



Department
for Transport

ADEPT

LIVELABS2
Decarbonising Local Roads



Centre of Excellence for Decarbonising Roads

An ADEPT Live Labs 2 programme

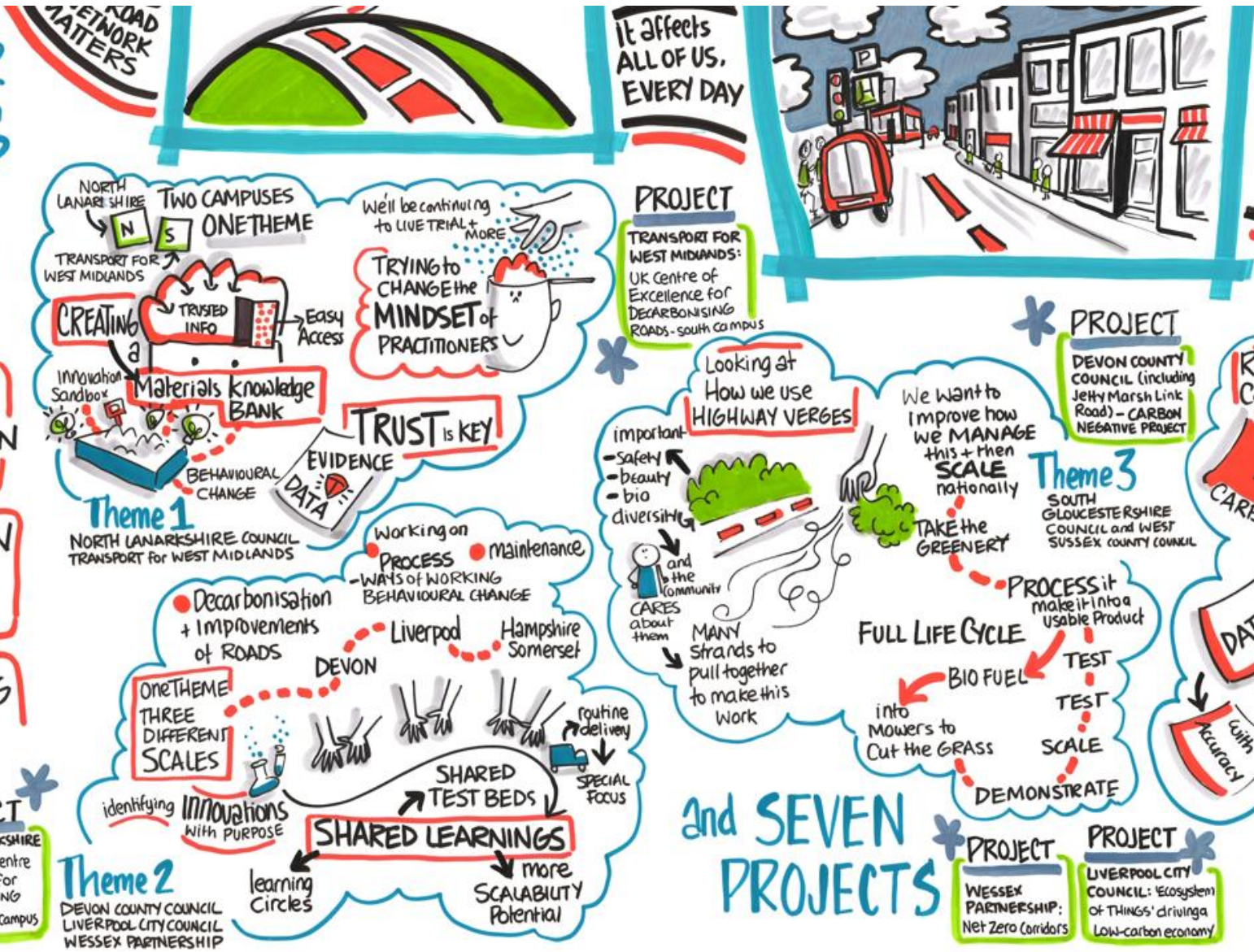


OUR FOUR THEMES

1. UK CENTRE OF EXCELLENCE for Materials DECARBONISATION
2. CORRIDOR and PLACE-based DECARBONISATION
3. A GREEN CARBON LABORATORY
4. A FUTURE LIGHTING TEST BED

PROJECT
EAST RIDING OF YORKSHIRE COUNCIL:
High Visual Efficiency for low-carbon lighting - DECARBONISING Street lighting

PROJECT
NORTH LANARKSHIRE COUNCIL: UK Centre of Excellence for DECARBONISING Roads - North campus



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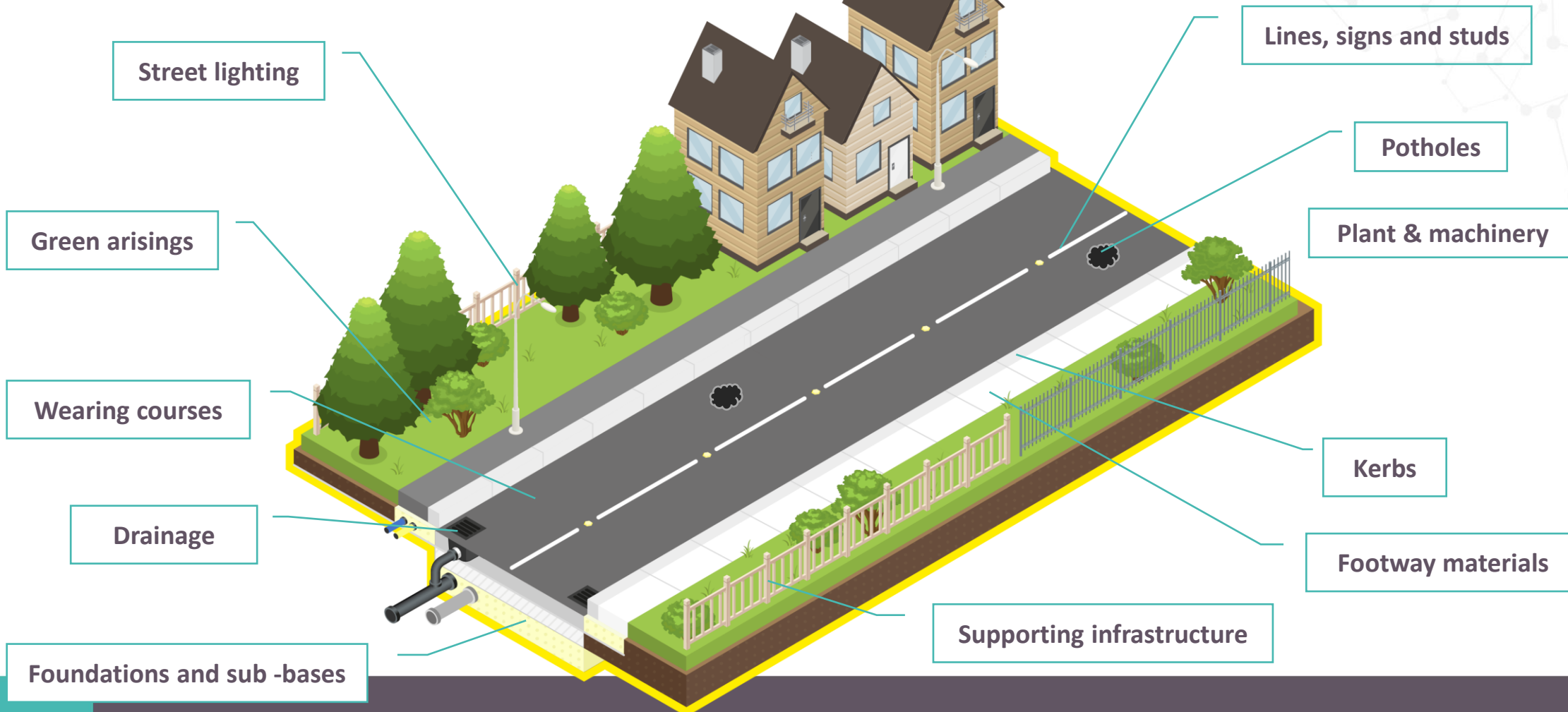
LIVELABS2

Decarbonising Local Roads

Systematic 'fence to fence' approach



Department
for Transport



Why a Centre of Excellence for material decarbonisation?

The transition to low carbon materials is critical for the sector to reach net-zero, but we are currently uncoordinated, siloed and slow to make change across LAs and the wider highways and local roads sector.

Challenges



Inherently high Co2 materials



Un-coordinated materials market and siloed working across LAs



Impending net-zero targets



75% of LAs have declared a climate emergency

Opportunities



Materials are the highest emitting area of our carbon footprint that is directly within our control



There is a wealth of best practice across the sector ready to be tapped into and shared

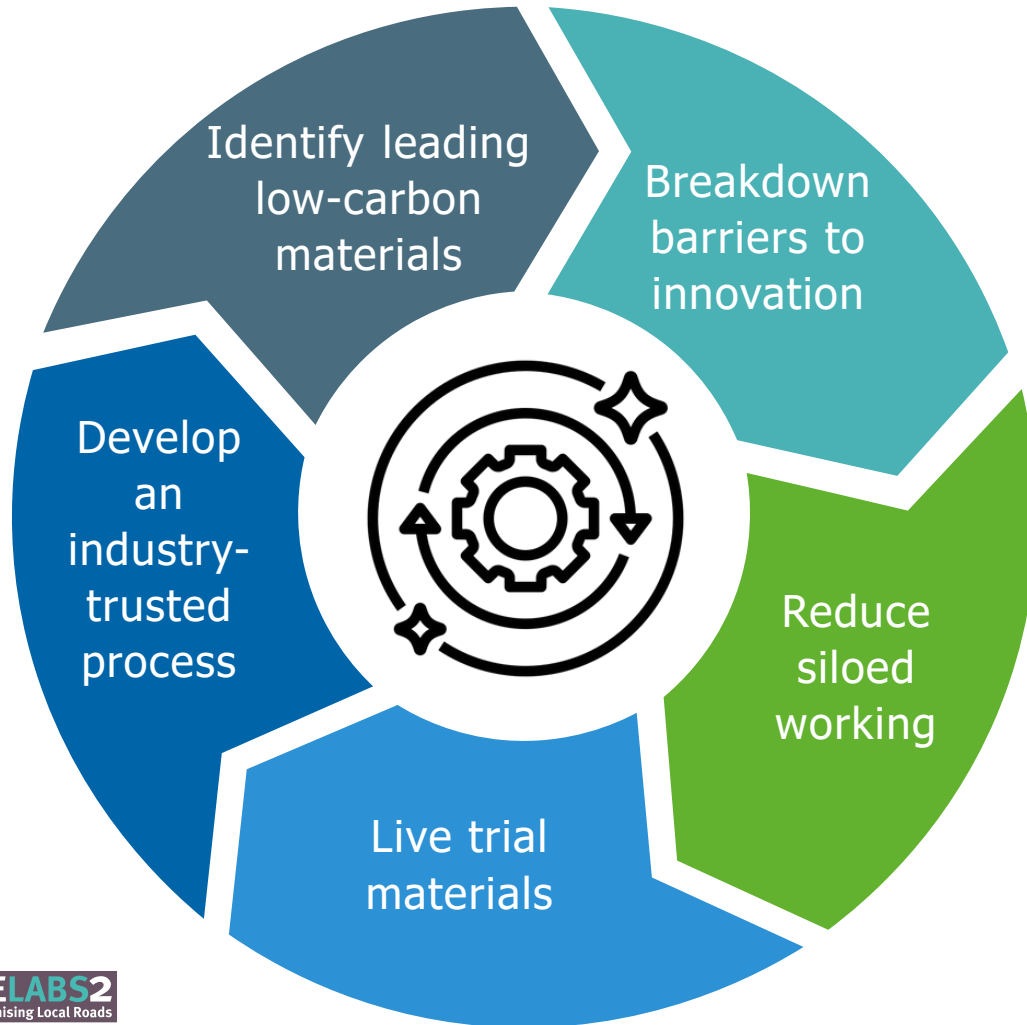


Live Labs can be a sector-wide springboard for low carbon materials adoption



Centre of Excellence for Decarbonising Roads

The key objectives of the
programme



Two Campuses, One Programme

Programme Centre



Governance



Carbon Framework



Evaluation



Academic Partners



Project Management



Partnership Network, Knowledge Share & Scale

Two-way
information flow

Wider
Industry

Deliverables Key



Dual delivery



North Campus – North Lanarkshire

- Live Lab demonstrators
- Challenge-led innovation programme
- Carbon and technical review
- Material knowledge bank
- Innovation sandbox and behavioural change



South Campus – Transport for West Midlands

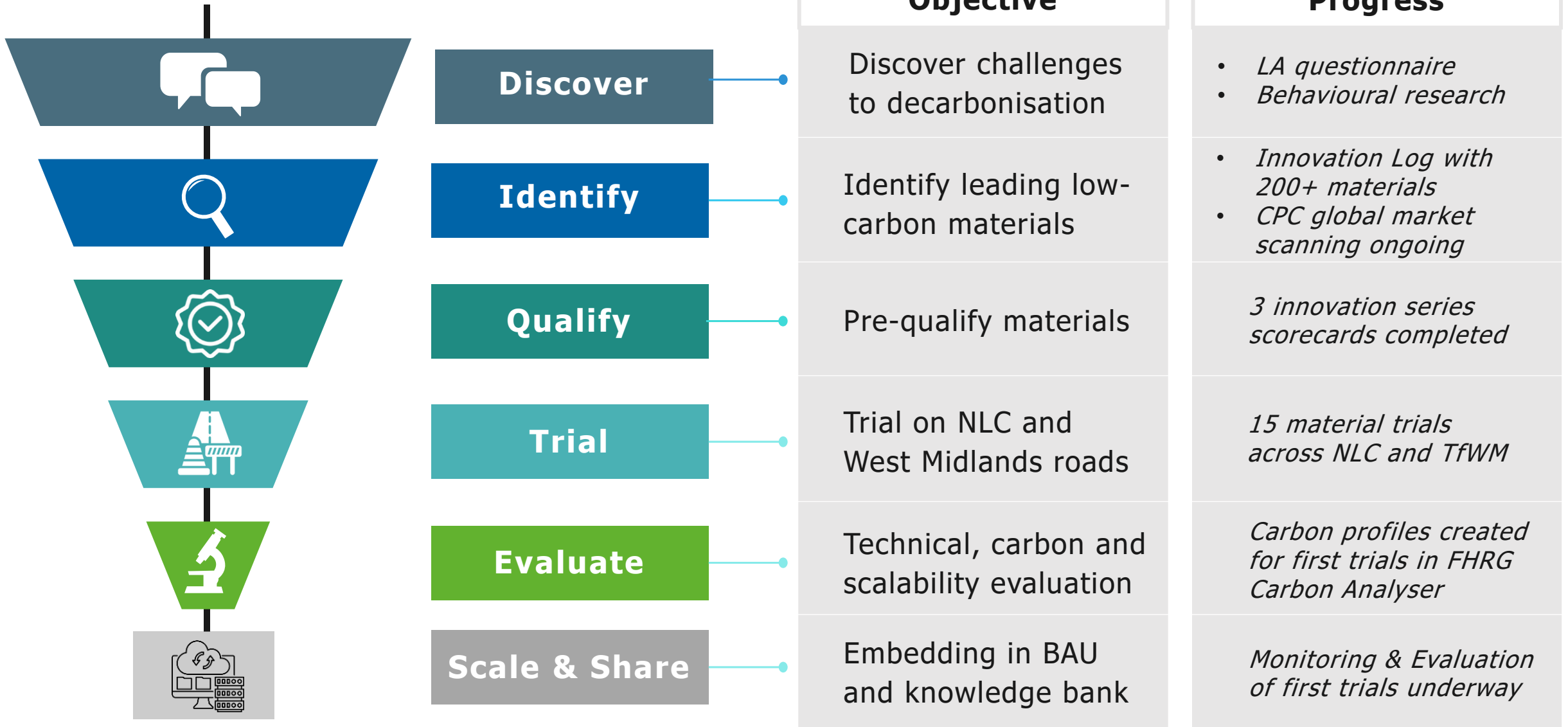
- Live Lab demonstrators
- Challenge-led innovation programme
- Carbon and technical review
- Skills development via Skills Academy
- Translation of specifications & standards

Our Partner Network

- Convening leaders from across the public, private and academic sectors to support the technical, carbon and strategic elements of the programme.
- Expert Research Group and Expert Advisory Panel

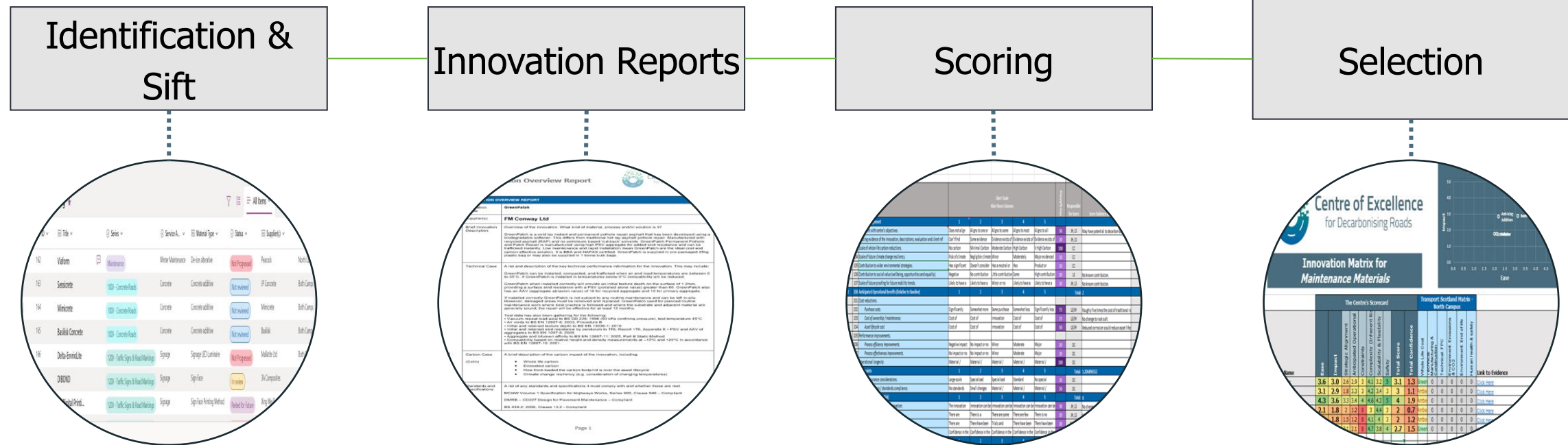


The Innovation Funnel



Case Study

Maintenance Materials



Our First Step: Carbon Baseline of NLC

Calculated for financial year 2022-2023 for all NLC local road services to baseline future carbon savings of the programme and identify carbon hotspots

Accounting for carbon emissions across Scopes 1, 2 and 3 for sites & premises, staff & contractors, vehicles & plant, and purchased products & services

Key insights:

Although material carbon is significant, energy transition will be necessary to significantly decarbonise



Key Results

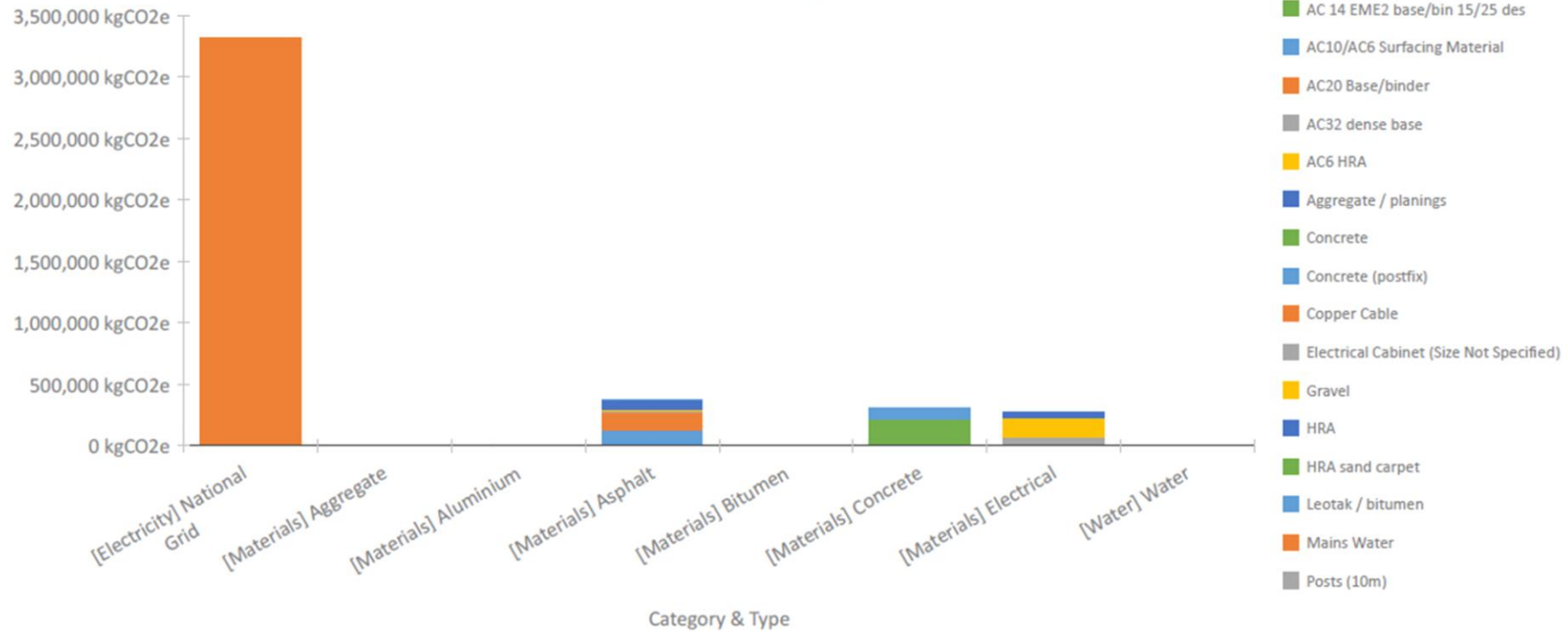
Dashboard Charts
North Lanarkshire Council

Service
Highways [2022]

Future Highways
Research Group



Emissions By Category & Type



CEDR Trial Objectives

Adhering to FHRG Perspectives

- To provide robust, reliable evidence for the adoption of new / alternative materials.
 - Transparent research processes.
 - Auditable, repeatable experiments and results.
 - ...calibrated with the sector.
- Meet the decision-making needs of LA materials purchasers.
 - Aligned with their priorities.
- Must be supplier agnostic.
 - Cannot promote one solution over another based on arbitrary supplier assertions.
 - Selecting tests based on market potential, market penetration, market interest, LA concerns, etc.
 - Can be used to transparently and independently test / refute supplier



Sector Priorities New Materials



Operational Performance

- **Efficiency.**
 - Productivity (e.g. number of potholes per day) (■).
 - Operational longevity (■).
 - Circularity considerations.
- **Target environment suitability.**
 - Wet?, hot?, cold?, surface types?, pavement conditions? (■).
- Safety considerations (use and users).
- Environmental considerations (e.g. road noise).
- User experience.
- **Operational warranties (■).**

Manufacturing & supply chain complexity (inherent risk)

- **Contracting / procurement requirements and constraints (■).**
- Transportation distances and haulage requirements.
- Materials handling and processing requirements.
- **LHA specification(s) alignment and compliance.**
- **Other materials and processes: consistency and coherence.**



Sector Priorities New Materials (2)



Supply Chain & Costs

Carbon Savings

- **Scalability of Supply.**
 - Diversity of Providers (■).
 - Quality and consistency assurance
 - Manufacturing complexity
- **Relative Cost & Price Volatility.**
 - Relative cost (■).
 - Cost volatility (■).
- **Business Changes, Plant & Skilling Costs.**
 - New / revised processes / design costs (■).
 - New vehicles, plant and equipment
 - Resource costs (capability / capacity) (■).
 - Materials handling & storage costs
 - Storage shelf life

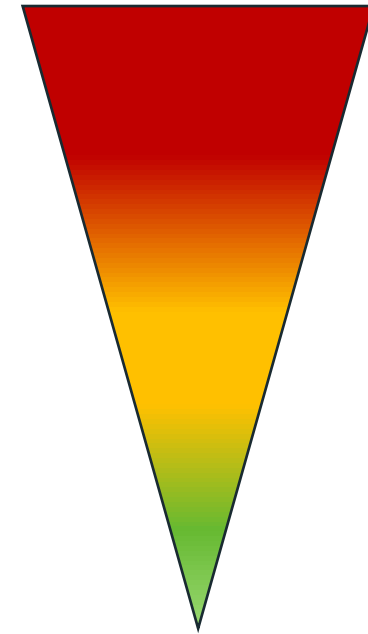
- **Transportation (■).**
- **Operations (■).**
- **Materials (■).**
- End of Life.

Summary

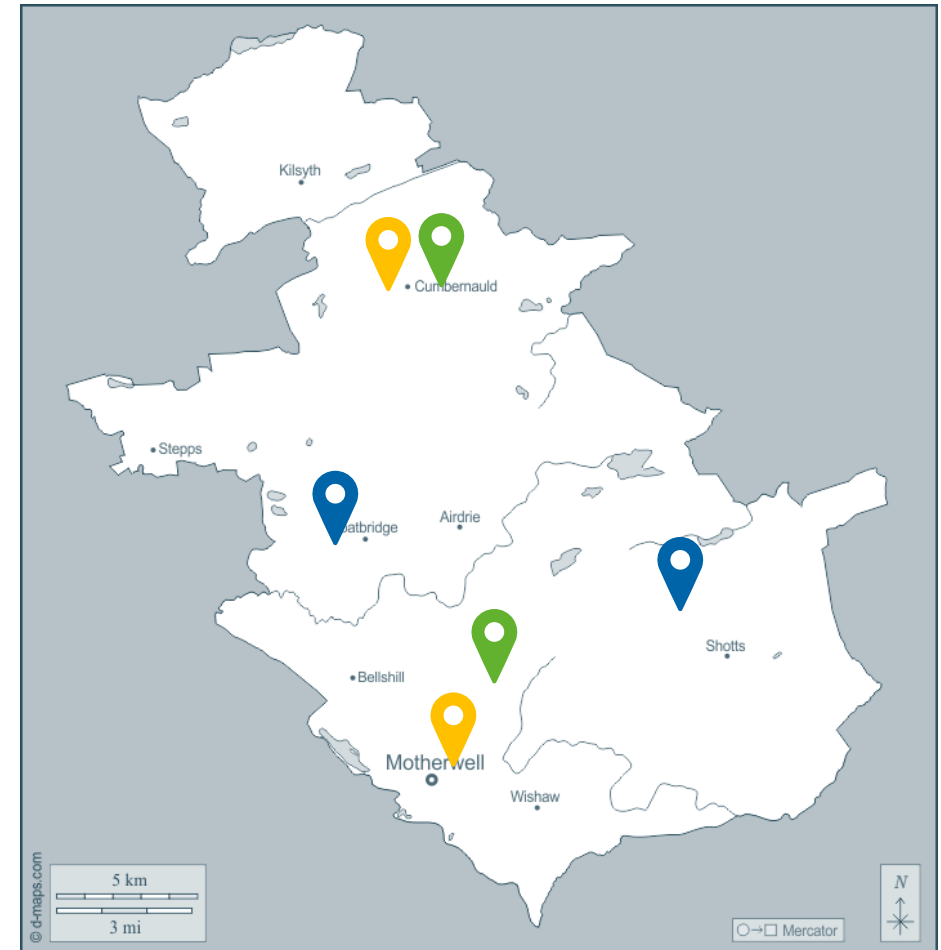
FHRG Roundtable Exercise Feedback

1. How much will it cost?
2. Is it effective and how long will it last?
3. How much business change is required to use it?
4. Can we procure it?
5. How much carbon will we save?

PRIORITIES



Live Trials



Legend for road types:

- = A road
- = B road
- = C road

Data collected:

- **Operational** – e.g. qualitative feedback and time for completion, curing time
- **Technical** – e.g. pothole size, LWD testing and coring of surrounding pavement
- **Carbon** – e.g. embodied carbon factors, operational carbon, tools utilised, required staff, volume of waste, and whole-life carbon based on indicative longevity
- **Cost & supply chain** – e.g. purchase cost and whole-life cost
- **Environment** – road class, traffic volumes, road condition, road surface temperature

Initial Results

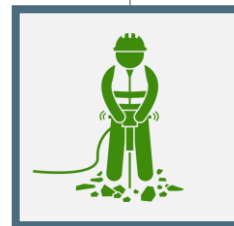
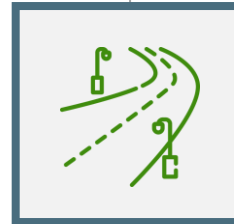
Carbon: est. 37.5% saving for GreenPatch

Technical: expected increased longevity from 3 out of 4 materials

Next Steps

- Monitoring and evaluation of repair performance over the next 7 years
- Full carbon profiles in Carbon Analyser
- Transition to best performing materials as BAU in NLC

Approach



Materials Trialled

- Degafloor Degafill (MMA-based cold-mix)
- Roadmender Elastomac (mastic asphalt)
- FM Conway GreenPatch (cold-mix with RAP)
- Meon Permafyx (MMA-based cold-mix)

Trial Methods

- A, B, and C road sites in NLC
- 27-28th February and 11th – 12th April 2024
- Creation of 18 simulated potholes and 18 patches 2m apart on 'Amber' roads

Control and Benchmark

- Benchmark solutions: HRA and standard cold-mix material
- Applied on the same road, same size potholes, same operatives, and same weather

Operative Feedback

- Health & safety implications of hot-mix mastic asphalt
- Openness and interest in MMA solutions
- GreenPatch is a simple switch from BAU

Approach



Materials Trialled

- 13 materials and methods demonstrated, including the same materials as the North Campus, as well as Colpatch, Roadpatch, and Velocity Patching



Trial Methods

- A, B, C and old/new residential road sites across 6 combined authorities in West Midlands
- March 2024
- Tested on 'normal' potholes



Control and Benchmark

- Applied on similar road types, in similar weather, and with oversight from core team



Operative Feedback

- Difficulty with operational ease with some materials due to narrower conditions of use



Case Study

TfWM Pothole Trials

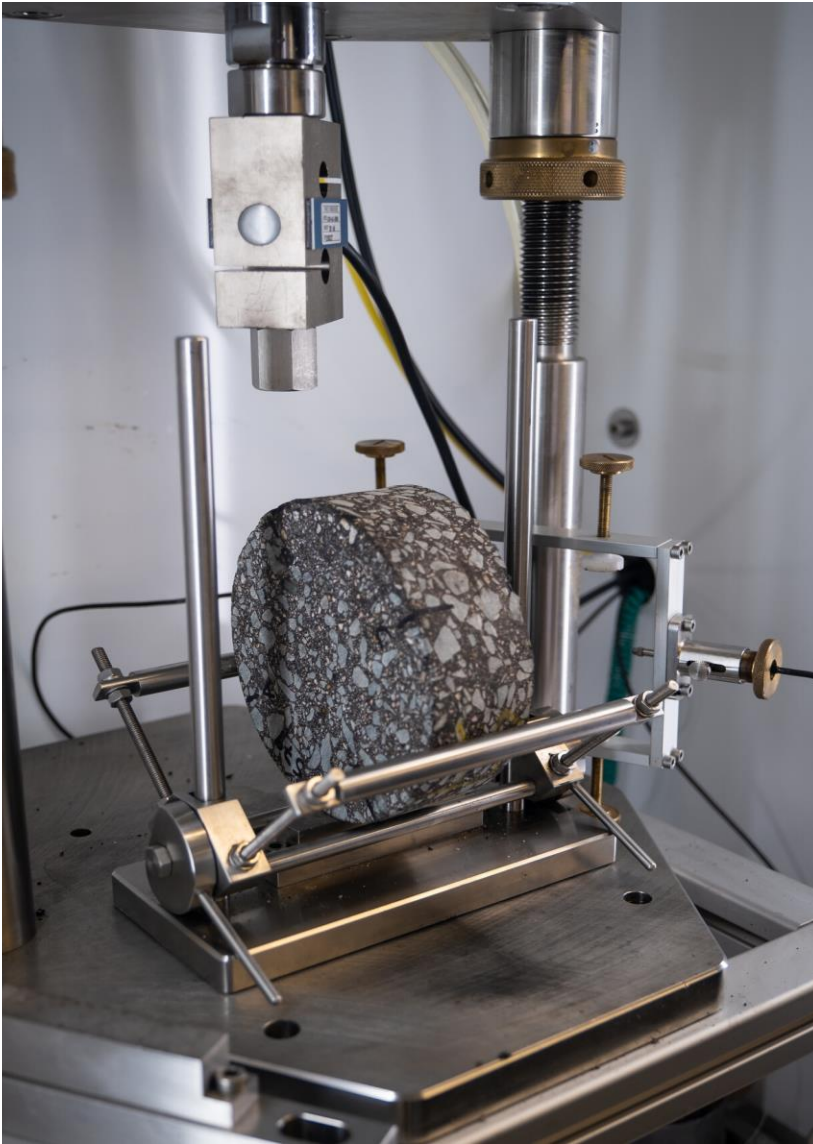
Next Steps

- Monitoring and evaluation of repair performance over the next 7 years
- Full carbon profiles in Carbon Analyser
- Transition to best performing materials as BAU in TfWM LAs

Initial Results

Carbon: est. 37.5% saving for GreenPatch

The Knowledge Bank



Behavioural Change

How we are leveraging behavioural science to design a fit-for-purpose knowledge bank

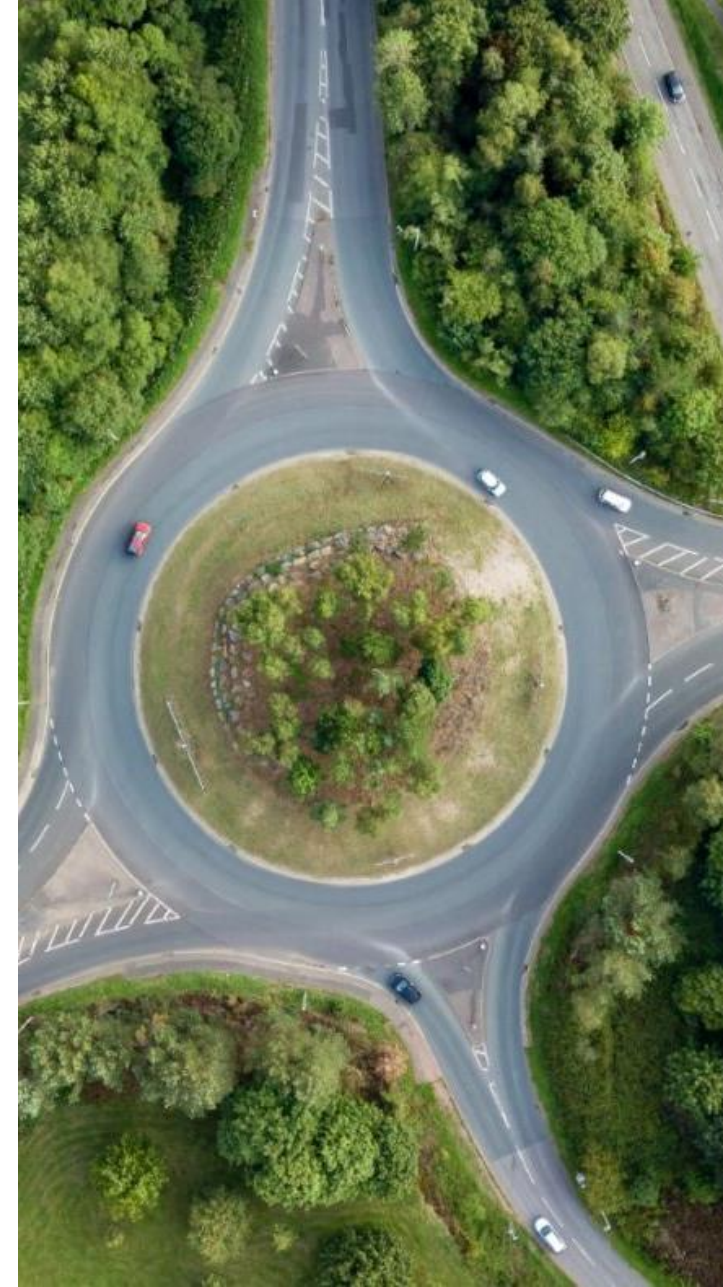
10 qualitative, end-user interviews held with LAs across Scotland and England

Identification of individual, social and material influences on LA behaviour when identifying and adopting material innovations

Operational, informational, organisational, and functional requirements identified for the knowledge bank development based on LA feedback

Full behavioural research report available on our website

 www.decarbonisingroads.co.uk



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Decarbonising Local Roads



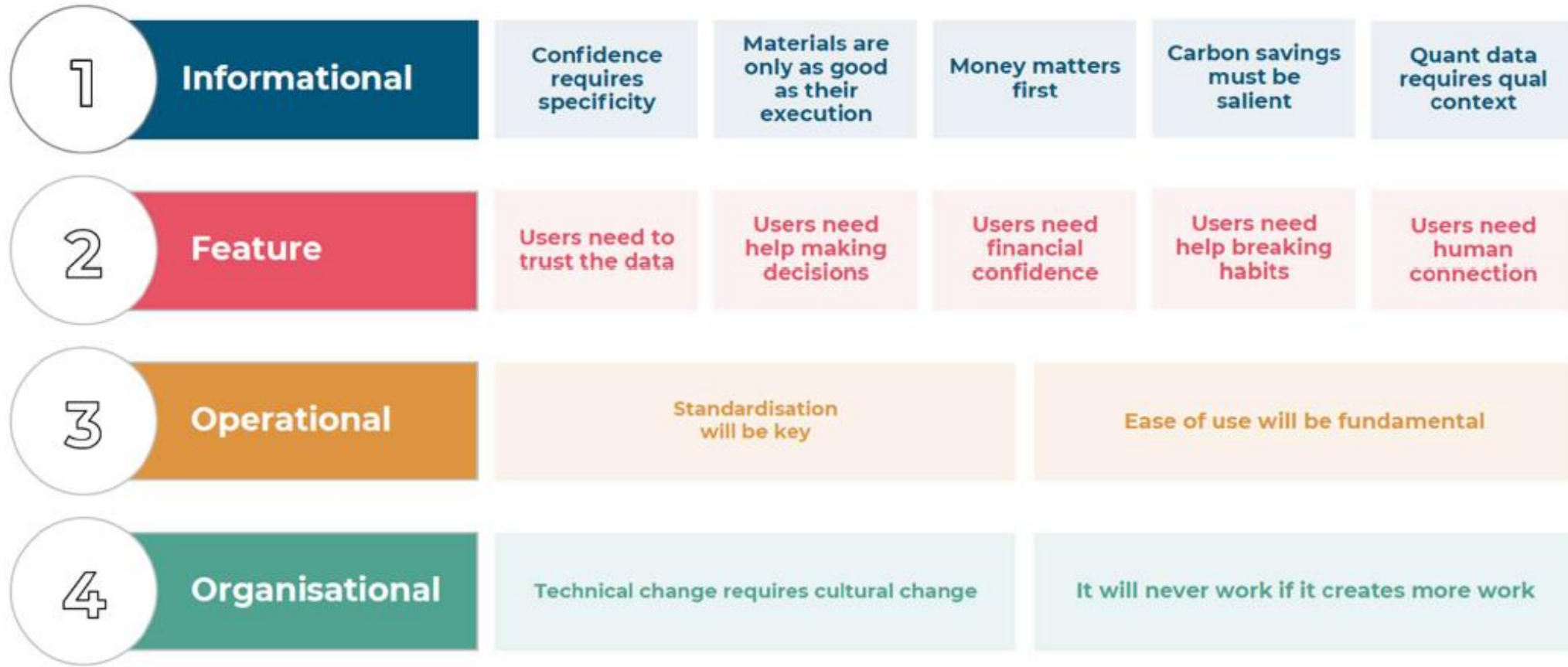
Transport for
West Midlands

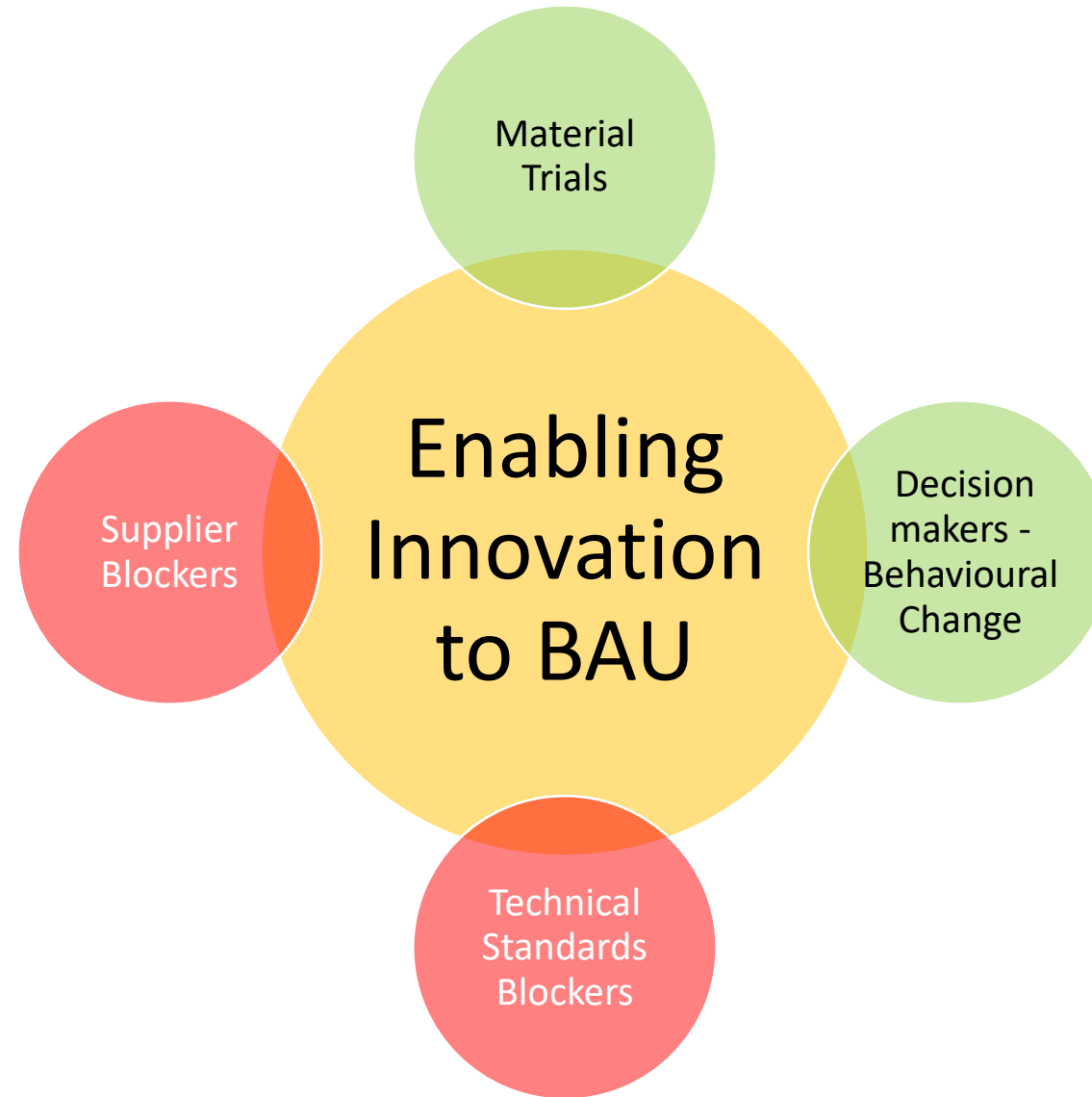
Amey



COLAS
WE OPEN THE WAY

End-User Requirements





Next Steps

Key milestones in 2024

Upcoming trials:

- Line-marking trials: e.g. MMA and biogenic thermoplastic
- Rejuvenator trial: applicability to HRA vs SMA
- Signage: reed-based signage and glass composite signpoles

Market Scanning

- Resurfacing & Surface treatments
- Concrete solutions

Material Evaluations

Full carbon and technical evaluations of materials, with support from University of Nottingham, Aston University and FHRG

Industry Playbook

Creation of best practice and guidance for LAs to identify, trial and evaluate low-carbon materials, with support from Connected Places

Knowledge Bank

Launch of the knowledge bank at the end of 2024, ready for LAs to use

How Can You Get Involved?

Join the UK-wide movement to decarbonise road materials

▶ **Get in touch to partner with us**, share your innovation experiences and get first access to the knowledge bank

▶ **Share innovations for the materials testing programme**, gaining access to sector leaders and live trial sites

▶ **Complete our survey for local authorities** so we can provide the most value for the sector through our live trials

✉ info@decarbonisingroads.co.uk

 www.decarbonisingroads.co.uk