



Tees Valley Urban Traffic Management and Control (UTMC) System

Executive Summary

This document summarises the business case being developed for the proposed Tees Valley Urban Traffic Management and Control (UTMC) system.

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PROJECT SPONSOR DETAILS

Lead Organisation:	Tees Valley Combined Authority
Registered Address:	Cavendish House, Teesdale Business Park, Stockton-on-Tees, TS17 6QY
Type of Organisation:	Combined Authority
Date of Formation:	April 2016
Company Registration Number:	N/A
VAT Registration Number:	N/A
Are you part of a group of companies?	TVCA Group
If so, who is the parent company?	TVCA
Lead Sponsor: name	Tom Bryant
Lead Sponsor: position in organisation	Head of Transport

PUBLICITY STATEMENT

Tees Valley Combined Authority (TVCA) has ambitions to improve the way people and products are moved around the area, so that journeys are reliable, the transport network is resilient, and air quality is improved.

TVCA is committed to delivering a transport-system fit for the future, so that everyone can participate in and benefit from the plans for growth. The current way that Tees Valley's transport system is organised could be improved.

There are several authorities and organisations involved in providing transport services, which could be better connected to each other, in order to improve provision and information for the travelling public.

The Tees Valley Strategic Transport Plan sets out ambitions for the transport network to be more integrated in how it is organised, managed and operated so that it is easier for everyone to plan their journeys and use the network for whatever they need, whenever they need.

This project seeks to upgrade the Tees Valley Urban Traffic Management and Control (UTMC) system. UTMC systems are designed to allow the different applications used within modern traffic management systems to communicate and share information with each other. This allows previously disparate data from multiple sources such as Variable Message Signs (VMS), car parks, traffic signals, air quality monitoring stations and meteorological data, to be amalgamated into a central console or database. The idea behind UTMC is to maximise road network potential to create a more robust and intelligent system that can be used to meet current and future management requirements.

The plan is to invest to enhance the capability of the system. This will provide a richer data set to enable the more integrated management of the network and the provision of better transport information across the Tees Valley for all modes of transport. This will give residents, workers and visitors in Tees Valley up-to-date information on their travel choices.

The aspiration is to enable better co-ordination in future between the various organisations involved in the planning, operation and maintenance of the transport network, to improve air quality, journey reliability and network resilience across Tees Valley.

EXECUTIVE SUMMARY	
TVCA Ref:	ITP0002
Programme Name:	Tees Valley Urban Traffic Management Control
Location: (delete as appropriate)	Tees Valley wide
Total Programme Cost and Duration:	<p>Estimated Whole Programme: up to £3,500,000 (subject to the development of a further business case and due diligence for future phases based upon the demonstration of improvements delivered in phases 1 and 2) Estimated Duration for Delivery: to 2025</p> <p>This summary particularly relates to the delivery of phases 1 and 2.</p> <p>Phases 1 and 2 Cost: up to £1,000,000 Estimated Duration for Delivery: to March 2022</p>
TVCA funding requested: £	Phases 1 and 2: up to £1,000,000 Integrated Transport Programme
Future funding sources: £ tbc	Future devolved funding sources Other funding sources attracted / mandated

DESCRIPTION

The vision for the Tees Valley Strategic Transport Plan is: *“to provide a high quality, quick, affordable, reliable, low carbon and safe transport network for people and freight to move within, to and from Tees Valley”*.

However, there is an aspiration in the Strategic Transport Plan for the transport system to be more integrated in how it is planned, managed and operated so that it is easier for everyone to plan their journeys and use the transport network for whatever they need, whenever they need. Key to realising this vision and aspiration is to utilise technology to plan, manage and operate the transport system in a much more co-ordinated way, in short to develop a fit for purpose Urban Traffic Management Control (UTMC) programme.

UTMC systems are designed to allow the different applications used within modern traffic management systems to communicate and share information with each other. This allows previously disparate data from multiple sources such as Variable Message Signs (VMS), car parks, traffic signals, air quality monitoring stations and meteorological data, to be amalgamated into a central console or database. The idea behind UTMC is to maximise road network potential to create a more robust and intelligent system that can be used to meet current and future management requirements.

As part of the Integrated Transport Programme allocation, Tees Valley Combined Authority (TVCA) has already allocated £0.5 million to upgrade the existing UTMC system, which is operated and maintained by Middlesbrough Council under the lead authority arrangements.

The agreed Integrated Transport Programme and Tees Valley Investment Plan identified the opportunity to enhance the UTMC system over the coming years to help deliver the outcomes set out in the Strategic Transport Plan (STP). Key outcomes within the STP that the new UTMC system could contribute to include: improved air quality, journey reliability and network resilience.

The basic UTMC system is now operational and enables current activities to be continued, such as:

- Traffic signal optimisation.
- Variable message sign operation.
- Car park integration; and
- Traffic and data gathering.

The new system will also allow remote network visualisation for each local authority to assist with network management and provide better ability to predict future transport needs.

What is this project, what will it do?

The project aims to do the following:

- Phase 1A to purchase and set up a new UTMC system;
- Phase 1B to ensure as much of the existing compatible on-street equipment, such as Variable Message Signs (VMS), traffic counters, traffic signals, etc. across the Tees Valley is linked to the new UTMC system; and
- Phase 2 should include the procurement of key additional on-street equipment, such as connecting additional traffic counters and traffic lights to the system, to improve data provision and enable the data to be used as a means of delivering improved traffic management through collaboration with other organisations as a “proof of concept.” An example of this would be the use of the UTMC system to take a pro-active approach to the reprioritisation of traffic flows at traffic lights resulting from, for example, football match day traffic, or a reactive approach in response to an incident which affects normal traffic flows at particular key junctions.

After this, it is planned that phase 3 of the programme will build upon the proof of concept delivered by this scheme. These will be subject to a separate business case and will comprise a series of ‘pilot’ applications clearly outlining the issues and how the UTMC system is to be used to provide a digital solution. It is expected that this will be delivered in 2022/23 and evaluated over subsequent years.

The principal elements of Phases 1 and 2 include:

- New UTMC system and central data repository (£500k advanced funding) – this is the capital equipment purchase and set up costs for the system which provides the backbone of the project;
- UTMC interfaces for existing/defunct vehicle/car park/cycle/pedestrian counters (Estimated cost of £270k) – this enables the current disparate data and systems to be integrated into the new system;
- Interface with Highways England (Estimated cost of £30k) – this enables arrangements to be put in place with Highways England to allow a more co-ordinated and real time management of the road network.
- New Journey Times Routes, plus additional existing data (Estimated cost of £80k) – this enables the collection of real time data on travel times and therefore a better understanding of how the network is operating, to help provide real time travel information in disseminate format;
- Licences for weather data, linked to air quality monitors (Estimated cost of £20k) – this will enable the collection of data on external influences on traffic flow and the local community, to help understand variance in longer term traffic flows;
- Enhancement of the Connect Tees Valley portal, (Estimated cost of £40k) – this will provide public accesses to summarised data to make better travel choices; and
- Connection of isolated traffic signals. (Estimated cost of £60k) – this will enable real time monitoring of traffic signals and ability to revise signal timings and traffic management remotely.

These estimates will be refined through further project development work, prior to preparation of the Full Business Case.

Within Tees Valley there is the Strategic Road Network (SRN) and the local road network. The SRN is the responsibility of Highways England and in Tees Valley comprises: the A1(M), A19, A66 (west to the A19) and, the A174 Parkway (including the A1053). The local road network is all other roads in Tees Valley and is the responsibility of the 5 Tees Valley local authorities in their capacity as local highway authorities.

As set out above, phase 2 of this project includes funding for an interface between the Tees Valley UTMC system and Highways England, which will allow the UTMC system to send/receive data. This flow of data will form the basis of a Collaborative Traffic Management Agreement between TVCA / the 5 Local Highway Authorities and Highways England that will allow a more co-ordinated management of the Strategic Road Network (SRN) and the local road network.

Establishing enhanced operational links with Highways England will enable pre-agreed traffic management plans to be prepared and subsequently implemented. This will mean that when issues arise on the SRN and/or local road networks there can be a co-ordinated response through the use of information messages and on-street equipment such as variable message signs (VMS), as well as the Connect Tees Valley portal.

This generally provides reliability benefits across the whole network, but principally when there are incidents or significant variations in demand that can lead to excessive congestion.

Implementing Phases 1 and 2 of the Tees Valley UTMC Development Project will help achieve improved air quality, journey reliability and network resilience through the provision of better transport information across the Tees Valley, giving residents, workers and visitors up-to-date information on their travel choices, and better co-ordination between the various organisations involved in the planning, operation and maintenance of the transport system.

Estimates of the likely reduction in delays and the reduced congestion that can be achieved are being benchmarked against similar systems and networks elsewhere in the UK. This will also allow an initial estimate of the air quality benefits to be undertaken. There will also be significant qualitative benefits for a range of users, including:

- Accurate data on the usage of the transport system, helping to support future funding bids, particularly for active travel measures, where baseline data on pedestrians and cyclists has been limited in the past;
- Increased business competitiveness, particularly in the logistics sector, whose knowledge and information of network conditions will be increased, allowing them to adjust timings and schedules for the benefit of themselves and their customers; and
- More vibrant local centres, with less rat running traffic following incidents on the SRN.

As set out above, this is a capital project, the scope of which is the upgrade to the UTMC system and to associated equipment and connections to provide the identified data feeds. Currently, the local highway authorities' pay a sum to Middlesbrough Council (as the lead authority for this work) for the operational revenue costs and this arrangement is expected to continue alongside this additional capital investment.

Why this project is needed? What is the problem we need to solve? (Rationale for intervention)

There is a clear disconnect between how the Tees Valley's transport system is planned, operated and maintained and how it is perceived and used by the travelling public. For example, responsibility for the road network is split between Highways England and the five local highway authorities. Private bus companies operate the bus networks and the rail infrastructure is the responsibility of Network Rail, whilst, train operating companies run the train services.

Each of these organisations also collect their own data in terms of network usage and incidents, meaning that they often react in isolation rather than for the benefit of the system as a whole.

This also means that there is limited opportunity for anyone to gain a holistic view of how the system is operating, either now or in the future.

The current situation has significant disadvantages and negative impacts, including:

- Incidents on the SRN, operated by Highways England, can often cause significant congestion on the local road network as traffic diverts away from the incident. This can overload the local road network, causing additional congestion in local centres, delaying buses and creating poor air quality.
- Passengers can often be stranded at rail stations because of an incident on the local rail network and unable to understand what alternatives are available to complete their journey.
- Businesses that depend on reliable transport connections to bring in or ship out their goods can suffer delay and additional costs as a result of unplanned incidents and congestion that they are required to react to, often at short notice. Leading to businesses having to keep higher stock to avoid supply outages, which has increased their costs.
- Limited car parking information in some of our local centres means that traffic can be circulating, looking for a space, at busy times, creating unnecessary movements and adding to local air pollution.
- Different organisations independently collecting data on how their own network is operating, without combining or sharing data, often makes it difficult to have robust background information against which to develop future infrastructure schemes.
- The need to ensure that travel information for all modes of transport is available in one place, live and readily accessible across all channels.

Market Failures:

- **Demonstration effect:** The pilot stage will be used to test the robustness of the infrastructure and demonstrate new methods of data analysis, interpretation and subsequent utilisation. New functionalities will encourage novel potential solutions to previously unidentified issues. The project is in essence addressing a missing market situation.
- **Coordination effect:** The project needs universal buy in from all partners, as any geographic gaps in coverage will seriously jeopardise the validity of the findings; and
- **Funding Gap:** The project is addressing an unspecified need (missing market) and given that it needs heavy upfront investment, there would be little commercial appetite at this early stage for such a speculative activity. However, the project does have the ability to identify mechanisms for ensuring post funding sustainability.

How much support are we giving and who is it for? (Scale and scope of intervention; assessment of support needed)

The geographic scope of the project is all major roads across the entire Tees Valley region. The failure to capture at least this geography would significantly weaken the validity of the analysis. In addition, the technology being utilised must be capable of augmenting existing provision, but sufficiently adaptable to be able to address emerging needs (5G applications).

The project at the very least must be accessible to all transport planners operating in the public sector in Tees Valley.

How does this project fit alongside other projects? (Complementarity, Displacement)

The project is a major component in the planning and evidence base for the Strategic Transport Plan and Integrated Transport Programme.

The project will also enhance, through the provision of valuable data analysis, the development of a number of place and area regeneration projects across the region. Finally, the project must augment the roll out of 5G across the region and provide a testbed for the applications of new ways of working.

As the project is in essence a public good, there is limited displacement with existing provision, however private sector data sources should be considered.

What must be achieved by the project? (Critical Success Factors & KPI Measures)

Avoidance of obsolescence/ Application of New Technology	<ul style="list-style-type: none"> Enhanced economic life for the technology; and Adaptable technology/knowledge transfer.
Production of evidence for enhanced transport planning	<ul style="list-style-type: none"> Reduced need for external consultancy support; More efficient data collection reducing need for manual surveys; and More successful funding bids to Government.
Better utilisation of road network	<ul style="list-style-type: none"> Less congestion; and Reduced delays for all vehicles on local road networks following an incident.
Reduction in the dis-benefits of road use to Tees Valley residents and businesses.	<ul style="list-style-type: none"> Improved air quality; More vibrant town centres with increased footfall; and Increased business competitiveness.

How is the project restricted? (Constraints)

UTMC Framework Technical Specification	<ul style="list-style-type: none"> TS003 presents the core technical standards recommended for use by Traffic Managers in their systems The UTMC Objects Registry TS004 presents a standardised set of data structures associated with traffic management, in several forms including UML data model, XML schema, SNMP MIBs, some IDL scripts for CORBA based systems, and tabular representation (originally designed for database designers). <p>All project expenditure must comply with these technical constraints</p>
Critical development path (sufficiency of technology) and future proofing	The project must ensure no break in provision whilst being compatible with existing and emerging technologies.
Usage	Information must only be used in compliance with data governance arrangements.
Geography	The project is limited to the Tees Valley but must provide complete coverage.
Project Duration	The project must be in place prior to the end of the economic life of its predecessor.
Technological change	Uncertainty about the capabilities of recently purchased equipment need to be addressed through testing to identify possible 'new uses - do more do different'. A position further compounded by fast paced technological change in the wider market.

How could we solve the problem? (Preliminary Option Development)

The following options are being considered:

- **Option 1: Status Quo:** Continue to utilise existing technology;

Options 2, 3 and 4, utilise the findings of a feasibility report which recommends a complementary technology path. This merely updates and expands existing provision, without considering more radical/emerging technology solutions:

- **Option 2: undertake Phase 1 only (Complementary Technology Options):** To ensure as much of the existing compatible on street equipment across the Tees Valley is linked to the new UTMC system
- **Option 3: Undertake Phases 1 and 2:** Phase 1 to ensure as much of the existing compatible on-street equipment across the Tees Valley is linked to the new UTMC system and Phase 2 should include the procurement of key additional on-street equipment to improve data provision;
- **Option 4: Undertake Phases 1, 2 and 3:** Phase 1 to ensure as much of the existing compatible on-street equipment across the Tees Valley is linked to the new UTMC system and Phase 2 should include the procurement of key additional on-street equipment to improve data provision. Phase 3 would be to identify 'pilot' applications of the new UTMC system which could be implemented and evaluated.

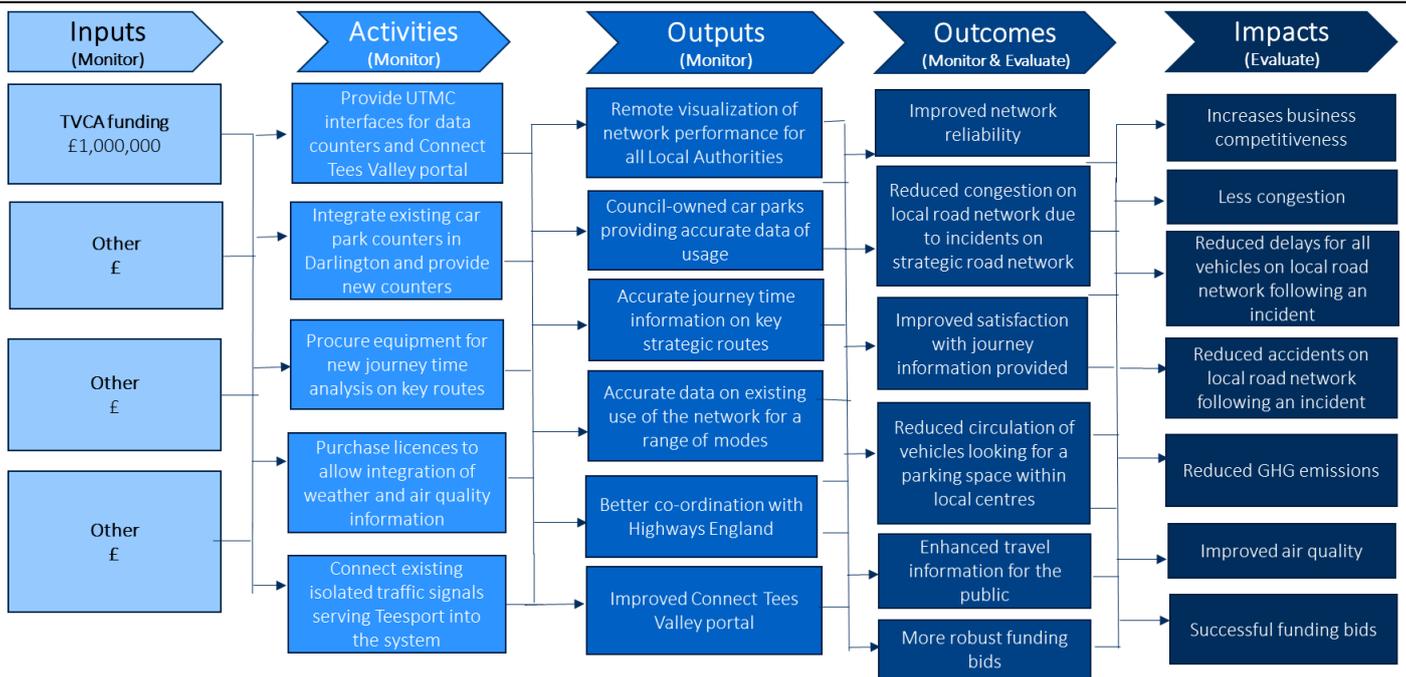
This option has been rejected on the basis that the delivery of Phase 3 would be a greater risk if delivered at the same time as Phase 1 and 2 and without the opportunity to prove the concept and evaluate prior to looking at further pilot applications of the technology.

Do More and Different (yet to be explored):

- **Option 5: Commercial Delivery: of Phases 1 and Phases 2;**
- **Option 6: Public Sector Smart City Approach (Expanding the remit beyond transport);**
- **Option 7: Commercial Public Sector Smart City Approach.**

Option 3 is currently the preferred option at this stage as it allows a Collaborative Traffic Management Agreement with Highways England to be put in place to allow a more co-ordinated approach and real time management of the road network and enables a proof of concept approach to be adopted prior to developing other potential pilot applications for the system.

What will achieve? (Benefits: outputs, outcomes, impacts)



Subsequent development of Full Business Case will further populate Logic Model and monetise benefits.

How will we do this, what risks might we face? (Assessment of Deliverability)

Delivery options are being considered in relation to phases 1 and 2 of the project as identified above, (as other options will not be shortlisted due to technological uncertainty). As this is aligned with the previous investment to upgrade the system, the preferred approach is for Middlesbrough Council to deliver this across Tees Valley under the lead authority arrangements set out above. This is the subject of discussions currently and will be dependent upon sufficient capacity being available and commitments to deliver this in the timely manner expected. If this proves not to be the case consideration could be given to alternative delivery models.

Risks:

- **Procurement Risk:** Failure to get appropriate delivery partners through the procurement exercise;
- **Procurement Risk:** Implementation may be delayed due to the need to procure external delivery support;
- **Procurement Risk:** Lack of in-house technical knowledge to assess the validity of the project offering;
- **Procurement Risk:** Capital costs are in excess of estimates;
- **Subsidy Control:** the project may be counter to emerging state aid guidance;
- **Delivery Risk:** Coordination issues between existing and planned technologies;
- **Delivery Risk:** Inability to access third party sites impacts on coverage;
- **Delivery Risk:** Inability to get consistent partner buy in;
- **Demand Risk:** Inability to monetise benefits;
- **Funding Risk:** Financial sustainability (capital and revenue).

What will happen next? (Consultation and due diligence process)

The project is at Strategic Outline Business Case stage. Preliminary feasibility work has been developed, but a preferred option has not yet been identified. Due diligence will be completed in May 2021, with the publication of the Full Business Case (which will include a costed detailed delivery plan).