MHA

Midlands Highway Alliance Plus

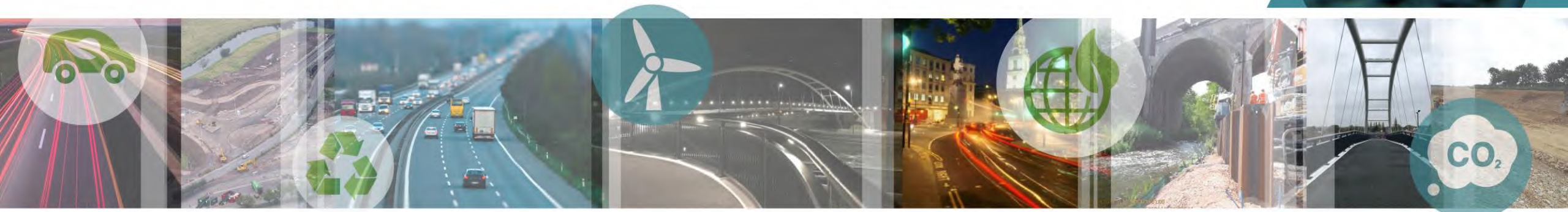
MHA, MSIG, WMHA: Moving Forwards Together

Sustainability and Carbon Reduction

Wednesday 13 October 2021

Achieving Net Zero & Sustainability

Mr. Jeff Crowe amey consulting



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The Challenge

To achieve net zero 2050, we need a paradigm shift in the transport sector to create a sustainable, efficient and integrated ecosystem.

Behavior and customer led transformation of transport services and disruptive technologies will be pivotal in achieving transport decarbonisation.

Jeff Crowe, Senior ITS Engineer, Intelligent Mobility, Amey

MHA+ Coventry, 13th October 2021

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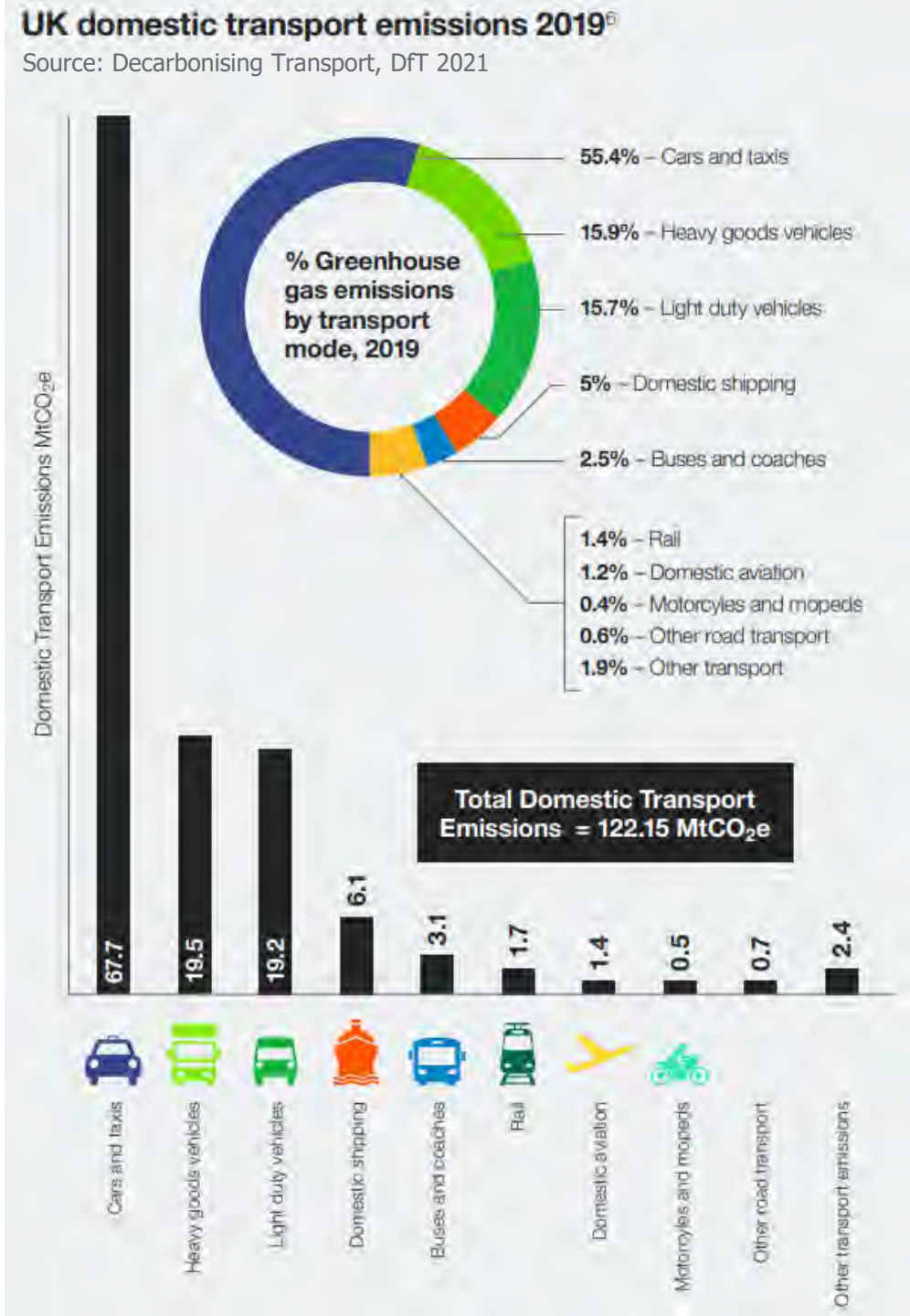
The solutions

Four example projects illustrating how we're meeting the net zero challenge

1. Through digital infrastructure and connected vehicle solutions
    a. Off-Slip GLOSA (Birmingham/Manchester, National Highways)
    b. Virtual VMS (Oxfordshire)
2. Active travel and cleaner transport solutions and methods
    a. Cycle Share Scheme (Telford & Wrekin)
    b. Mobility Hubs (Staffordshire)

Our Mission - To create integrated transport systems that are safe, efficient and accessible for all, through the application of innovative technology, combined with our understanding of operating and maintaining transport assets.



Off-Slip GLOSA Project

- Highways England (National Highways) funded, key support from TfGM
- Further development of A45 Birmingham and Solihull GLOSA project
- Focus on air quality impact, reducing emissions from LCV & HGV freight transitioning off-slips
- Sept 2019 through March 2021
- Manchester area – used TfGM UTC System
- Off-slips in Oldham A627(M) - uphill, Bury M66 - downhill
- Other Key Partner – Eastpoint – GLOSA app/hub developer

What is GLOSA?

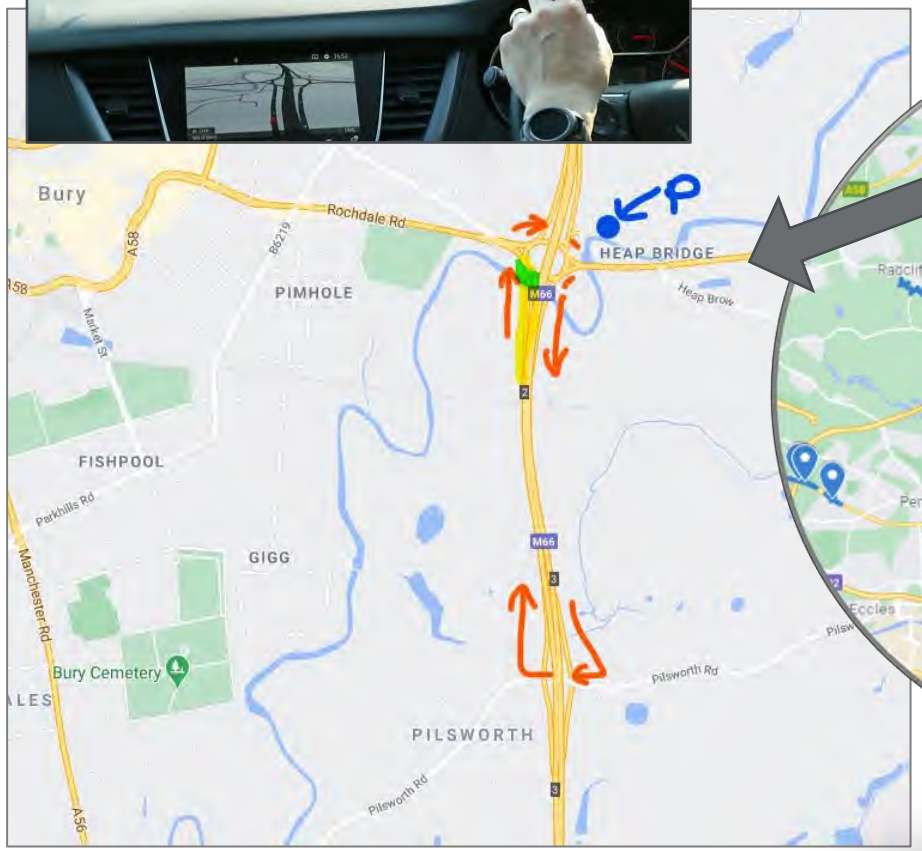
- **Stands for Green Light Optimised (Optimal) Speed Advisory**
- Is a connected vehicle technology
- Collects timing of traffic lights from junctions
- Delivers to a presentation device in-vehicle (mobile app, vehicle infotainment display, etc)
- **Mainly uses voice announcements to minimise driver distraction**
- Presents it as optimal speed to approach the next junction to get through on green
- Also provides countdown to green whilst waiting at a junction
- Aims to smooth out stop and starts, acceleration and braking - Reducing emissions and noise

Caption showing voice announcement

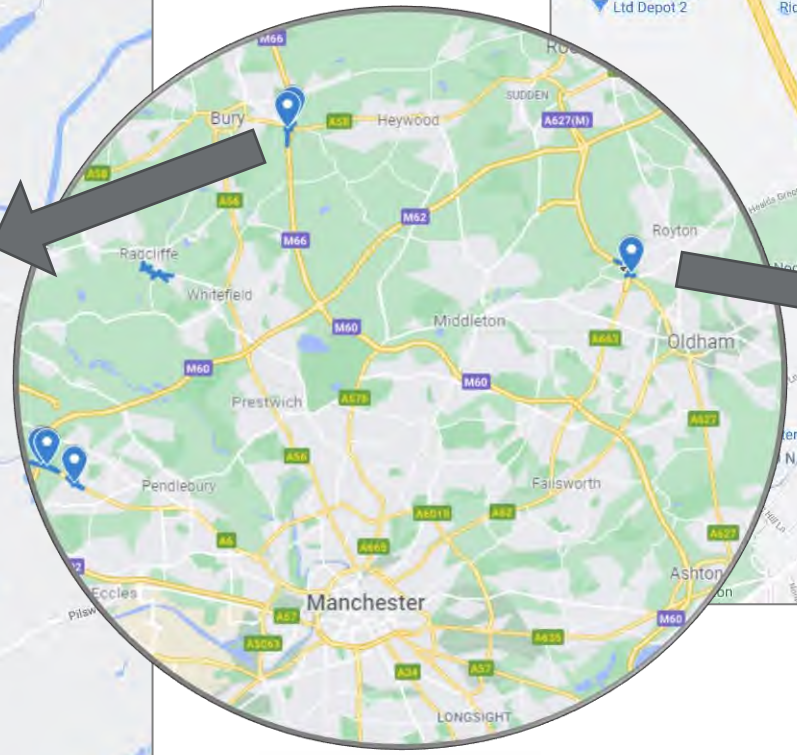
Example UK test © KL Systems Ltd

Audi in-vehicle GLOSA display © AUDI AG

Test location and driving routes



Bury - M66 J2



Oldham – A627(M)

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System Overview

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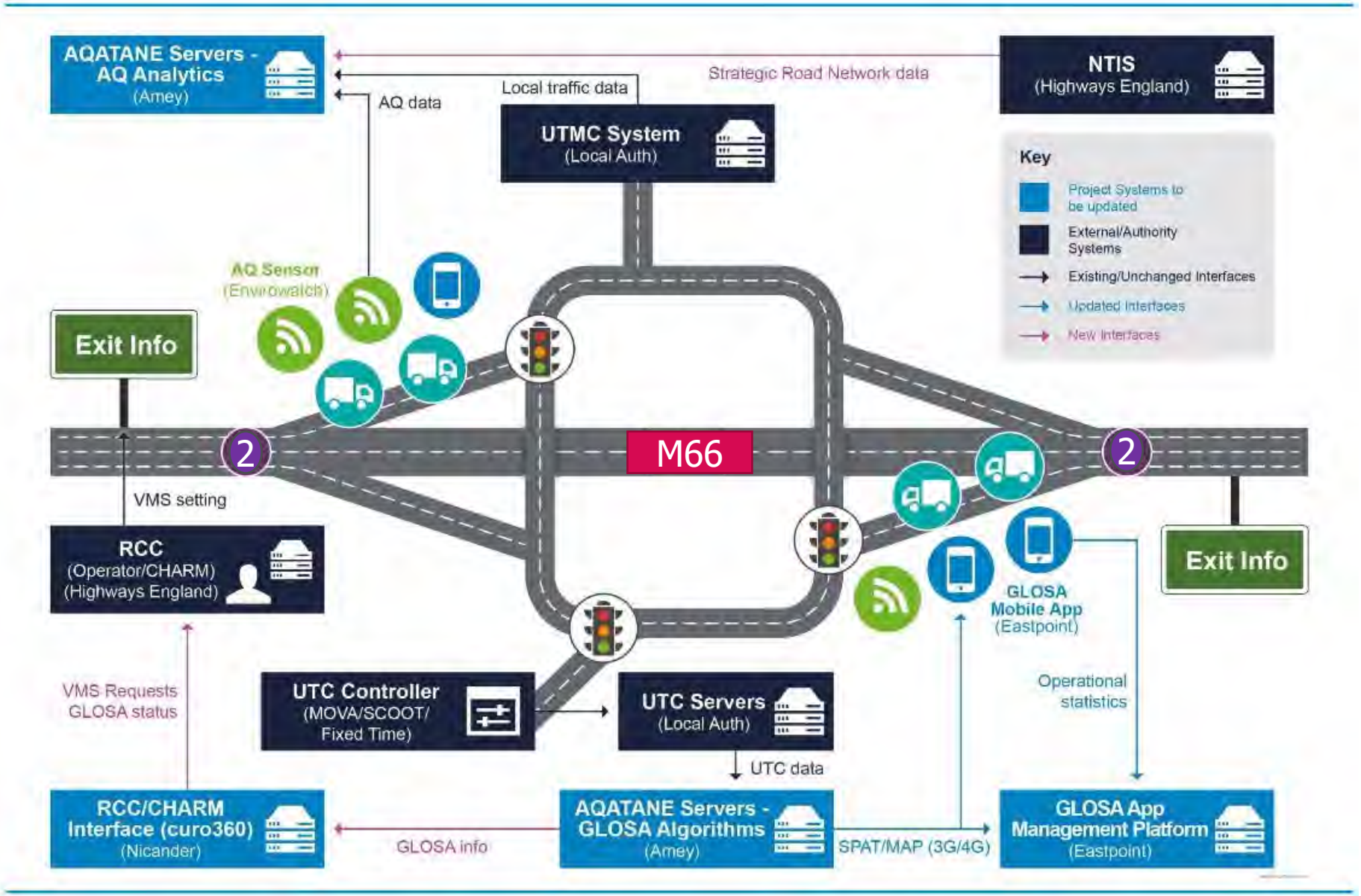

GLOSA App

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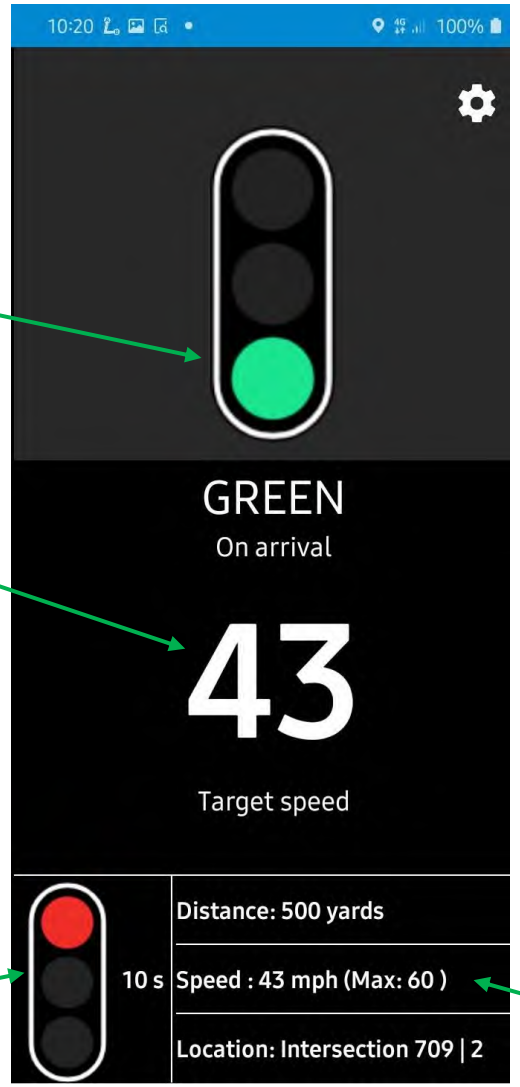
**** Emphasis on following audio ****

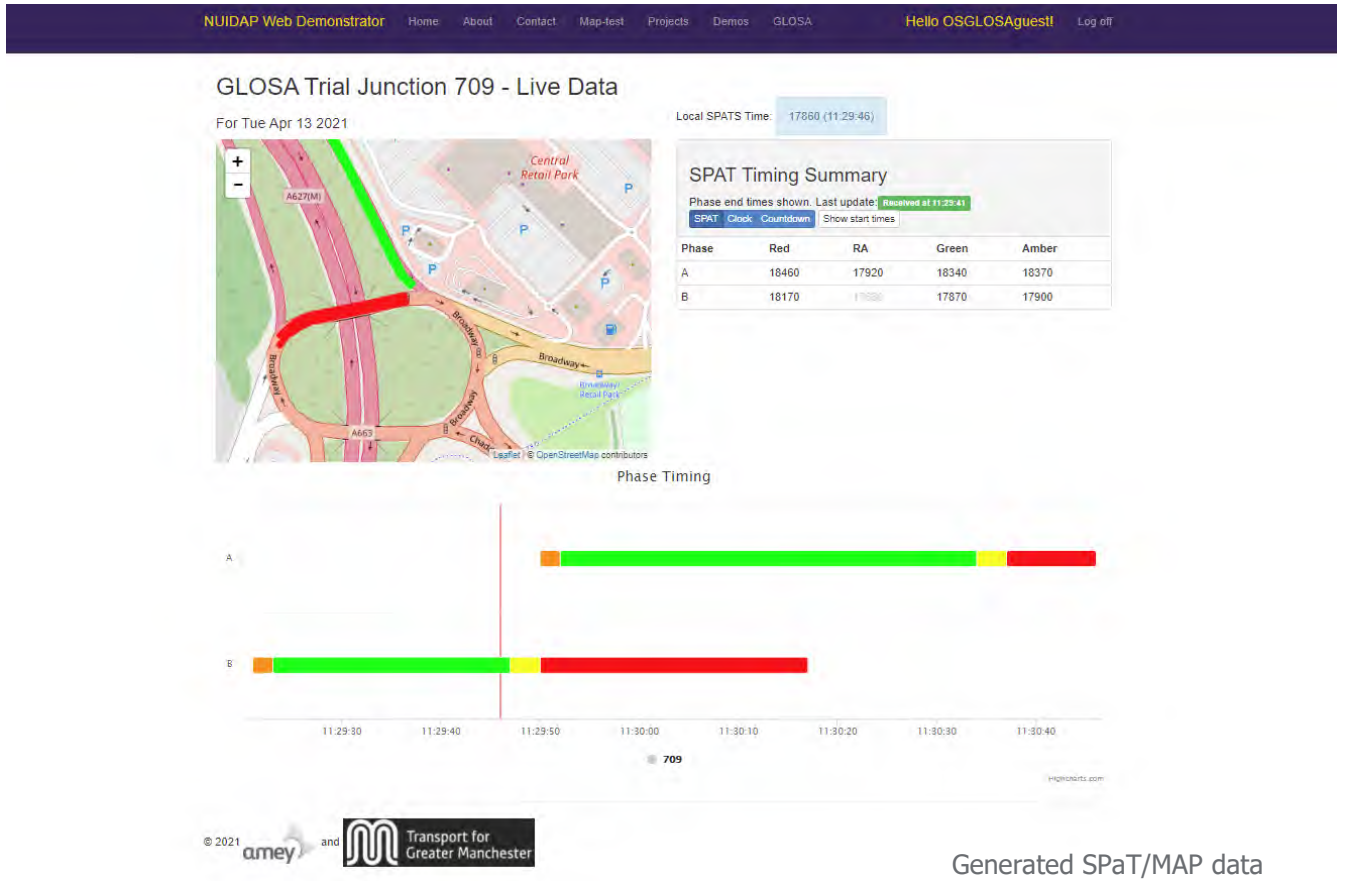


Arrival Prediction

Target Speed

Current Phase

Current Distance, Speed, Location



Generated SPaT/MAP data

Testing - Overview

Three test phases:

1. Testing with Portable Emissions Monitoring Equipment (Ricardo)
    - LCV (VM Caddy) - October 2020
    - HGV (MAN) – February/March 2021
2. Ad-hoc driver experience testing (Amey)
    - January through March 2021
    - Project personnel plus some "adopted" non-ITS-expert drivers
3. Formal driver experience testing – HGV test cohort
    - Haulier engaged with, some training, cancelled due to COVID

MAN TGX Euro6 used in testing

GLOSA Testing – Oldham

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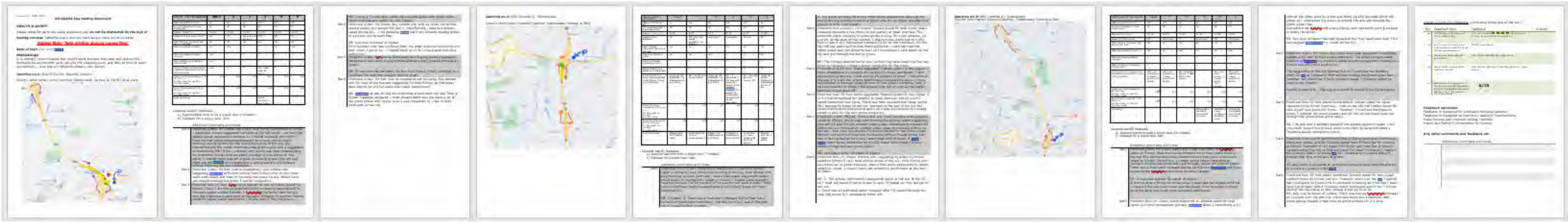
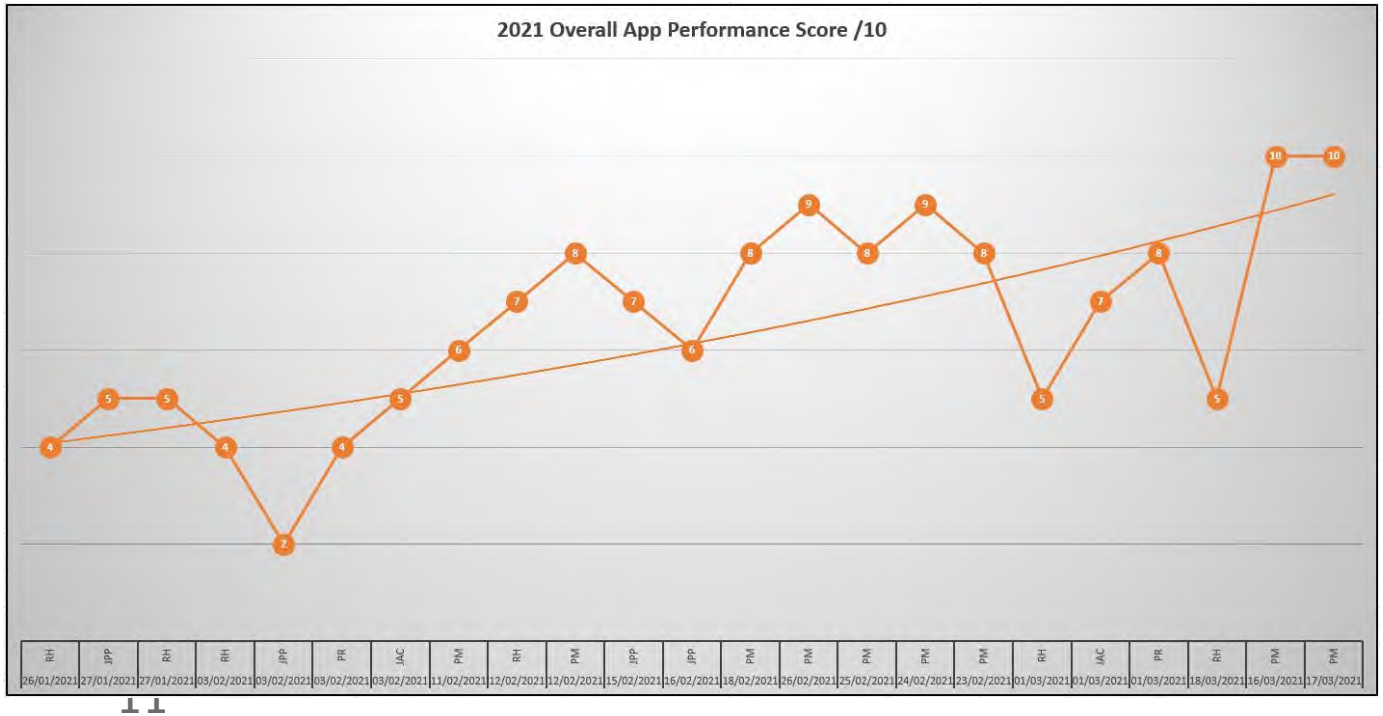
Test Results – Driver Experience





Qualitative analysis from hundreds of App test runs

"Worked well suggesting by audio to reduce speed to 50mph if safe, then 40mph at top of the slip, then 30mph part way down (all at good intervals), then a final audio suggestion to reduce speed for signal. I slowed down just enough to get through at the start of green."

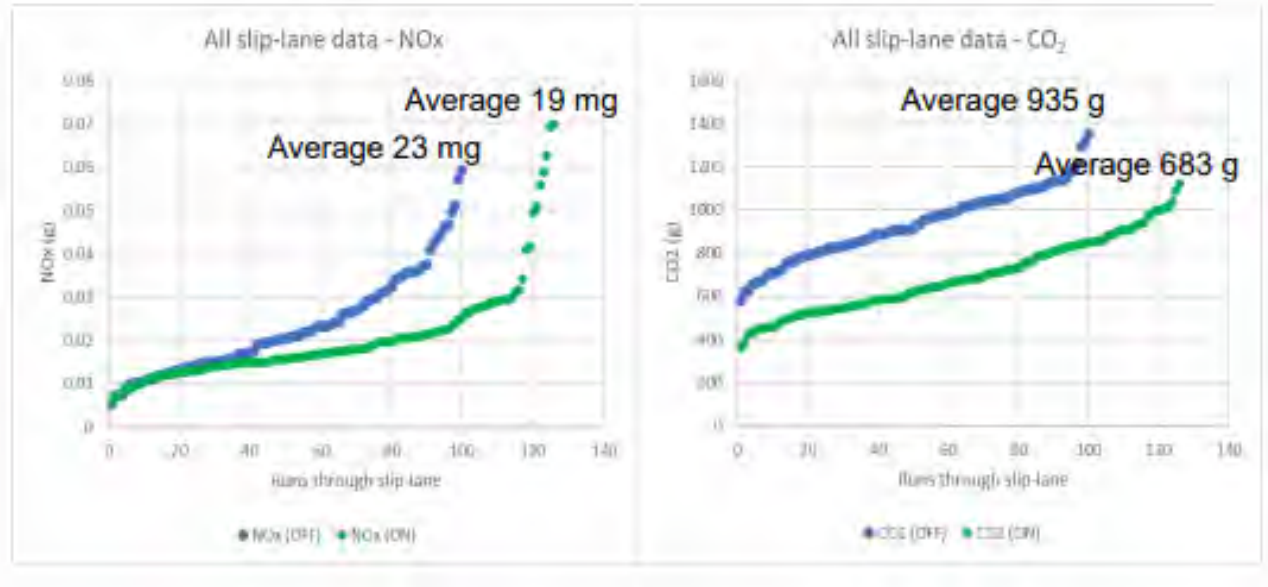
"Couple of signal drop outs, liked new graphics"

"Working very well"

"App recommended speeds better, more confidence"

PEMS Summary – Slip Lane Effects

- Up to **27% avg. reduction in CO_2** emissions
- Up to **17% avg. reduction in NO_x** emissions
- Average **-4mg** per run No_x
- Average **-252g** per run CO_2
- Up to **12.5p**/run savings in fuel use
- Measurable reduction in dwell times on slips



All data from Oldham off-slip

Conclusions

Evolving digital technology that points to the future of highways

GLOSA can work effectively with SCOOT and fixed time

Possible to deploy with "minimal infrastructure"

Measurable, positive impact on emissions

Positive driver feedback

The lights work by communicating with a dashboard-mounted display — much like a satnav — which then displays the speed needed to safely beat the light change (as depicted left). Should the driver end up stuck at a red signal anyway, the display instead receives and displays information on how long it will be until the next green light (as right)

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Oxfordshire County Council - VVMS

Virtual Variable Message Signs

This project was tasked with developing a solution that reduced the need for large and expensive physical roadside infrastructure

Aim was to produce the UK's guidance for obtaining VMS settings from Traffic Management Systems e.g. UTMC

The project started with a wide engagement exercise to understand the need of the major UTC suppliers, the VMS providers and the Local Authorities

Concluded with a proof of concept live test around Oxford and Bristol

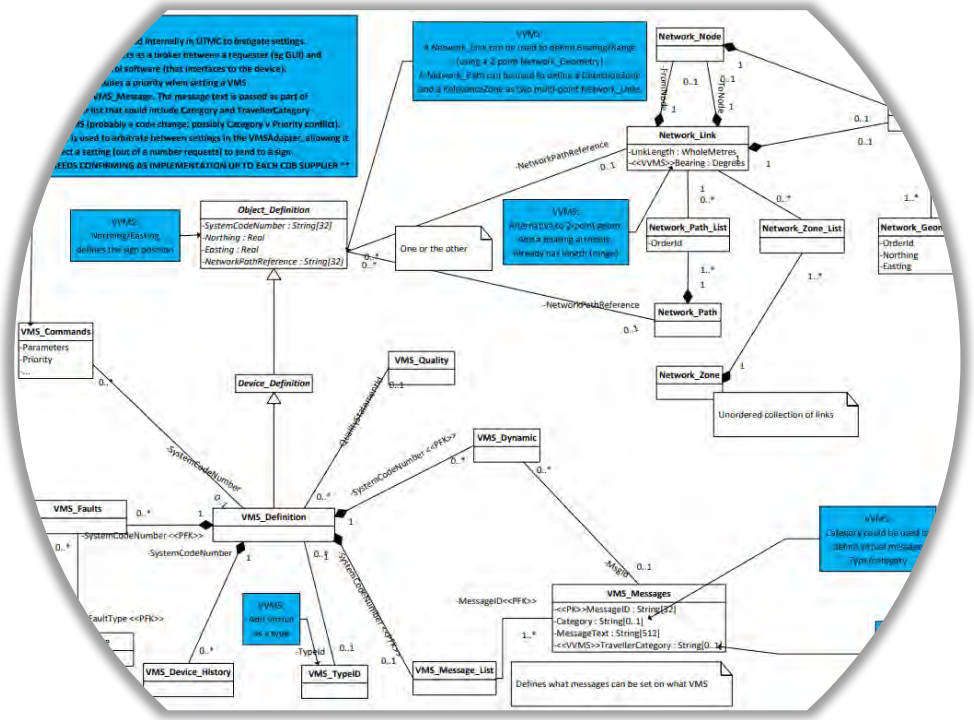

diagram of data flow

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Project is a service provided by Amey to OCC under Smart Technology Framework Contract won in 2018

DfT funded connected vehicle project to evaluate the practicalities of providing information - that is normally delivered via roadside signage

Working with KL Systems, SME who have developed a proof-of-concept VVMS App

Aim: Develop the UK approach to delivering roadside messages into the vehicle

Phase 1

Evaluate current standards from traffic control systems and connected vehicle standards

Develop a VVMS cloud hub and create data extracts

Phase 2

Live trial extracting data from Bristol CC and Oxford CC UTMC systems

Demonstration of the principles of delivering virtual messages


GLOSA
DIVERSION ROUT
STRAIGHT ON
AT ROUNDABO
GPS UP
CONNECTED
Test Message
10:52:21 BZ:268 DIST:21 IN DEGS: 178 DEGS1


GLOSA
10:41
ACCIDENT AHEAD
SLOW DOWN
SLOW DOWN
Test Message

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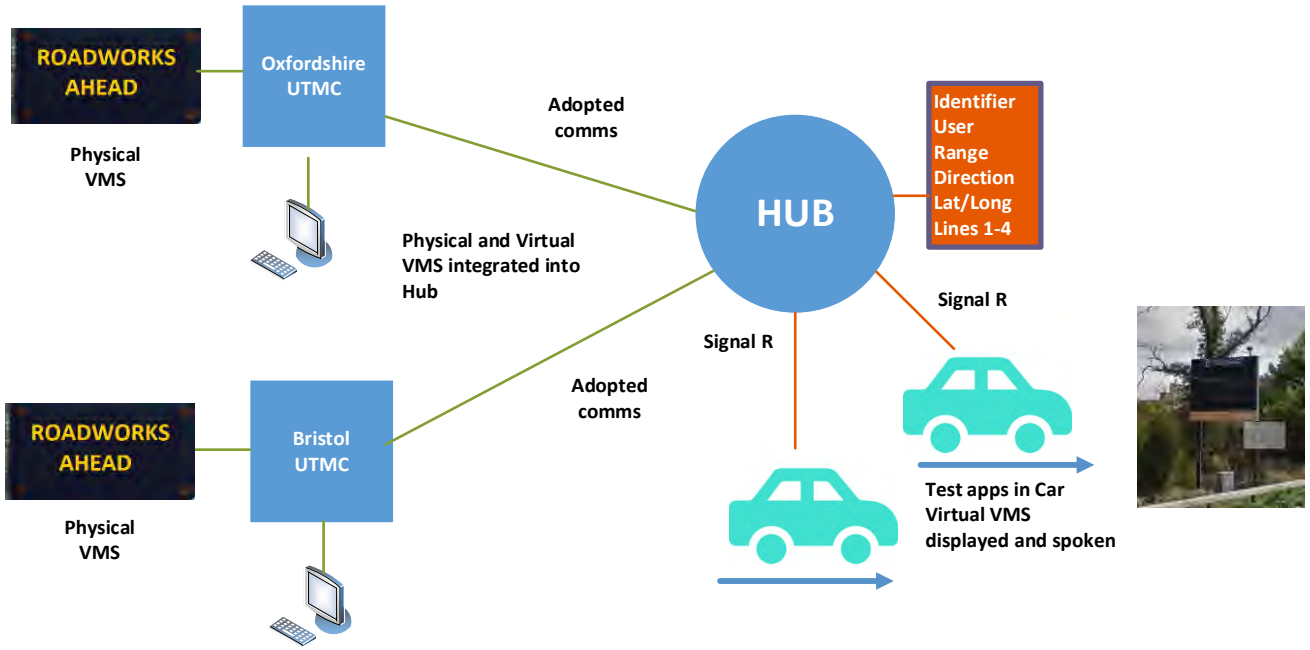
C-ITS
CONNECTED
15 mph

Virtual Sign interfaced through Apple and displayed with navigation


ROADWORKS AHEAD
Physical VMS
Oxfordshire UTMC
Adopted comms
HUB
Identifier
User
Range
Direction
Lat/Long
Lines 1-4
Physical and Virtual VMS integrated into Hub
Signal R
Signal R
ROADWORKS AHEAD
Physical VMS
Bristol UTMC
Adopted comms
Test apps in Car
Virtual VMS
displayed and spoken


A1(M)
A1(M)
A168
74889
A1M/9918A
HE
A19 (N) CLOSED
AFTER A1231
SUNDERLAND
Leeming Ln


OVER 18
GET TESTED
TO STOP COVID
SEE WEBSITE


Cleaner Transport
Intelligent Mobility
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Cleaner Transport

Focused on road transport and taking a data-led approach we examine, design and deliver low carbon multi-modal solutions across:

- Sustainable transport modes
- Alternative fuels
- New business models
- User behaviour & modal shift

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Existing projects

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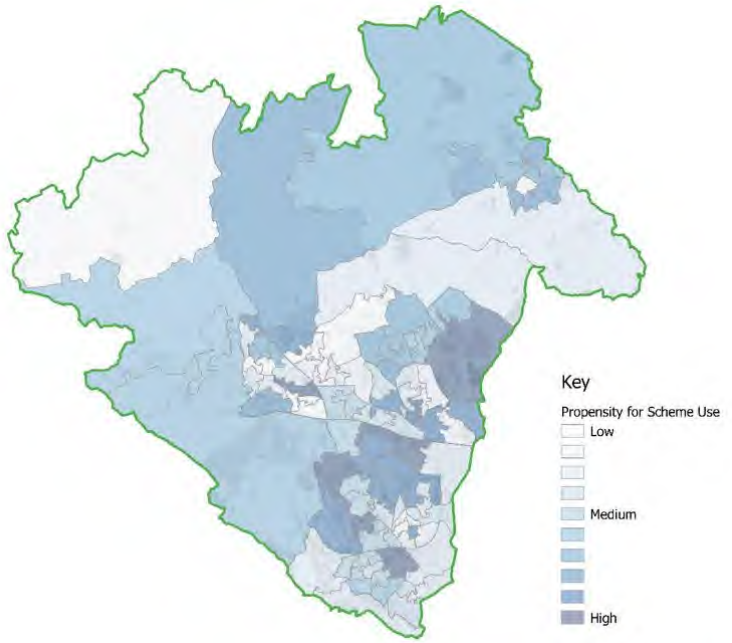
Telford & Wrekin - Cycle Share Scheme

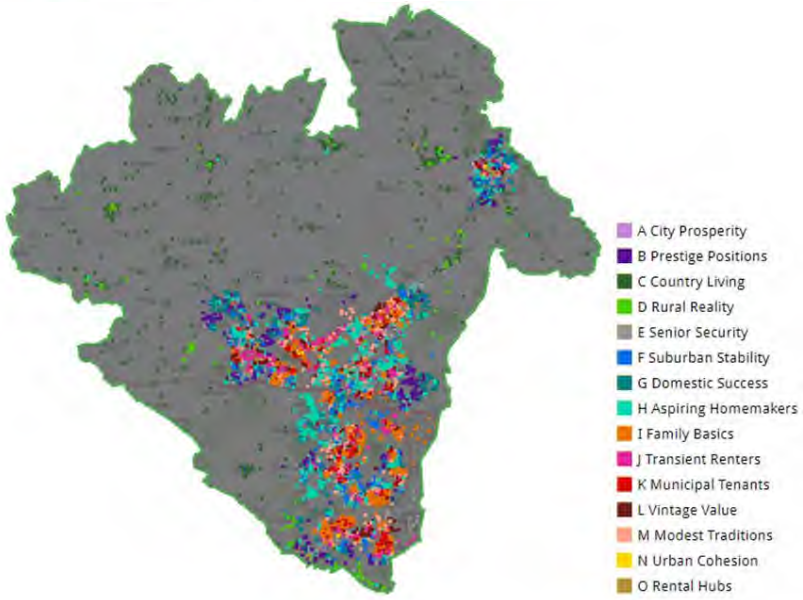
The study explored the feasibility of a cycle share scheme across Telford & Wrekin.

Based on demand analysis, we developed an initial scheme design including locations for docking stations, cycle types and recommendations for the operational model.

Our approach

- Aggregated demographic and travel data sets were analysed to assess the overall levels of demand and identify 'hotspot' locations
- Using Mosaic data, we got an accurate understanding of the lifestyles and behaviours of households in Telford & Wrekin to infer the propensity of users to adopt a cycle share scheme
- We provided recommendations on:
    - Ways to encourage modal shift
    - Operating & commercial models
    - Opportunities to provide accessible cycles and cargo bikes.





Next Steps

By taking a data-led approach, we created a phased scheme design and an implementation plan. The purpose is to ensure user and demand data informs the operation and expansion of the scheme.

We are now supporting Telford & Wrekin in taking the next steps to implement the scheme:

- Engaging with operators, local businesses & council stakeholders
- Ensuring the future scheme integrates with existing services such as Telford Bike Hub
- Developing the tender technical specification
- Advising on behaviour change initiatives
- Monitoring & evaluating the scheme

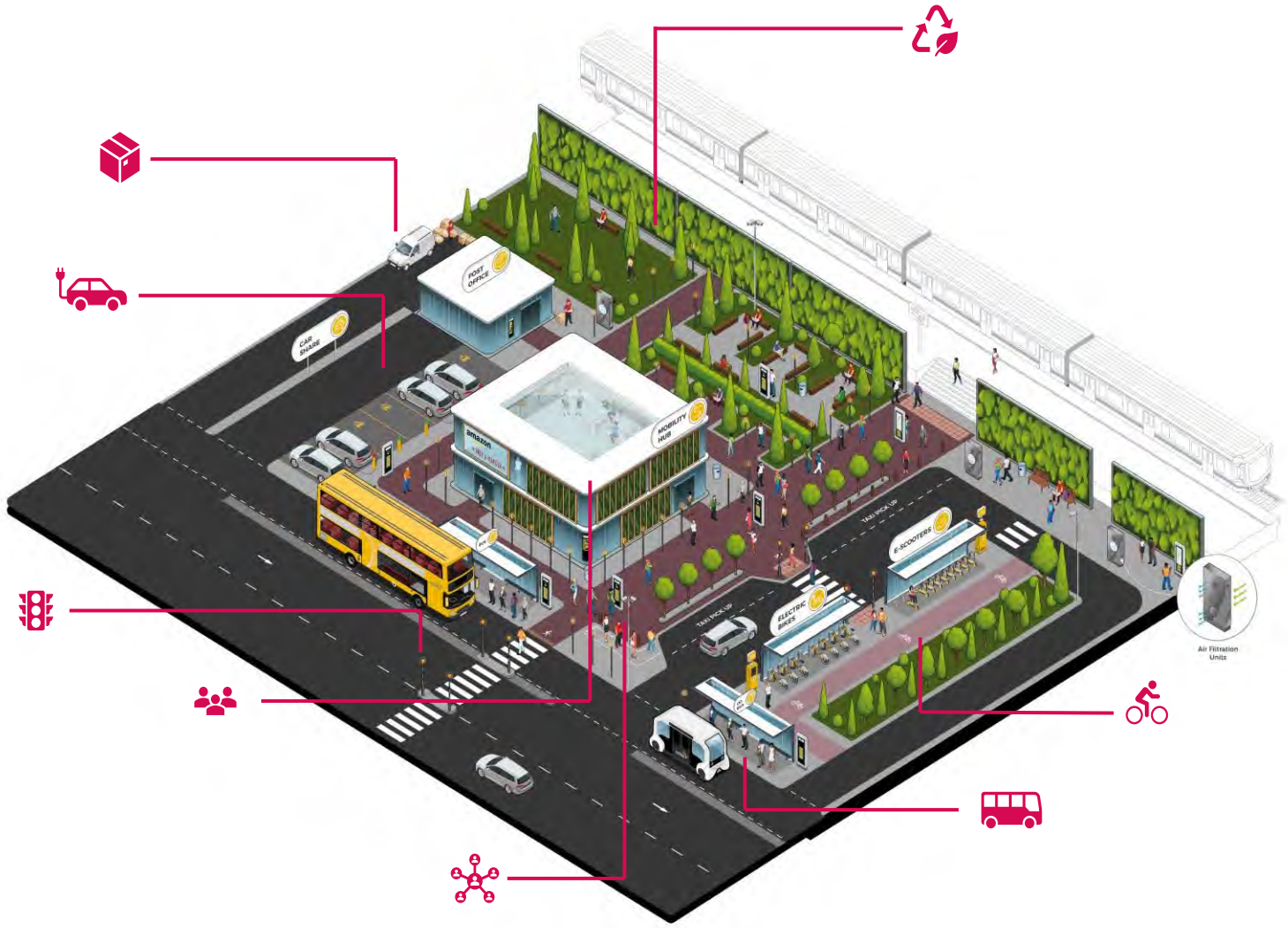
Staffordshire County Council - Mobility Hubs

Staffordshire County Council

Louise Clayton, Head of Transport Operations and Future Connectivity at Staffordshire County Council

"Mobility hubs provide a fantastic opportunity for us to solve many of the connectivity challenges faced by our residents and communities and to do so in a sustainable way, by bringing together a range of mobility modes that cater for all needs.

The mobility toolkit is a vital tool that will help us match the needs of our communities to the range of services local mobility hubs can offer and will be used to identify the best locations for hubs and nodes. This is the start of a very exciting journey for Staffordshire."



- Demand Responsive Transport (DRT)
- Co-Working Space
- Micro-Mobility
- Green Wall/ Green Spaces
- EV Charging
- Connected Infrastructure
- Data Integration (MaaS Platform)
- First & Last Mile Delivery
- Car Club

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Mobility Hub Toolkit

Staffordshire County Council

The Toolkit sets out a data driven process, comprised of 5 steps, to analyse viable locations for mobility hubs and identify the demand for different modes and services.

It is intended to support in developing a business case for the deployment of mobility hubs.

1. Scoring Matrix
2. Demand Analysis
3. User Analysis
4. Site Visit
5. Final Selection

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The Five Stages in Detail

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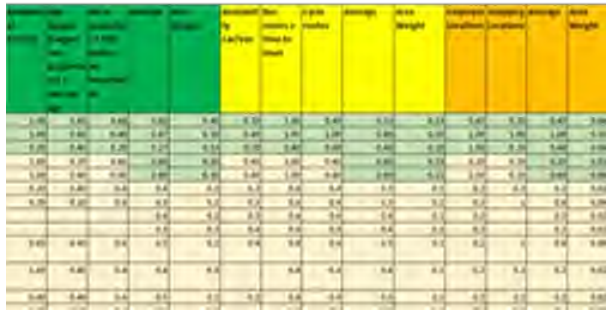
1 Scoring Matrix

Unique to each client as the scoring should be directly related to the objectives of the mobility hub. Creating the matrix at the start avoids bias further along the process and ensures analysis is data driven



2 Demand Analysis

Transport demand is determined by analysing what is driving current people movement patterns and modes. This is key to understanding current and future service demand

3 User Analysis

Understanding of the lifestyles and behaviours of households to infer preferences for certain transport modes and their propensity to adopt services at the mobility hub

4 Site Visit

Following Demand and User analysis it is recommended that a site visit is conducted to identify factors that are not shown in the data

5 Final Selection

Final selection takes data from the previous stages and feeds this into a matrix. A final map is then produced showing the detail for the location alongside a score and justification for its selection

In Conclusion

- Our presentations illustrate how we are applying technology, data and connectivity that can lead to cleaner and better used transport
- Introducing VVMS will remove the need for physical roadside architecture over time
- GLOSA has illustrated the carbon savings from smoothing traffic
- Correctly staged and implemented Bike Shares are a vital step in moving people out of their cars
- Integration – a factor for success, not just a buzz word
- Data is pivotal in understanding travel patterns, customer behaviour and for the future provision of transport services
- Along with providing new transport services, there needs to be a targeted approach to change behaviour and achieve modal shift
- Encouraging the adoption of alternative travel will drive down carbon dependency

These are amongst the many projects we are engaged in assisting in reaching Net-Zero!

Any Questions?

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