

Cardiff Intelligent Transport Systems Strategy

Putting sustainable journeys
into people's hands



**Trawsnewid
Trafnidiaeth
Caerdydd**

**Cardiff
Evolving
Transport**





Introduction

Today, having effective Intelligent Transport Systems (ITS) to manage increasing transport network demand is as important as the physical infrastructure because we cannot expand that anymore.

Cardiff's transport infrastructure underpins our thriving economy. This infrastructure no longer simply consists of having good road and rail links. Modern cities, such as Bristol, Manchester, Nottingham and Coventry recognise that ITS is the essential glue that stimulates behavioural change in favour of more sustainable transport choices. These deliver social, environmental and economic benefits.

The case for our ITS Strategy is built on the need to deliver on our One Planet objectives. The Strategy will enable us to make the most effective use of our physical transport network by harnessing technology to encourage people to cycle and walk more and use buses in place of cars. This will deliver congestion reduction, air quality improvement and health benefits.

Delivery of the ITS Strategy will be based on evolution not revolution. It will make better use

of our existing ITS systems through improved orchestration, upgrade and replacement and partnering with external organisations. This will underpin key measures, including integrated enforcement of parking, speeding and access control. A further key catalyst for the need to bring this strategy forward is the imminent opening of the new city centre Transport Interchange (Bus Station) in 2023. This will dramatically enhance the public transport infrastructure in the City as a whole. However, to take full advantage of this new facility we need to ensure that the wider network and public transport integration is effective and aligned with this technology and data-driven approach. Work on improving our transport network is continuous. The ITS Strategy will involve a phased delivery to 2030. The phasing will complement currently on-going work-streams including:

- Provision of real-time information at bus stops and bus station integration
- Smart Corridor pilots
- Control Room system upgrades
- Enhanced enforcement activities utilising smart technologies
- Working in partnership with Welsh Government and TfW to deliver integrated ticketing and Mobility-as-a-Service (Fflecsi passenger transport service, open data and phone apps)

The Strategy will ensure that our City has properly integrated digital infrastructure to support smart mobility systems during the next 10 years and beyond.

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The Strategy will enable us to make the most effective use of our physical transport network.
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ITS puts sustainable transport decisions directly into people's hands



Intelligent Transport Systems (ITS) bring together transport users, infrastructure, and service providers into a single smart system that makes journeys cheaper, more convenient, faster and greener.

Increasingly ITS is the bedrock of mass public transport systems throughout the world's major cities to provide an integrated, safe, efficient and sustainable transport system.

ITS uses an array of technologies together with real-time data from numerous sources to:

- Give car, bus, cycle and train users up-to-date, fingertip responsive transport information, costs and ticketing to help them make timely decisions on their travel plans
- Enable bus and train operators to run the most effective and low-cost, low carbon services
- Collect and process accurate real time information on network performance and condition.
- Enable analysis from which to learn, inform and improve future performance.

“Our ITS Strategy provides a framework for delivering safe, efficient transport.
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Whilst Cardiff was a leading player in the early adoption and deployment of ITS, in recent years many of these systems have become increasingly outdated, inefficient and costly to maintain.

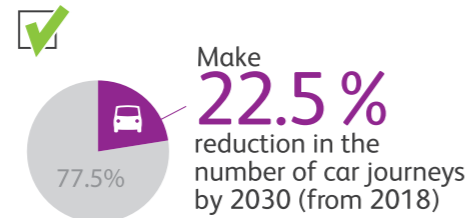
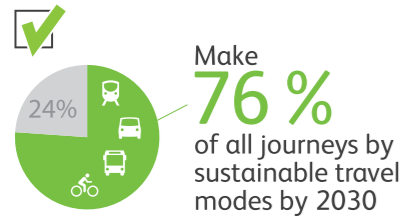
Without modern ITS, Cardiff will be poorly placed to meet our stated transport policy objectives and compete with other cities on the leading edge of transport.

Our ITS Strategy provides a framework for delivering a safe, efficient transport network. Projects delivered under the framework will help save time, money and lives and enable Cardiff to deliver on our key transport policy objectives, which are to:

- Make sustainable transport more attractive
- Tackle climate change
- Reduce congestion
- Improve air quality
- Improve public transport

Our city is growing. To tackle climate change together we need to:

General targets for sustainable journeys in Cardiff



Emissions from transport are one of the biggest contributors to climate change. To tackle climate change and reduce Cardiff's carbon emissions, we all need to take action to make our travel behaviour more sustainable.

	2010	TODAY	2025	2030
Walking + Cycling	26% (7% cycle, 19% walk)	31% (13% cycle, 18% walk)	37% (19% cycle, 18% walk)	43% (26% cycle, 17% walk)
Bus, rail and tram	16%	19%	27%	33%
Car	57%	49%	37%	24%
Total:	100%	100%	100%	100%

Targets for travel to work journeys by Cardiff residents

Source for the above infographics: Cardiff's Transport White Paper: Transport Vision to 2030. Published in 2019.



ITS helps us deliver sustainable transport challenges



Intelligent Transport Systems are key to us overcoming many challenges to deliver our transport vision.

Climate Emergency

Cardiff has made a commitment to make Cardiff a Carbon Neutral City by 2030¹. The transport sector is one of the largest contributors to carbon emissions in Wales, so radical action is required to lower emissions and tackle climate change.

Role of ITS: Presenting journey makers with better information, underpinned by ITS, about the various costs, including emission costs, and times taken across different transport modes empowers people to make informed journey choices that encourage a positive shift to more sustainable transport modes.

¹ <https://www.oneplanetcardiff.co.uk/>

Clean air

In 2020, Public Health Wales estimated that the equivalent of over 220 deaths each year, among people aged 30 and over, could be attributed to Nitrogen dioxide (NO₂) pollution in the Cardiff and Vale Health Board area.² Whilst policies have improved air quality in recent years, it still remains a significant threat.

Role of ITS: Pollution sensors and other roadside monitoring technologies will allow us to identify signs of high pollution levels and react by implementing traffic plans or changing intelligent signalling automatically. Targeting areas with poor air quality can work alongside reducing congestion to improve the affordability, and availability of sustainable transport, resulting in a more inclusive city.

² <https://www.cardiff.gov.uk/ENG/resident/Parking-roads-and-travel/clean-air-cardiff/Pages/default.aspx>





Creating safe, child-friendly and healthy communities

In 2019 there were 565 casualties that arose as a result of road accidents in the Cardiff area out of 5,808 in Wales³. Whilst the long-term trend shows a reduction in the number casualties, there is still room for improvement. We also need to make the transport network as safe as possible for children, particularly around schools where we can provide tools to help enforce school zones to reduce traffic risks and improve air quality.

Role of ITS: Increased use of real time data can make our streets and neighbourhoods safer by making existing measures more responsive. These include improved orchestration and integration of automated speed enforcement, speed and red-light cameras, control systems and incident warning.

³ Gov Wales Police recorded road accidents: 2019
<https://gov.wales/police-recorded-road-accidents-2019.html>



A City for Everyone

Travelling around our City is not always as easy as it should be. There are issues with affordability, accessibility and availability of transport which cause inequalities.

Role of ITS: Increased use of data and new technologies, like Mobility as a Service (MaaS), will help people with greater mobility needs move around Cardiff by giving them a platform to plan and pay for journeys. ITS data will help the Council and transport providers to understand user needs better and provide the ability to match supply with demand, to create more frequent, better integrated, lower cost services.





Managing a growing city

We need to get our transport network right to handle future population and visitor demand as detailed in Cardiff's Local Development Plan.

Role of ITS: Enables better integration across all modes of transport, including the South Wales Metro. New emerging technologies such as Mobility as a Service (MaaS) have the potential to allow us to travel anywhere with a single click on a smart device, using a single payment method, through a single solution.

Tackling congestion and supporting business

Congestion costs money and consumes a significant amount of people's time.

Role of ITS: Reduces congestion in the City by providing Urban Traffic Control (UTC) operators with CCTV images and some of the necessary data to monitor traffic flows and implement intervention strategies. ITS will make the transport

network efficient, raise productivity and make travel easier. This will create innovative commercial opportunities that will bring both economic and social benefits.

Public transport

Faster and easier journeys to local jobs, amenities and the city centre are fundamental success factors for a smart city. People need to travel and yet their journeys are not always possible using one single mode of public transport.

Role of ITS: Real time passenger information (RTPI) and new services such as Mobility as a Service (MaaS) which are being pursued by Transport for Wales offer a solution to these problems by providing real time information and the ability to travel anywhere via a single click, using a single payment method, through a single solution.



Objectives

Cardiff and the CCR (Cardiff Capital Region) requires a convenient, cost effective, fast and low carbon mass transit system enabled by ITS. The key objectives of the Strategy are:

- 1 Ensuring sustainable transport is the most rapid, convenient cost-effective option for users and operators delivering the transport 10-year vision
- 2 Tackle congestion and support business
- 3 Fully address the Climate Emergency and Air Quality Agenda and deliver a low carbon network





Four themed ITS activities between 2022-30

Bringing together the scoping work that has been undertaken, as well as referencing UK best practice, the ITS Strategy proposes the following four stand-alone delivery themes:

THEME 1: GROUNDWORK: Establish effective infrastructure for improved network management

Delivers a multifunctional, collaborative, intelligence-led service and transforms this facility into a transport monitoring and management hub.

THEME 2: ENGAGING THE PUBLIC AND USERS: Implement City-wide transport communication and boost public transport and active travel with ITS

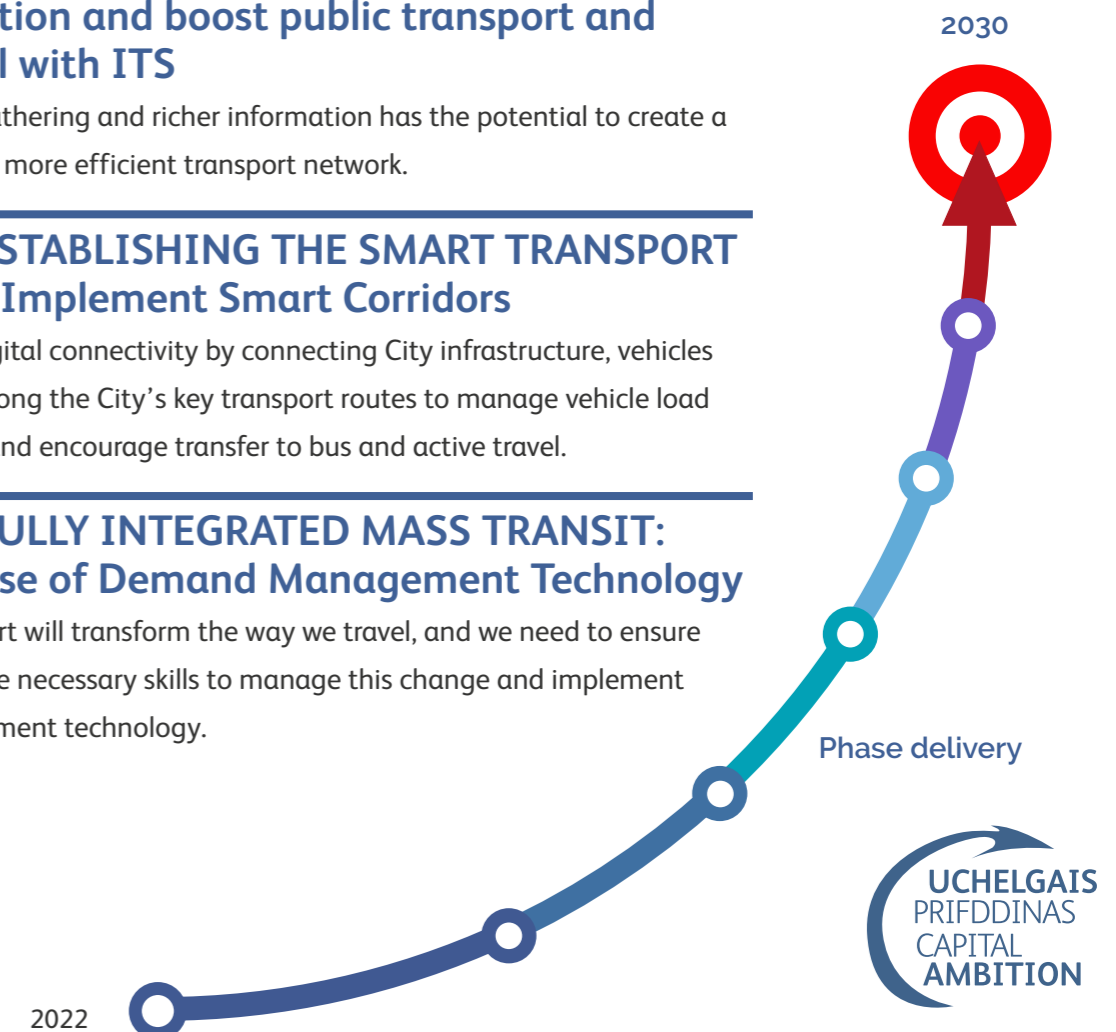
Improved data gathering and richer information has the potential to create a cleaner, safer and more efficient transport network.

THEME 3: ESTABLISHING THE SMART TRANSPORT NETWORK: Implement Smart Corridors

Delivers better digital connectivity by connecting City infrastructure, vehicles and individuals along the City's key transport routes to manage vehicle load more effectively and encourage transfer to bus and active travel.

THEME 4: FULLY INTEGRATED MASS TRANSIT: Enhanced use of Demand Management Technology

Digitising transport will transform the way we travel, and we need to ensure that Wales has the necessary skills to manage this change and implement demand management technology.



Theme 1

GROUNDWORK: Establish an Effective Infrastructure for improved management of the network

Adding ITS intelligence to the new Urban Traffic Control (UTC) Room will deliver a multifunctional, collaborative, intelligence-led service.

Current Control Room

The current Control Room monitors the City's transport network. For the past 20 years it has worked in a successful collaboration with South Wales Police, using its City-wide public safety cameras to prevent crime and protect the public. The Centre uses its current ITS technologies and CCTV cameras to manage the transport network, dealing with traffic disruption, road incidents, congestion, adverse weather or planned events.

The future Control Room will provide a full view of our transport network

What is needed now is a newly equipped and better connected Control Room fit for a future transport network. These measures will ensure that the Centre can support the City's new developments and sustainable transport objectives. It will:

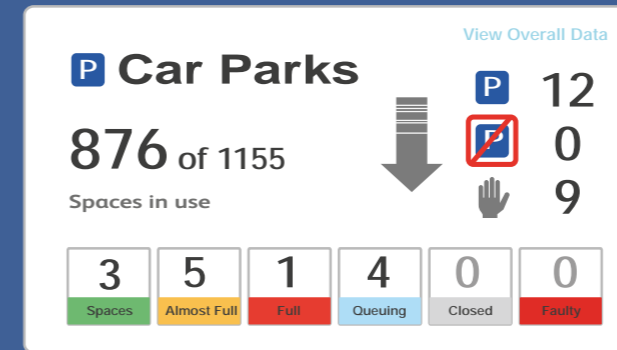
- Enable agencies to collaborate in a multifunctional unit, sharing knowledge and technical developments.
- Keep Cardiff abreast of ITS changes.
- Become a focal point where Welsh transport



authorities learn and develop their ITS skills.

- Support security and public transport services to help them to co-ordinate the City's multimodal transport network and effectively manage public safety.
- Facilitate better city-wide management, allowing co-ordinated, managed responses to traffic and security incidents in the City and improve traffic and crowd management.
- Present a holistic view of the city, watching events and disruption as it unfolds, whilst having the necessary data to support decisions and enable rapid responses to traffic and transport related incidents.

Bringing together smart city activities; traffic management; emergency services and public transport agencies, the Control Room will help to raise standards and make the Capital a safer place to in which to work, visit and live.



Key actions

- Prepare a business case for a new UTC Control Room that will clearly define the costed programme to deliver the future UTC control room and wider smart network
- Roll out programme of upgrades to ITS Infrastructure and systems including the control room, signage, traffic signals, enforcement, parking and CCTV
- Establish working relationships and explore co-location opportunities with partner transport operators to better coordinate network operations, including event and incident management

Theme 2

ENGAGING THE PUBLIC AND USERS: Implement City-wide transport communication and boost public transport and active travel with ITS

Engaging the wider public and transport users will be critical to developing the new smart system.

Improved communication and information gathering and sharing will allow us to make better operational and planning decisions for buses, trains, cycling, vehicle routes, parking, and interchanges as well as fare tariffs.

City-wide travel communication and Active Travel

ITS is based on collecting data and processing it (either manually, semi-automatically or in a completely automated fashion) and then applying the insights it generates for the benefit of pedestrians, commuters, motorists and other users of the transport network. For instance, an upgrade of systems that analyse current bus locations in comparison to their route timetables would improve countdown displays at bus stops to inform customers if their bus will arrive early, on time or late.

The use of data underpins this strategy and is a fundamental success factor for a smart multi modal transport system.



Key actions

- Develop a transport user (car/bus/cycle) app/website to better inform travel making decisions
- Improve transport provider access to user feedback and customer relations to engage with transport users to better inform sustainable travel interventions
- Use geographical and real-time data to understand the journey experience of users and where improvements are needed
- Explore opportunities to incentivise sustainable travel



Theme 3

ESTABLISHING THE SMART TRANSPORT NETWORK: Implement Smart Corridors

Better digital connectivity: Connecting city infrastructure, vehicles and individuals

It is fair to say that technology has revolutionised the transport sector and presents an exciting opportunity to address a wide range of social, environmental and economic issues. In order for Cardiff to maximise the potential of these transport opportunities, it needs to modernise its communications to support the plethora of ITS technologies that are available.

Cardiff has built its current ITS over many years of incremental deployments. Whilst these technologies have a reasonable lifespan, we know that some of this equipment is at the end of its working life, is unsupported or has been superseded by newer technology. This makes managing and maintaining these technologies difficult and expensive and they often do not give us the functionality we need to operate the City's transport network effectively. However, as part of our "evolution not revolution" approach we will only update infrastructure as and when it is required.

ITS offers systems to address the City's many communication needs. These rely on fibre optic and wireless technologies. Cardiff currently owns a comprehensive network of private fibre which spans the City. This fibre cabling is dedicated to serving devices on the transport network. It is envisaged that this will be utilised where possible.

In the absence of private fibre connectivity, we will look to utilise mobile and fibre communications from commercial telecommunication providers.

If Cardiff wishes to have a 21st century transport system that sustains the economic competitiveness of the Cardiff Capital Region then it needs a future-proofed, flexible and resilient network that has the ability to allow communications between traffic, the environment and its users.

The first, A470 Phase, of the SMART Corridor Programme will be procured and deployed as a 'Living Lab' to establish a blueprint that can be rolled out as a City-wide, SMART Corridor Programme in discrete work packages. SMART Corridors will also integrate with and adopt the methodology developed through the deployment of the Pop-up Cycleways in the City centre. The objective is to deploy ITS technology that enhances the ability to Monitor, Control and Inform on each Corridor.



Key actions

- Identify ITS improvement opportunities to provide safer, more efficient journeys for walking, cycling and public transport
- Work with the Welsh Government and regional partners to improve the management of cross-boundary movements
- Develop and deliver a programme of network improvements that better utilises information technology to improve performance (e.g. prompt traffic signal response for pedestrians and cyclists, detectors for measuring queuing and journey times to inform drivers and improve network efficiency)



Theme 4

FULLY INTEGRATED MASS TRANSIT: Enhanced use of Demand Management Technology

Further digitising transport will transform the way we travel. To take full advantage of this we need to ensure that Cardiff has the necessary skills to manage this change.

Making future transport more intelligent, sustainable and efficient creates a range of opportunities to acquire new skills that will boost economic growth. This will be a collaborative environment which focuses on the current and future skills required to support the City's green recovery through a focus on sustainable transport modes aligned to the City's key transport objectives.

Smart Parking

Smart Parking solutions, such as Park Cardiff, take the hassle out of parking by providing drivers with a single solution to locate, select and provide directions to a parking spot and pay for it. This system was installed in 2017 to help reduce the time taken by drivers to locate available parking slots using historical data. The ITS Strategy will build on this existing capability to enhance its scope and capability.

Data integration

Cardiff's ITS infrastructure has grown incrementally during the last 20 years. The systems that have been added do not exchange data with each other. This inhibits information flow and limits fluent network operation and orchestration. The ITS Strategy's integration of systems will allow for the better co-ordination of business activities, better communication and a more proactive transport system. This system will be anchored to a common 'data pool'. It will be capable of identifying problems before these impact the network and make it easier to analyse transport datasets.

Open data

Making data open has the potential to improve travel, create a more efficient transport network, support innovation and create jobs. We envisage that ITS data could be made openly available to inspire the creation of new transport products, apps and services for the people of Cardiff, thus acting as a catalyst for innovation. This will bring social and economic benefits to the City and the wider Region, whilst ensuring that data is stored securely and that commercial interests and privacy are maintained.

Data Analytics

We will maintain a continuous supply of new data and ensure it is reliable. This will require adequate resources and analytical skills. These are in limited supply across the Council, so will need to be sought. These skills will be pivotal to the success of operating a modern multi-modal transport network. Improving analysis of the network in real time will flow through to putting targeted information in users' hands that will enable them to move around the City in a safer, more efficient and sustainable way.

To improve decision making we will facilitate decisions using visualisation tools. These allow one to communicate data with images. This makes it easier to spot trends and patterns. Importantly, increased system automation and increased data visualisation will help Control Room staff to take a data-driven, proactive approach to network management.

Key actions

- Work in partnership with the Welsh Government and Transport for Wales to deliver integrated ticketing
- Explore opportunities to use existing and emerging demand management systems and technology to support an integrated mass transit network
- Expand Smart Parking to provide a fully integrated solution for efficient parking
- Explore Opportunities for Mobility as a Service (MAAS)



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