessons learnt and draft business cases were provided for the final evaluation. These were quite high level and it is hoped that more detailed versions will be produced and submitted to the programme management team.

Following the success of the Live Lab, Kent has set up a Digital, Technology and Innovations Board which will monitor the on-going outcomes from the project. It was stated that success of the Live Lab has stimulated an innovation and digital agenda within Kent, attracting significant funding.

4.5 Staffordshire

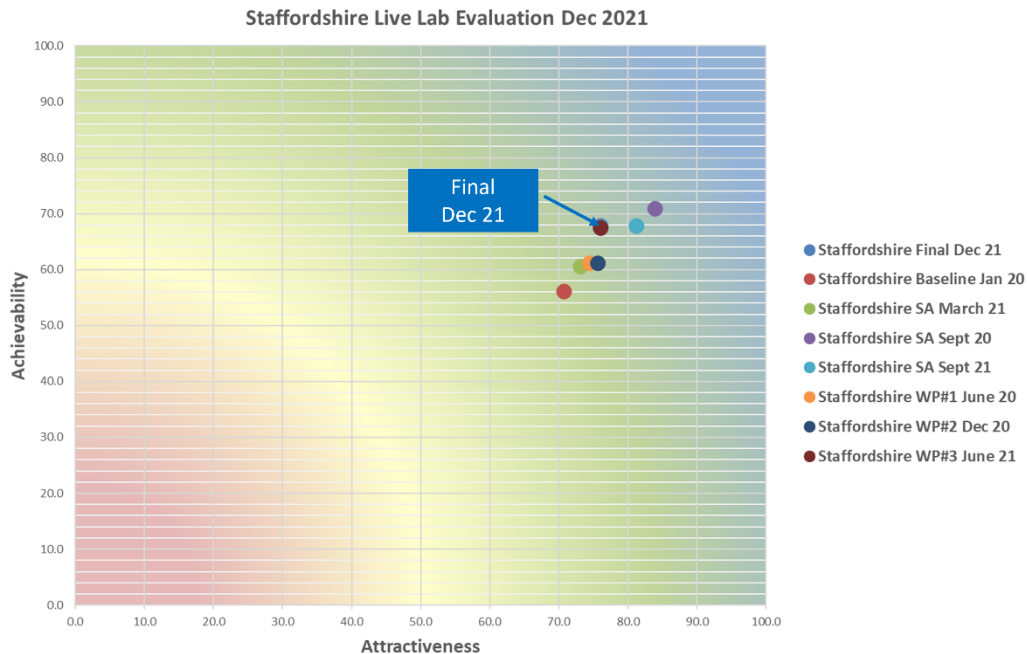**Figure 5: Staffordshire Live Lab Evaluation Progression**

Table 8: Staffordshire Live Lab Progression

Staffordshire								
Attractiveness	Jan 20	Jun 20	SA Sept 20	Dec 20	SA March 21	Jun 21	SA Sept 21	Dec 21
Strategic Alignment	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Learning Objectives Clarity	Good	Good	Good	Good	Good	Good	Good	**Good**
Future Benefits Analysis	Satisf.	Satisf.	Good	Good/ Satisf.	Good	Good	Good / Excel.	**Good**
Constraints Analysis	Good	Good	Good	Good	Good	Good	Good / Excel.	**Good**
Scalability & Flexibility of Project	Good	Excellent	Excellent	Excellent	Good	Good	Good	**Good**
Providers & Partners	Good	Excellent	Excellent	Excellent	Good	Good	Excellent	**Good**
Stakeholder Support	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Prog. Consistency & Coherence	Good	Good	Good	Good	Good	Good	Good/Excel	**Good**
Achievability								
Complexity (Inherent Risk)	Mod-High	Moderate	Moderate	Moderate	Moderate	Moderate	**Moderate**	**Moderate**
Governance & Accountability	Good	Good	Good	Good	Good	Good	Good / Excel.	**Good**
Partner Management	Good	Good	Excellent	Good	Good	Good	**Good**	**Good**
Resources Competence & Capacity	Good	Good	Excellent	Good	Good	Good	**Good**	**Good**
Communications Strategy	Good	Good	Good	Good	Good	Good	**Good**	**Good**
Alternatives Certainty	Good	Good	Excellent	Good	Good	Good	**Good**	**Good**
Future Affordability & Transferability	Good	Good	Good	Satisf / Req. Imp	Satisf / Good	Good	**Good**	**Good**

The Staffordshire Live Lab has been a great success. It has explored a new way of delivering of innovation through partnerships with SMEs aimed at addressing a specified challenge (Air Quality and Mobility).

The 'Dragons Den' approach of selecting the innovations for each challenge worked very well. The majority of trials have been a success, both from the perspective of the authority and the respective SME. With hindsight, the selection process could have involved more technical challenge and also an increased focus on what intended outcomes from the respective trials would be. The maturity of the SME would also be more fully considered, informing how the trial was implemented and supported. Only one trial (Car Share) did not have a successful outcome, but valuable learning has been captured that would inform a future, similar trial.

The following success were highlighted:

1. **Fotech installed fibre cables to detect vibrations from vehicles and to analyse traffic volumes and dynamically change signal junctions to relieve congestion. This was an example of concept that has progressed to live simulations with a view to being deployed at scale across the Staffordshire network.**
2. **Living Walls will remain in situ. Staffordshire County Council are working with Hertfordshire to extend their use specifically in the context of the national bus strategy. It was stated that the publicity of the Live Labs has helped build those connections.**
3. **The pop-up charges trail will inform the Electric Vehicle strategy.**
4. **Staffordshire has been awarded £1M based on its Demand Response Technology solution.**
5. **The Air Quality sensor trial has led to further funding from Defra.**
6. **The e-scooter trial proved the viability of the solution in a rural environment. Over £100K miles of car travel was taken off the road. The commercial viability was also demonstrated. The e-scooters trial has led to a further trial of e-bikes.**

Several business cases have been completed with the remainder work in progress.

The Staffordshire Live Lab Board will be transitioned into a wider Highways and Transport Board.

Staffordshire County Council is very clear that it could not have achieved the success of the Live Lab without the involvement of Amey, Keele University, and the Connected Places Catapult. The plan is to upskill authority staff so they can be more involved in innovation in the future.

COVID-19 impacted on the scale of face-to-face engagement and publicity originally planned for the Live Lab. Several SMEs commented that they would have appreciated more informal opportunities to discuss ideas and actively collaborate.

4.6   Suffolk
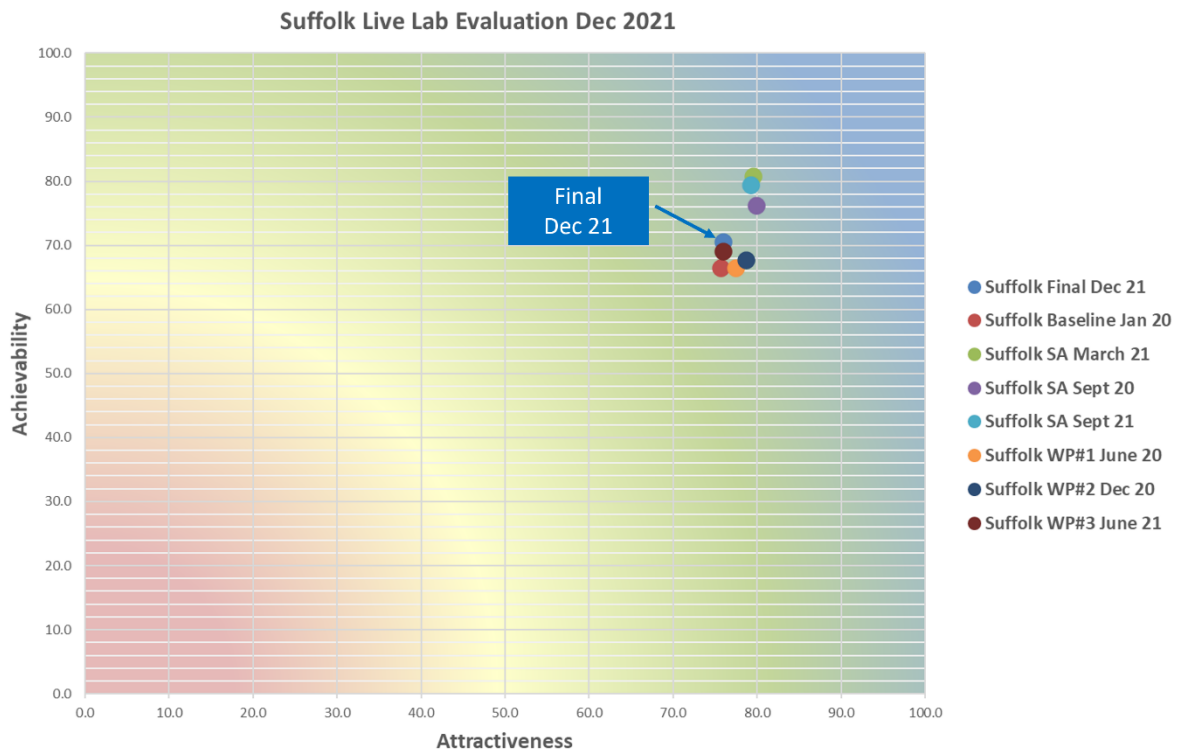
Figure 6: Suffolk Live Lab Evaluation Progression

Suffolk Live Lab Evaluation Dec 2021

Table 9: Suffolk Live Lab Evaluation Progression

Suffolk								
Attractiveness	Jan 20	Jun 20	SA Sept 20	Dec 20	SA March 21	Jun 21	SA Sept 21	**Dec 21**
Strategic Alignment	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Learning Objectives Clarity	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Future Benefits Analysis	Good	Good	Good	Good	Good	Good	Good	**Good**
Constraints Analysis	Good	Good	Good	Good	Good	Good	Good	**Good**
Scalability & Flexibility of Project	Excellent	Excellent	Good	Good	Good	Good	Good	**Good**
Providers & Partners	Good	Good	Good	Good	Good	Good	Good	**Good**
Stakeholder Support	Good	Good	Good	Good	Good	Good	Good	**Good**
Prog. Consistency & Coherence	Good	Good	Good	Good	Excellent	Excellent	Excellent	**Excellent**
Achievability								
Complexity (Inherent Risk)	Mod-High	Moderate	Moderate	Moderate	Moderate	Mod-Low	Mod-Low	**Mod-Low**
Governance & Accountability	Good	Good	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Partner Management	Good	Good	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Resources Competence & Capacity	Good	Good	Good	Good	Good	Good	Good	**Good**
Communications Strategy	Good	Good	Good	Good /Satisf.	Good	Good	Good	**Good**
Alternatives Certainty	Good	Good	Good	Good	Excellent	Excellent	Excellent	**Excellent**
Future Affordability & Transferability	Good	Good	Good	Satisf.	Good	Good	Good	**Good**

The Suffolk Live Lab has been a great success. The project team have been professional, enthusiastic and focused. The Live Lab commenced rapidly, with any procurement issues resolved promptly. The solutions were quickly installed and closely monitored. The agility of the programme and management team meant solutions that were proven not to work or deliver the anticipated benefits were stopped and if appropriate, replaced with alternative technologies or re-focused in application (e.g. solar solutions and the use of sensors in adult social care) The decision was made not to proceed with the solar energy project, but a comprehensive business case has been developed that will inform future, similar initiatives.

Many of the trials have or will transition into current operations (e.g. cameras, adaptive lightings, radars and air quality sensors). Financial savings are already being realised. The successes of the Suffolk Live Lab in adaptive lighting are seen as an international benchmark.

COVID-19 did have an impact on overseas supply change delivery. Initially it was thought only specialist teams could install some of the adaptive lighting leading to implications for traffic management. However a 'plug and play' solution was found which overcame all the issues.

Some trials have been less successful than anticipated (e.g. the use of gully sensors to reduce gully cleaning and assist with flood management). The challenge has been to change the behaviours of staff so that they will trust and use the information available. **The Live Lab project team are keen to highlight the importance of changing behaviours if the full benefit of the technology is to be realised.**

An interesting observation from the Suffolk Live Lab was that the general public do not like to see sensors on columns and are very suspicious of their purpose. The messaging around such installations is critical in minimising concerns and complaints.

As mentioned previously, the University of Suffolk has been an integral part of the success of this Live Lab. The project team commented on what a positive experience working with the university students has been.

The BSI Knowledge portal is also a key part of the project. However, it was not appreciated how much work this would involve to do well. It is proposed that all the other Live Labs publish their innovations through the

Suffolk portal. However concerns were expressed by the Suffolk project team as to the scale of work this would require and the implications for Suffolk County Council in being responsible for a duty of care in relation to content, standards and information verification.

4.7   TfWM (Network Resilience)

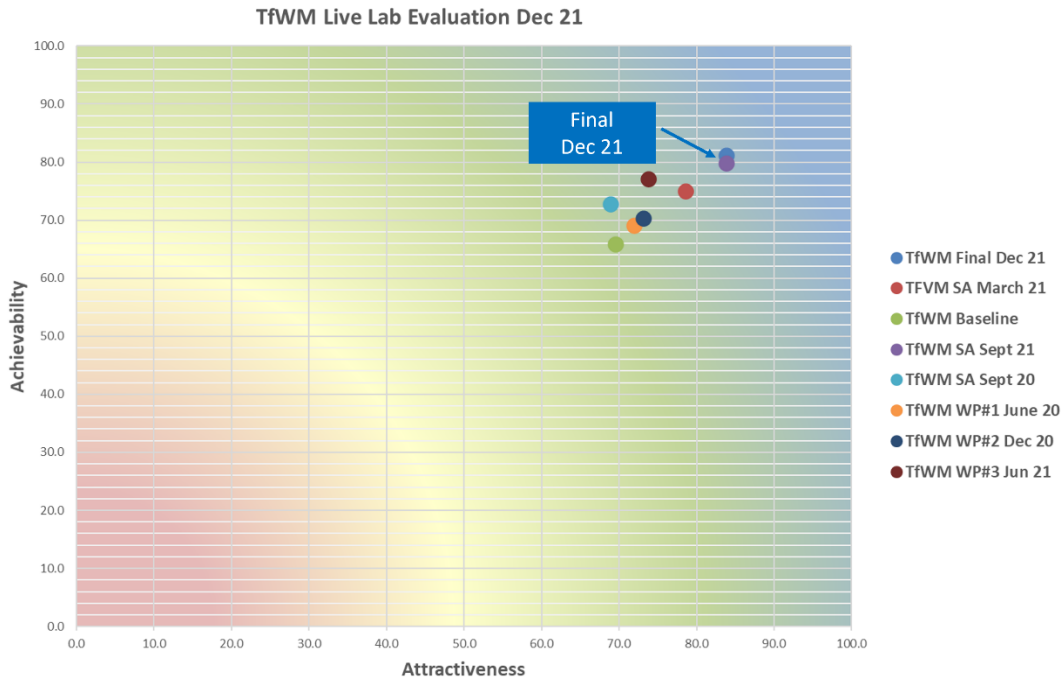**Figure 7: Network Resilience Live Lab Evaluation Progression**

Table 10: Network Resilience Live Lab Evaluation Progression

Network Resilience (TfWM)								
Attractiveness	Jan 20	Jun 20	SA Sep 20	Dec 20	SA March 21	Jun 21	SA Sept 21	**Dec 21**
Strategic Alignment	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Excellent**
Learning Objectives Clarity	Satisf.	Good	Good	Good	Good	Good	Excellent	**Excellent**
Future Benefits Analysis	Satisf.	Satisf	Satisf	Satisf	Good	Good	Excellent	**Excellent**
Constraints Analysis	Good	Good	Good	Good	Good	Good	Good	**Good**
Scalability & Flexibility of Project	Good	Good	Good	Good	Good	Good	Good	**Good**
Providers & Partners	Good	Good	Good	Good	Excellent	Excellent	Excellent	**Excellent**
Stakeholder Support	Good	Good	Good	Good	Good	Good	Excellent	**Excellent**
Prog. Consistency & Coherence	Good	Good	Good	Good	Good	Good	Good	**Good**
Achievability								
Complexity (Inherent Risk)	Moderate	Moderate	Moderate	Moderate	Moderate	Mod-Low	Mod-Low	Mod-Low
Governance & Accountability	Good	Good	Good	Good	Good	Good	Good	Good
Partner Management	Good	Good	Good	Good	Good	Good	Good	Good
Resources Competence & Capacity	Good	Good	Good	Good	Good	Good	Good	Good
Communications Strategy	Good	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Alternatives Certainty	Good	Good	Good	Good	Good	Good	Good	Good
Future Affordability & Transferability	Satisf.	Satisf.	Satisf.	Satisf / Req. Imp	Good	Good	Excellent	Excellent

The Network Resilience Live Lab has now finished and as the charts show, has been a great success. The Live Lab had two missions which have largely been achieved:

1. *(Main)* **To develop tools to understand public customer car travel behaviour on the West Midlands' road network, how to influence that behaviour and how to link those two interpretations.**
2. *(Auxiliary)* **To make available the learning regarding the required frameworks, processes and training discovered during the project to audiences within and beyond the project scope.**

The installation of fixed cameras is complete and providing a large volume of valuable data (4.5 million data points per day) to the analytics workstream. This data is now being used across the authority to better understand traffic-flow and the impact of events and interruptions with a view to informing network transport policy and decision-making.

The granular persona workstream has progressed well. 14 detailed personas have been developed that reflect the characteristics and profile of network users. It is intended that the impact on these personas will be considered each time new policies or interventions are proposed, providing greater insight into how true behavioural change can be achieved. The one area that has not been as successful as originally planned is the linking and monitoring of the personas to network interventions that may change or influence behaviour. However, it is understood that this objective will continue to be developed and tested post-Live Lab.

The activities and successes of the Network Resilience Live Lab have been embedded within the authority and its neighbours. This was achieved through a 'Benefits Realisation' workstream delivered by Arcadis and IBI.

From the start of the Network Resilience Live Lab, communications and shared learning has been seen as integral to its success. Their approach has been professional and enthusiastic with the team engaged in an extensive range of activities including participation in seminars, exhibitions and conferences, blogs and newsletters and government minister visits. There has been distinct branding of the Live Lab on both internal and external communications.

4.8   Thames Valley Berkshire (TVB)

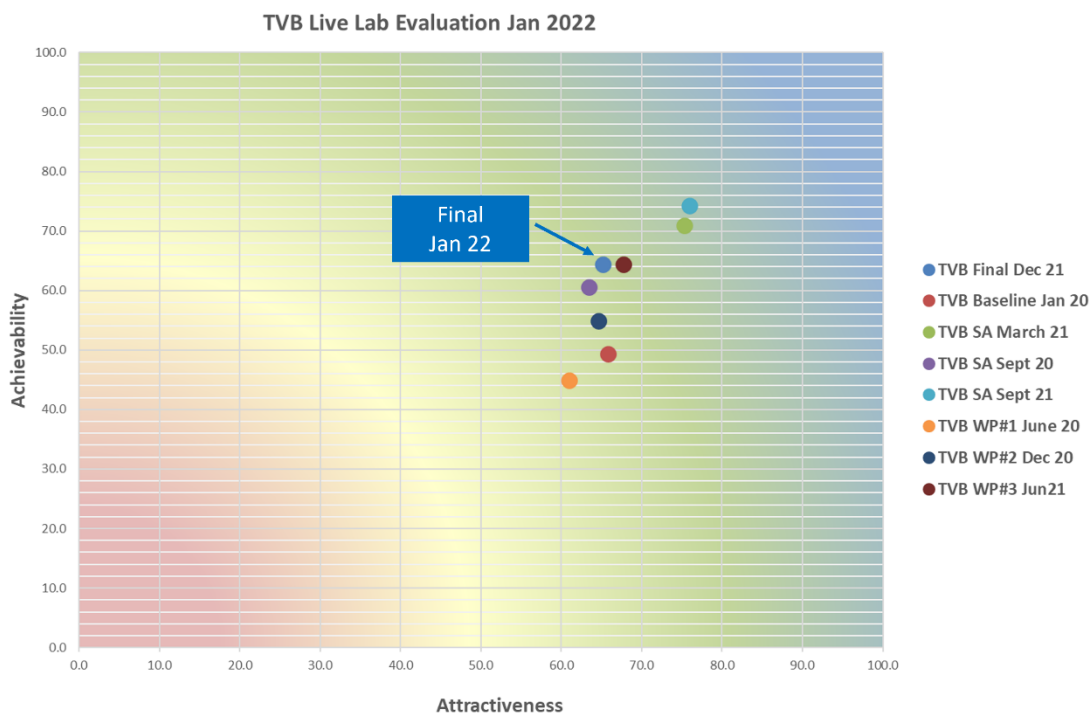**Figure 8: TVB Live Lab Evaluation Progression**

Table 11: TVB Live Lab Evaluation Progression

Thames Valley Berkshire								
Attractiveness	Jan 20	Jun 20	SA Sep 20	Dec 20	SA March 21	Jun 21	SA Sept 21	**Jan 22**
Strategic Alignment	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	**Good**
Learning Objectives Clarity	Good	Satisf.	Satisf.	Good/ Satisf.	Good/ Satisf.	Good	Good	**Good / Satisf.**
Future Benefits Analysis	Satisf.	Satisf	Satisf	Satisf	Satisf.	Satisf.	Good	**Satisf.**
Constraints Analysis	Req. Imp	Req. Imp	Good	Good	Good	Good	Good	**Good**
Scalability & Flexibility of Project	Good	Good	Good	Good	Good	Good	Good	**Good**
Providers & Partners	Satisf.	Satisf.	Good	Good	Excellent	Good	Excellent	**Good**
Stakeholder Support	Good	Good	Good	Good	Good	Good	Good	**Good**
Prog. Consistency & Coherence	Good	Good	Good	Good	Good	Good	Good	**Good**
Achievability								
Complexity (Inherent Risk)	Mod-High	Mod-High	Mod-High	Mod-High	Moderate	Moderate	Moderate	**Moderate**
Governance & Accountability	Good	Satisf.	Good	Good	Excellent	Excellent	Excellent	**Excellent**
Partner Management	Req. Imp	Req. Imp	Satisf.	Good	Excellent	Good	Excellent	**Good**
Resources Competence & Capacity	Good	Good	Good	Good	Excellent	Good	Excellent	**Good**
Communications Strategy	Req. Imp	Req. Imp	Satisf.	Satisf.	Satisf.	Satisf.	Good	**Satisf.**
Alternatives Certainty	Good	Good	Good	Good	Good	Good	Good	**Good**
Future Affordability & Transferability	Satisf.	Satisf.	Satisf.	Satisf / Req. Imp	Satisf.	Satisf.	Satisf.	**Satisf.**

The TVB Live Lab prepared well for the evaluation, with representatives from each of the five workstreams, (Potholes, Congestion, Health, Energy and Air Quality) contributing to the discussion.

Although the Live Lab programme officially ended in November 2021, the TVB Live Lab has been given an extension to June 2022. The delays are largely due to the initial challenges in procurement but also the complexity and ambition of the project. This evaluation was completed in January 2022 as a waypoint assessment. It is proposed by TVB that a final evaluation is undertaken by Proving in June 2022, to assess the final outcomes and learning from the Live Lab.

To date, sixty-three innovations were identified during the Live Lab project. Of these, forty-six have gone to trial, with thirty-five completed and eleven still in progress. A number of research and evaluation reports are also currently in draft form. The completion of these reports will be a key areas of focus for the next few months. The scale of outstanding activity is reflected in the assessment, showing consistent performance with the WP#3 June 21 evaluation. It would be anticipated that the performance scores would improve once all the workstreams are completed and the respective reports produced.

Each of the workstreams have delivered valuable learning and outcomes as a set of discrete trials. TVB has acknowledged that their objective to develop big data that provides an integrated repository has been a challenge. Four areas of learning have been identified which are valuable for future initiatives aimed at capturing and exploiting large integrated repositories of data:

1. **'Big data can be very powerful but has to be the right data and at the right level of granularity.'**
2. **'We are not really ready to reap the benefits of big data, both in the structure of our organisations or in the storage, integration and ownership of our data.'**
3. **'That the lack of standardisation of systems and data can significantly hinder the deployment of new technologies into legacy systems.'**
4. **'That there is a lot of groundwork to do to be able to take real steps to using technology to meet our carbon targets.'**

The TVB Live Lab has also launched an Innovation Valley Rewards App to encourage sustainable transport and enable people to make better travel choices across Berkshire. Live modelled air quality data will be integrated into the app. There has been a slow but steady uptake, and the plan is to continue to build momentum and encourage its active use.

TVB provided a useful summary of proposed next steps for each workstream. This involves embedding the use of the trialled innovations and data outputs into the respective Berkshire authorities. A focus of any final evaluation should be an assessment of how successful this has been.

5 Live Lab Evaluations: Lessons Learnt

This section summarises the lessons learnt during the Live Labs evaluations. They are presented against each of the key assessment factors developed for the programme.

5.1 Strategic Alignment and Contribution

1. Overall, there was strong and continued alignment and contribution to the strategic ambition of the ADEPT Live Lab programme.
2. The strategic driver and objectives of the programme should be clearly defined. Where possible, measures of success should be agreed.
3. Consideration should be given to ensure a balanced portfolio of projects (*Refer Section 1, 4.1 Project Selection*)
4. If the scope and ambition of the project changes significantly, the Programme Management Team and Commissioning Board should formally consider the impact on the strategic objectives and balance of the programme.

5.2 Clarity of Learning

1. The volume and quality of learning acquired during the programme was significant. However, the channel and repository for capturing, reviewing and storing this learning needs to be agreed and in place from the start of the programme. The repository should be easy to access and use by the sector.
2. The innovation registers maintained by the respective Live Labs were of limited value overall, often incomplete and with insufficient data. Again, a centralised repository monitored by the programme team should help ensure the innovations are fully documented as developed. The trial does not have to be complete for useful learning to be acquired and captured.
3. The requirement to produce blogs and white papers throughout the life of programme is a useful tool to encourage projects to be thinking constantly about outputs and the dissemination of valuable learning.
4. The involvement of an academic partner can add rigour, insight and assurance to the quality of learning acquired. However, their role, scope of work and required outcomes must be clearly defined and agreed from the start of the project. Also, as potentially an expensive cost, the use of academia must demonstrate clear added value.

5.3 Future Benefits Analysis / Future Affordability & Transferability

1. Greater emphasis, encouragement and support may be required to ensure all projects produce business cases that are useful and accessible by the sector. The projects should understand their obligations when being awarded any funding.
2. A template for business case development may be useful to help ensure quality and consistency. However, it should be flexible enough so that the project can reflect the specific characteristics of the trial.
3. A professional organisation / consultancy may be used to prepare the business cases, but the quality of output will still depend on the information available. The project team should still 'own' the business cases.
4. The business case should be built around the actual trial. Several business cases seen by Proving appeared to be based on case studies for other related trials or innovations. This was not the purpose of the Live Lab.
5. Many of the benefits will only be realised after the Live Lab has finished. The process for capturing benefits / outcomes after the programme has ended needs to be defined and agreed.

5.4 Project Collaboration, Consistency & Coherence

1. To encourage project collaboration and shared learning, the programme management team and Proving (in its monitoring and evaluation role) actively avoided a competitive ranking or comparison of performance. This approach generally worked well, however, those Live Labs that had some difficulties seemed reluctant to ask their Live Lab peers for advice and guidance.

2. On this programme, the women project managers appeared to have stronger, more supportive relationships with each other.
3. Where working on similar research, individual projects should be encouraged to more actively collaborate and share knowledge and learning. If required, this can be facilitated by the programme team (as with the bi-weekly meetings).

5.5 Constraints Analysis (costs, resources, timescales)

1. Although there is no evidence of financial mis-spend, the 'light touch' approach to project monitoring has some risks. There should be greater scrutiny of project costs without becoming too intrusive or damaging the ethos of trust upon which this programme was based.
2. The agility, flexibility and length of programme allowed projects to respond to any emerging opportunities and issues bringing in additional resource as required.
3. The closure of the programme requires early clarity. This entails a significant amount of work for each project to do well.

5.6 Complexity (inherent risk) Assessment

1. An assessment of project complexity (**scale, diversity, inter-dependencies, novelty and volatility**) is invaluable at the start of the project. It is recommended that this is conducted at the proposed business case stage before full funding is awarded. Such an assessment will identify the inherent risks of the proposed project and its likely achievability. A highly complex project should only be considered if the potential scale of likely benefits are significant and realistic.
2. An assessment of complexity at the start of the project will help determine the scale of project planning and management required to support successful delivery.

5.7 Project Governance / Management

1. The larger Live Labs all benefited from having a full-time dedicated project manager with the skills, focus and time to commit fully to the project.
2. An external 'professional' project manager can bring discipline and independence to the project.
3. It might be more difficult to justify a full-time project manager for smaller projects, but the duties and responsibilities still need to be understood and sufficient time allowed to supervise the project.
4. Where possible, the project manager should commit to the role for the life of the project. If they do leave, they should be replaced with someone of the required calibre and experience.
5. The SRO should be committed and actively involved. They are responsible for establishing and maintaining the profile of the project within the authority and region. There is a risk if they leave their role, the vision for the project and commitment within the authority both decline.

5.8 Partner Procurement

1. Each project may have different challenges when procuring goods and services. This is usually due to the specific procurement and contractual processes required by the host authority.
2. As proposed, future, similar projects should be allowed sufficient time and the necessary support and guidance to procure the required technologies and services.
3. New / updated guidance for the procurement of research and innovation by local authorities should be considered.

5.9 Partner Management

1. Where partner relationships are equitable, collaborative and inclusive, the project progresses well and delivers benefits to all parties. The project manager plays a critical role in facilitating and encouraging this approach, particularly in relation to large providers and smaller SMEs.
2. Where partners have considerable autonomy and responsibility for delivering the Live Lab, the authority still needs to have sufficient oversight and authority for the project.
3. Incubation hubs are an efficient way of optimising the learning and innovation from multiple sources. The authority needs to monitor the activities and outputs from the incubation hubs to maximise the benefits to be realised by **both** the public and private sectors.

4. The issues of ownership for emerging solutions and Intellectual Property should be agreed at the start of the programme. As the projects progress, attention should be given to ensure they remain relevant and enforceable.
5. Ensure that representatives of all key partner and providers are involved in the project evaluations providing a richer, more accurate assessment of project progression and any challenges faced.

5.10 Communications Strategy

1. The communications strategy is likely to be more successful if there is a dedicated resource who is fully involved in the project and understands the respective ambition, outcomes and challenges of the Live Lab.
2. The role of communications in influencing the intended outcomes of the project, i.e. introducing and explaining interventions, encouraging behavioural change and use of sensors (adult social care), needs to be recognised.
3. The actual impact of communications should be monitored, captured and shared as part of the learning.
4. Establish a communications protocol to which all projects sign up to.
   o Ensure all projects understand their respective duties and responsibilities.
5. Ensure all key partners understand their obligations and conditions regarding communications.
   o Build into contractual arrangements.
6. Consider the internal communication protocols necessary to improve projects collaboration.
7. Ensure all stakeholders, specifically the Commissioning Board, DfT and local authorities understand and meet their responsibilities in raising the profile of the programme.

6   Appendix B: Live Lab Assessment Factors

ID	Dimension	Factor Name	Weighting
100	Economy	**External Frameworks & Contracts**	
100	Attractiveness	**Strategic Alignment & Contribution**	
101	Attractiveness	With ADEPT SMART Places	75
102	Attractiveness	With national and local strategies and political programmes	75
103	Attractiveness	With industrial strategies and capabilities	75
104	Attractiveness	**Learning Objectives Clarity**	
105	Attractiveness	Clarity of project and learning goals	100
106	Attractiveness	Research method assessment	100
107	Attractiveness	Measures of project performance, including quality of learning	100
108	Attractiveness	Sharing and disemmination of learning	100
109	Attractiveness	**Benefits Analysis & Certainty**	
110	Attractiveness	Scale, scope, longevity and confidence of benefits.	100
111	Attractiveness	Analysis if NO benefits to be realised from individual research workstreams.	75
112	Attractiveness	Identification of any dis-benefits.	75
113	Attractiveness	**Constraints Analysis & Certainty**	
114	Attractiveness	Analysis and management of costs	100
115	Attractiveness	Analysis and management of timescales	100
116	Attractiveness	Analysis and management of resources	100
117	Attractiveness	**Scalability & Flexibility of Project**	100
118	Attractiveness	**Providers & Partners**	
119	Attractiveness	Commitment & availability	100
120	Attractiveness	Technical readiness	100
121	Attractiveness	Increasing partners / sector linkages	100
122	Attractiveness	**Stakeholder Support & Commitment**	100
123	Attractiveness	**Consistency & Coherence**	
124	Attractiveness	With the other LiveLabs projects	100
125	Attractiveness	With the overarching learning objective of the Live Labs programme.	75
126	Attractiveness	With market trends and technology developments.	75
200	Achievability	**Complexity (Inherent Risk)**	
201	Achievability	Scale	50
202	Achievability	Novelty	50
203	Achievability	Diversity	50
204	Achievability	Interdependencies	50
205	Achievability	Volatility	50
206	Achievability	**Governance & Accountability**	
207	Achievability	Project management	100
208	Achievability	Project plan	100
209	Achievability	Risk & issues management	100
210	Achievability	Ownership & accountability	100
211	Achievability	**Partner Management**	
212	Achievability	Procurement/ legal & commercial contract and sign-off.	75
213	Achievability	Partner collaboration, management & audit.	100
214	Achievability	**Resources Competence & Capacity**	
215	Achievability	Internal (Research, Support, Management)	100
216	Achievability	Partners / External	100
217	Achievability	**Clarity & Perception (Communications Strategy)**	
218	Achievability	Internal (Comms)	100
219	Achievability	Partners (Comms)	100
220	Achievability	Public (Comms)	100
221	Achievability	National & local press (reach and reaction)	100
222	Achievability	Other agencies	50
223	Achievability	**Alternatives Certainity**	
224	Achievability	Best option and certainty	75
225	Achievability	**Future Affordability & Transferability**	
226	Achievability	Design, development and delivery cost relative to the learning benefits.	100
227	Achievability	Future management and maintenance of residual research technologies.	100