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Introduction

This document will explain Derbyshire's approach to both Intelligent Transport Systems (ITS) and Cooperative Intelligent Transport Systems (C-ITS) and how it will support the Council's People Centre Approach.

Intelligent Transport Systems (ITS)

ITS is according to ITS United Kingdom:

'A combination of Information Technology and telecommunications, allowing the provision of on-line information in all areas of public and private administration.'

ITS can be applied to road transport to improve efficiency and safety through the provision of on-line information to drivers in their vehicles and by equipping the vehicle with computerised systems which assist the driver (e.g., following and lane keeping).

Cooperative Intelligent Transport Systems (C-ITS)

C-ITS is the technology and standards used to connect vehicles to other vehicles and infrastructure. This specifically relates to increasing road safety and supporting specific groups of drivers. It can inform road users of emergency vehicles on their route as well as ensuring signals are on green for those emergency vehicles to make their journey efficiently. It can also be used to improve signal timings to prioritise public transport. C-ITS can also inform the road user of when lights are on green to decrease the pollution caused by congested traffic. Another function of C-ITS is that it can warn of hazards on the road such as black ice. Derbyshire will aim to use this technology to monitor traffic on the network and allow intervention when required.

At Derbyshire we are referring to both systems as Connected Futures. A Connected Future is ensuring that we can manage and co-ordinate our network from one place using up to date relevant data. The co-ordination centre is known as the Intelligence Centre. Figure 1 overleaf shows the vision for Connected Future:

Figure 1 The Derbyshire Connected Future Vision



The Connected Future Project has been funded by the Derbyshire Highways Hub Advanced Real Time Information (DHART) project, the Bus Service Improvement Plan (BSIP) and the A61 Growth Fund.

The Connected Futures Strategy will support three of the Council Plan's key priorities:

- Resilient, healthy and safe communities by improving transportation links and network efficiency, helping to improve air quality
- High performing, value for money and resident focused services by providing a variety of sustainable transportation options, ensuring our services work together reducing costs and increasing overall network performance.
- Creating a prosperous and green Derbyshire by maximising network efficiency, improving facilities for sustainable transport whilst managing the network for improved air quality.

It will also support the Local Transport Plan vision of:

- Improving quality of life and promoting healthy natural environment by improving facilities for sustainable transport whilst managing the network for air quality.
- Supporting a resilient local economy by providing stronger, more reliable transportation options.
- Tackling climate change by monitoring air quality and reducing emissions through efficient network management.
- Promoting equality of opportunity by improving transportation links across the County.
- Contributing to better safety, security, and health by improving air quality on the network.

It will also support our Asset Management Policy aims to meet the council ambition below:

“We will work together with our partners and communities to be an enterprising council, delivering value for money and enabling local people and places to thrive”

The Council has a duty under the Traffic Management Act 2004 to keep traffic moving freely and quickly on their roads and the roads of nearby authorities.

This document intends to set out how:

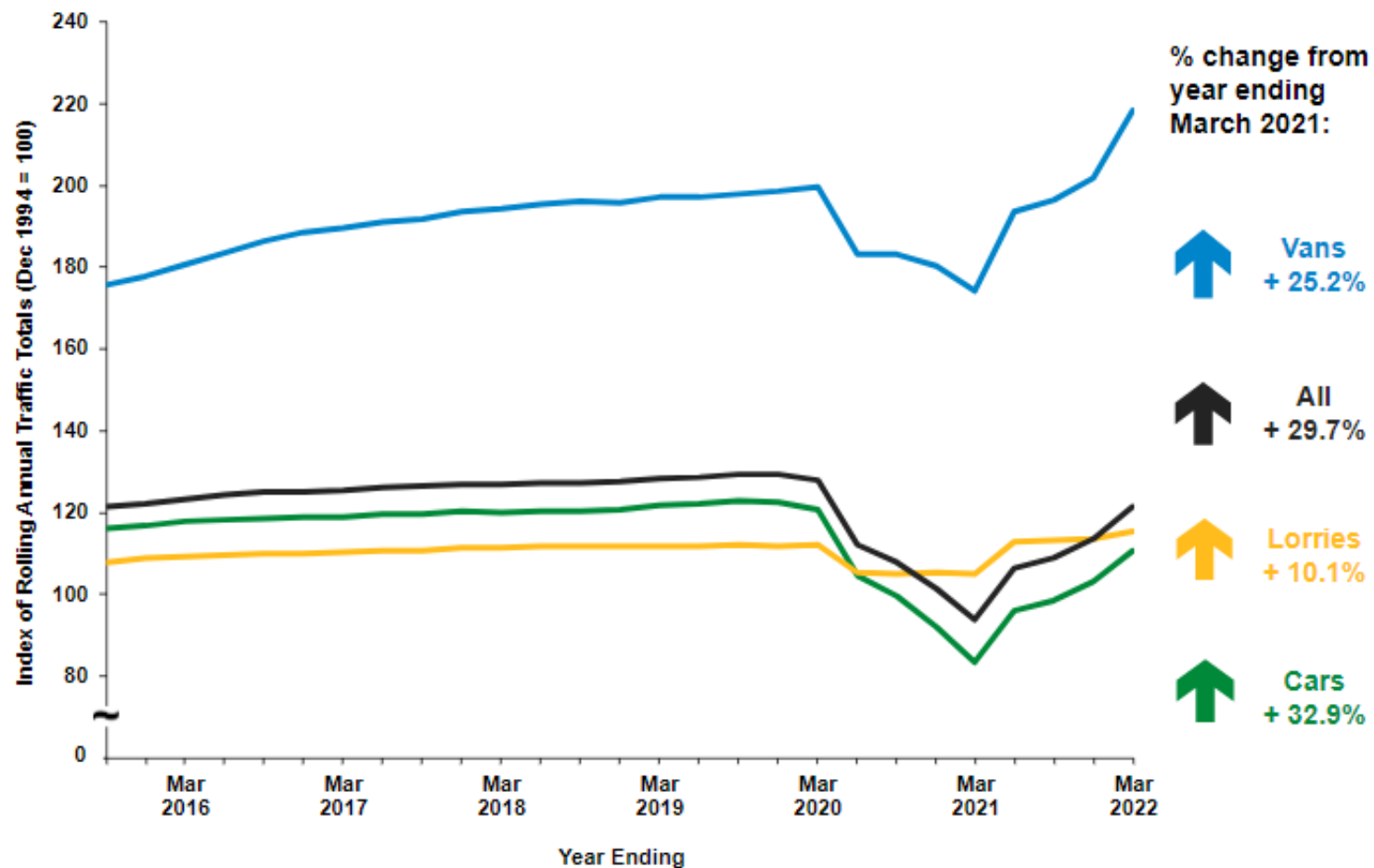
- Derbyshire Connected Futures will work to improve the network in Derbyshire
- Derbyshire will deliver the concepts suggested by ITS and C-ITS.
- How we will deliver and develop the 2018 ITS Strategy
- How we will meet the aims of the Asset Management Policy.
- How we will ensure we fulfil our duty under the Traffic Management Act 2004.

The document will be reviewed biennially.

What is the current situation nationwide?

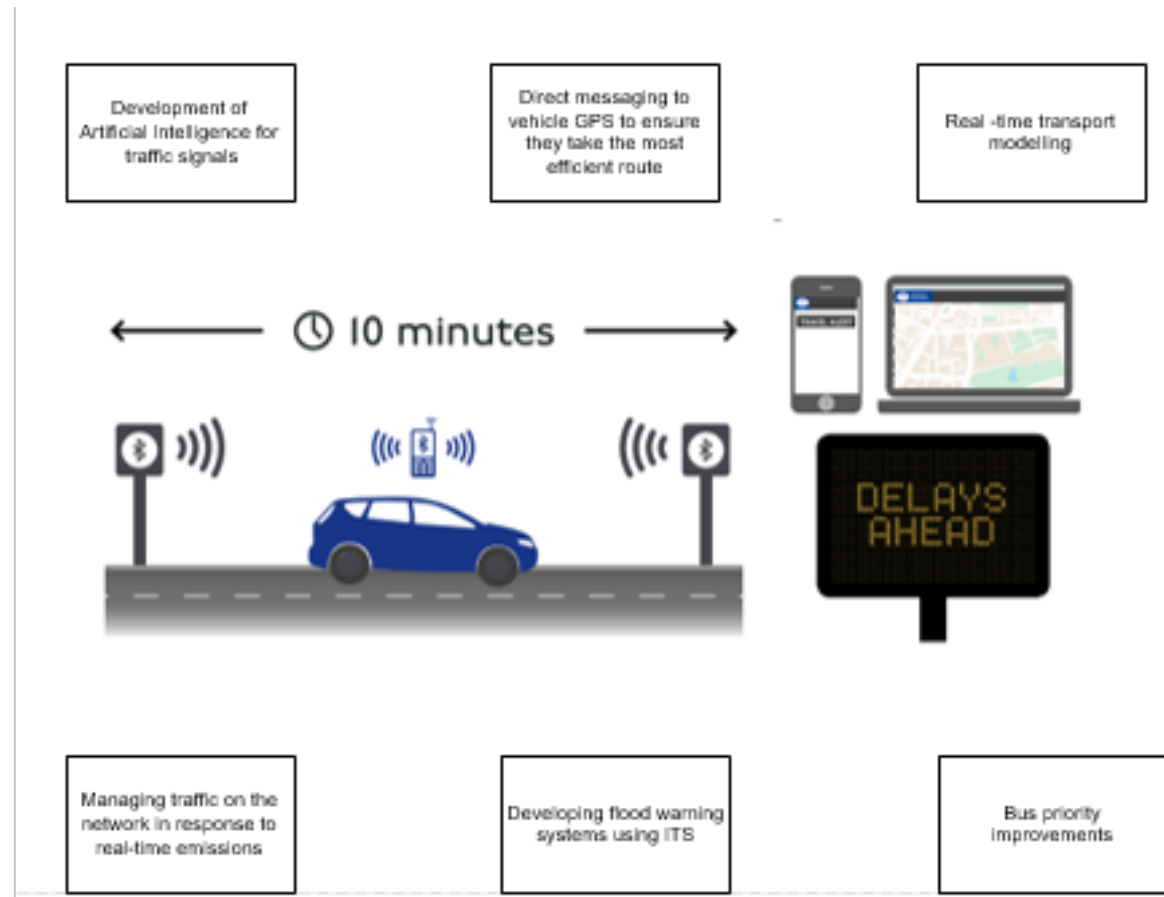
According to the Department for Transport, road use has steadily increased across all networks in the United Kingdom since 1993 with a decrease in 2020/21 due to the Covid pandemic. Traffic flows are starting to increase again nationally so we need to address the challenges this creates and develop a working solution to ensure network efficiency whilst meeting climate change objectives.

Figure 2: Department for Transport's rolling annual road traffic in Great Britain, by vehicle type from 2015 – 2022



Current initiatives in the United Kingdom include:

Figure 3: Current ITS initiatives in the United Kingdom



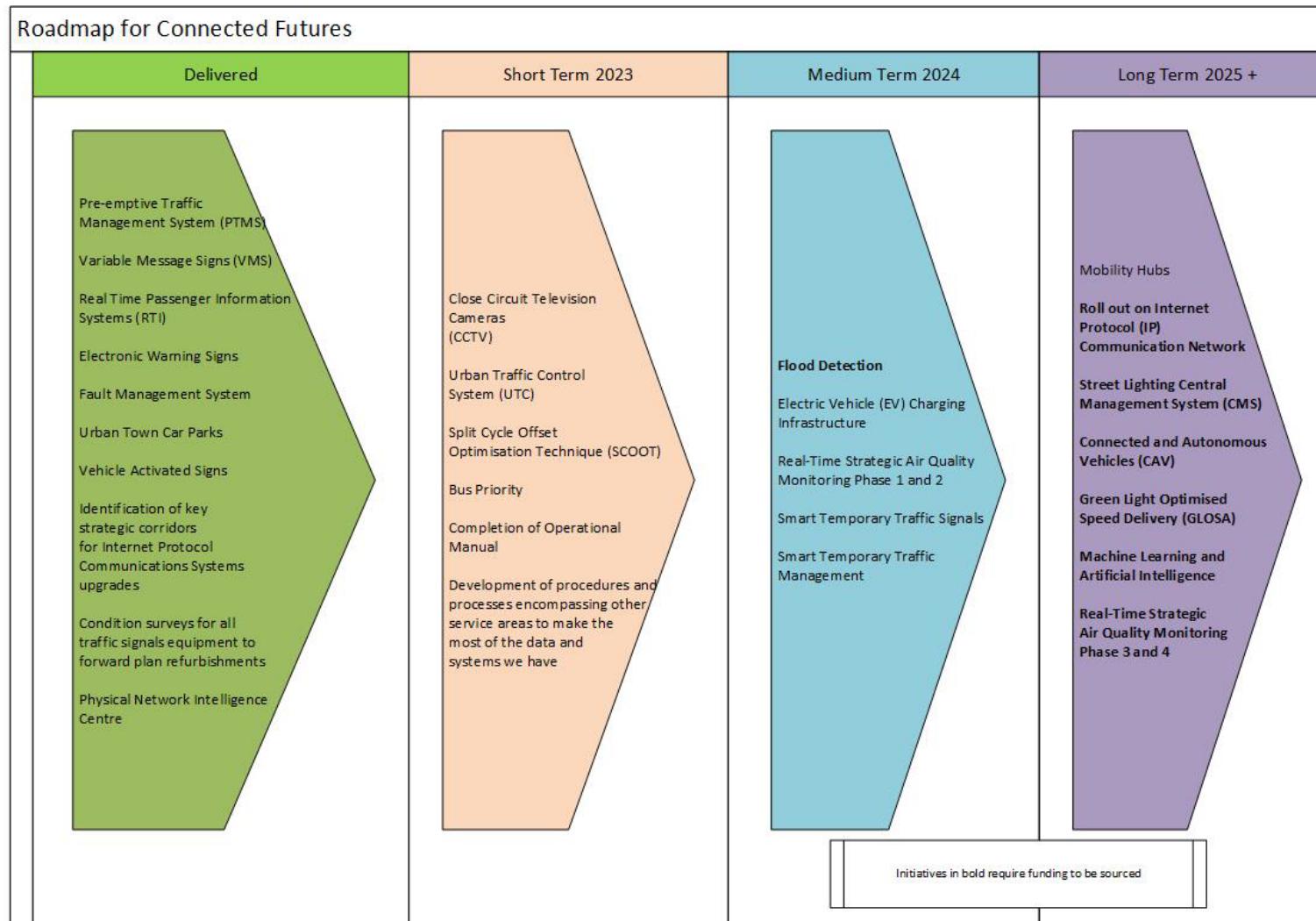
(Image from Transport for London)

What is Derbyshire County Council doing to ensure it delivers a Connected Future?

In 2018 the initial ITS Strategy was produced. Delivery of the aims has commenced with infrastructure installations for the control centre and supporting hardware having been installed. Supporting software has been procured with funding secured in the short term. The development of the processes, procedures and additional operational strategies will necessitate the securing of additional funding to allow development of the systems as the service provision is enhanced in the medium and long term to meet the challenges associated with the macro environment.

Progress on the aims set out in the ITS Strategy and a future roadmap of deliverables is shown in figure 4 overleaf with development areas that will require funding being highlighted:

Figure 4: Roadmap of Deliverables

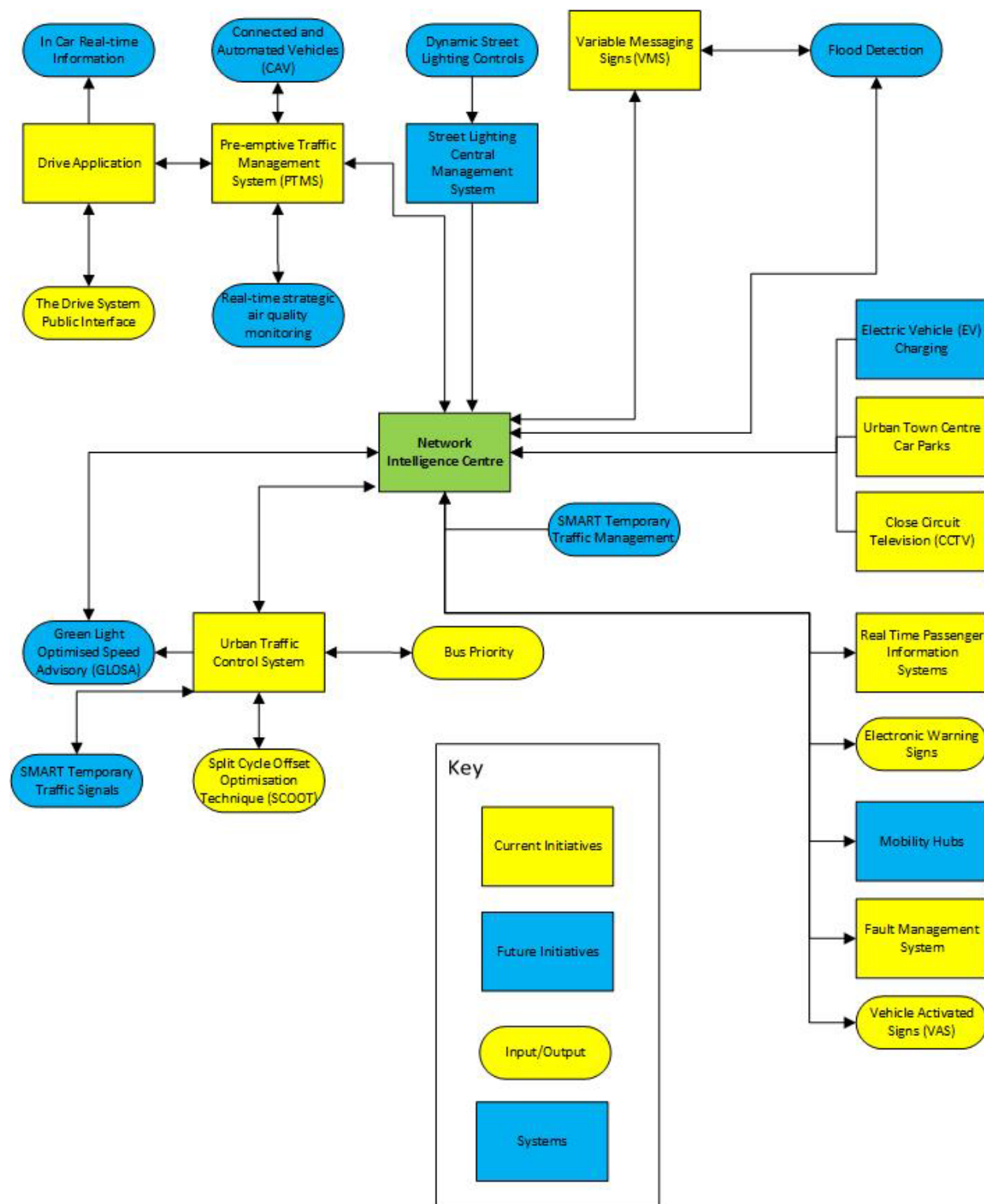


Network Intelligence Centre

Derbyshire County Council have developed the Network Intelligence Centre to manage our Connected Futures work. The Network Intelligence Centre is based at County Hall and can carry out monitoring and traffic control. One of the aims of the Network Intelligence Centre is to allow data sharing with others to enable multiple agencies to develop applications. The following section will explain what systems are used, what information is gathered and how it is managed.

Figure 5 overleaf shows the current and future initiative Derbyshire are involved in to ensure a connected future. The document will go into detail of what each initiative involves.

Figure 5: Derbyshire's Connected Future



Current Initiatives

Network Intelligence System

The Network Intelligence System gathers data from a wide range of static and real-time information sources including, but not limited to, road works, traffic signals, real-time bus information, close circuit television (CCTV), floating vehicle data, variable messaging signs (VMS), meteorological data systems and car parks.

In the future we aim to connect to all our relevant data gathering systems associated with managing our network as well as other highway authority network information feeds.

We aim to also share our data with other highway authorities to improved cross-boundary network management as well as sharing with some 3rd Parties.

Pre-emptive Traffic Management Systems (PTMS)

The pre-emptive traffic management system gathers real-time traffic data, which is gathered from sources including, but not limited to, mapping applications on mobile phones, Bluetooth data, count sites, ANPR cameras and vehicle manufacturers data. It provides a real-time network analysis of congestion and highlights areas of the network that may require an intervention to improve flow.

Data may be gathered from specific network users including, but not limited to, abnormal loads, emergency services, event co-ordinators and cyclists. Users will be provided with the option to share anonymous location data used to inform other network users of vulnerable road users within their vicinity via a free mobile application – The Drive Application. Derbyshire endeavours to work with vehicle manufacturers to enable this information to be displayed within the vehicle systems.

Variable Message Signs (VMS)

These are used on network to inform users of facilities, incidents and events that may affect their journey.

Urban Town Car Parks

Derbyshire will provide real time car parking availability to reduce the amount of traffic in urban town centres. This information will be displayed on Variable Messaging Signs.

Close Circuit Television Cameras (CCTV)

CCTV has been deployed on key corridors in the network to provide real-time information on traffic incidents including congestion. These images will be available to operators of the Network Intelligent System to support decision making and provide more detail to the information outputted from the PTMS.

Real time passenger information systems

Derbyshire have installed over 200 real time passenger information screens and several interactive totem information points. These will ensure that the public are able to effectively journey plan, being kept up to date with the real-time bus information for the service they are planning to use. In the future Derbyshire would like to expand this service to cover more bus service providers.

Electronic Warning Signs

Derbyshire operate a number of electronic warning signs across the County. An example of these signs is 'slippery road ahead'.

Fault Management System

Automated fault reporting by our electronic assets on the network are processed and sent through to the fault management system. This system notifies engineers of these faults and prioritises them in accordance with our risk managed agreed timescales.

Vehicle Activated Signs

Derbyshire operate a number of 'vehicle activated signs' across the County. An example of these is a warning sign about traffic turning ahead.

Urban Traffic Control System (UTC)

The UTC system has been deployed to manage our signal-controlled junctions and crossings providing real-time fault management and analysis. On key strategic routes and within key urban areas the system will proactively manage the network using Split Cycle Offset Optimisation Technique (SCOOT). For sites where control is not required, we will monitor faults in real time using the UTC system.

Split Cycle Offset Optimisation Technique (SCOOT)

The SCOOT system monitors traffic movements within a contained localised region of the network. This is based on the network usually within an urban environment where we have multiple signal-controlled junctions and crossing in close proximity. The SCOOT system will offset the timings on the individual junctions and crossings to coordinate them reducing congestion and travel time within the region.

Bus Priority

Working with local bus companies operating within the County we monitor the real-time location of services compared to the scheduled timetables within the Network Intelligence System. If services are running behind schedule, we can adjust the timings of our permanent traffic signals to prioritise their service and reduce delays for public transport vehicles.

Future Aspirations

Roll out of Internet Protocol (IP) Communication Network

To enable the future aspirations a key element required is the roll out of internet protocol (IP) across the County. Without this, communications with vehicles will be difficult and we may end up relying on 5G infrastructure.

Street Lighting Central Management System (CMS)

Derbyshire are considering developing a case to invest in a Central Management System to manage the Street Lighting assets. This will allow real time control of light output levels. Derbyshire intend to introduce dynamic street lighting controls as part of this system. This will allow lighting assets to continuously adapt to the presence and behaviour of users on the network. It means we can light the street only when and where it is needed. As such, it offers a solution to the energy waste and luminous pollution associated with conventional road lighting.

Mobility Hubs

Mobility hubs are highly visible, safe, and accessible spaces where public, shared and active travel modes are co-located alongside improvements to public realm, and where relevant, enhanced community facilities. The redesign and reallocation of space from the private car, is intended to enhance the experience of travellers as well as benefiting local residents and businesses. The concept has been applied to the streetscape in many European and North American cities and is now being replicated in the UK.

Flood Detection

Derbyshire aim to gather data from real-time river level monitors within the County to help us manage our flood response. The data will allow us to communicate flood risks to the public through a variety of digital and non-digital platforms. Physical responses to flooding are managed by our Flood Response Policy.

Electric Vehicle (EV) Charging Initiatives

Derbyshire has committed to providing 1000 EV Charging Points across the County by 2025. Derbyshire have commissioned a report to look at expected demand for EV charging across the County for the next 8 years and what infrastructure will be required. Once this report has been processed Derbyshire will be looking to procure EV Charging Points in the following settings:

- Private sector provision
- Provision at fuel station
- Provision at Council Owned Sites
- Provision at future mobility hubs such as train stations.

Connected and Autonomous Vehicles (CAV)

Connected and autonomous vehicles (CAVs) combine connectivity and automated technologies to assist or replace humans in the task of driving. This can be through a combination of advanced sensor technology; on-board and remote processing capabilities; GPS and telecommunications systems. Derbyshire will provide the infrastructure and communications systems to ensure that the vehicles are aware of relevant information to ensure a smooth journey. This will reduce delay and improve air quality.

Green Light Optimised Speed Advisory (GLOSA)

GLOSA is an internal vehicle system that receives information from upcoming traffic signals via Vehicle to anything (V2X) communication channels. The system will then advise the driver of a speed recommendation that, if adopted by the driver, would ensure the vehicle would not need to stop at the traffic signals and could instead proceed on a green light improving journey

time. Derbyshire are ensuring that any installed ITS communication systems can function on the proposed V2X communication protocols.

Real-Time Strategic Air Quality Monitoring

Analysing real-time strategic data allows us to create an emissions profile within an area of the network. This data can be used to highlight areas with low air quality. This data can be provided to the responsible authorities to enable efficient use of limited resources to address the problem. Derbyshire aim to link this data to roadside air quality sensors and weather stations to improve data accuracy.

Smart Temporary Traffic Signals

This will allow temporary traffic signals to connect to the Urban Traffic Control System to enable coordinated urban traffic management and control.

Smart Temporary Traffic Management

This uses smart technology to enable roadworks furniture such as cones, signage and permit boards to link and report location and safety infringements. This would improve safety for workers on the highway and enable real-time reporting of works on site.

Initiatives external to Derbyshire County Council

The work that Derbyshire are proposing to ensure a Connected Future will also be complimented by several projects run at more local levels. Details of some of these projects are below:

Travelling Light – Hope Valley Climate Action

The Hope Valley are delivering a sustainable travel pilot which will aim to decarbonise rural travel and improve the experience of rural travel. It hopes to combat climate change through encouraging sustainable travel and reducing vehicles powered by fossil fuels. The project has been awarded £120,000 from the Department for Transport which will fund the initial year of the project. Further information can be found on the following website: [Travelling Light - Hope Valley Climate Action](#).

Buxton on The Move

Buxton Town Team are currently carrying out a consultation to look at options within the area to improve accessibility to transport and encourage sustainable travel. Further information can be found on the following website: [Buxton Town Team | Projects | Buxton on the Move](#).

Revitalising the Heart of Chesterfield

Chesterfield Borough Council are leading on this project to revitalise the market place. Specific aspects of this project include improving the quality of lighting to support climate change, improving digital connectivity and improving the environment for pedestrians and cyclist. Further information can be found on the following website: [Revitalising the Heart of Chesterfield - Destination Chesterfield | Destination Chesterfield](#).

Brimington Air Quality Action Plan

Chesterfield Borough Council have initiated this plan to tackle air pollution in Brimington. The plan includes, but is not limited to, encouraging sustainable travel, relocating traffic, low emission vehicles and engineered solutions to areas of concerns. Further information can be found on the following website: [Air Quality Management Area \(Brimington\) \(chesterfield.gov.uk\)](http://chesterfield.gov.uk/Air_Quality_Management_Area_(Brimington)).

Tideswell & District Environmental Group – Time is of the Essence

This group are encouraging sustainable transport through more cycling as well as setting up the Climate Pathfinders Youth Forum (CPYF) to encourage younger generations to drive climate change action. Further information can be found on the following website: [Tideswell & District Environment Group – Time is of the essence \(tdeg.org.uk\)](http://tdeg.org.uk/Tideswell_District_Environment_Group_-_Time_is_of_the_essence).