Kent County Council
kent.gov.uk

Transport Business Case Report

Kent Strategic Congestion Management Programme

CO04300369/014 Revision 01

March 2016

INVESTORS IN PEOPLE | Gold

INVESTORS IN PEOPLE | Champion

amey

Document Control Sheet

Project Name:	Kent Strategic Congestion Management Programme
Project Number:	CO04300369
Report Title:	Transport Business Case Report
Report Number:	014

Issue Status/Amendment	**Prepared**	**Reviewed**	**Approved**
00	Name: Brian Smith Signature: Date: 23-12-15	Name: Steve Whittaker Signature: Date: 23-12-15	Name: Steve Whittaker Signature: Date: 08-01-16
01 (Gate 1 Comments)	Name: Brian Smith Signature: Date:11-03-16	Name: Gareth Elphick Margaret Nicholls Signature: Date:11-03-16	Name: Jeff Webb Signature: Date:11-03-16
	Name: Signature: Date:	Name: Signature: Date:	Name: Signature: Date:
	Name: Signature: Date:	Name: Signature: Date:	Name: Signature: Date:

Contents

Figures

Tables

1 Introduction

1.1 Overview

1.1.1 Amey has been commissioned by Kent County Council (KCC) to develop proportionate business cases for various South East Local Enterprise Partnership (SELEP) schemes being promoted by Kent to be funded by the South East Growth deal as part of the Government's Local Growth Fund (LGF).

1.2 Kent Strategic Congestion Management Programme (KSCMP)

1.2.1 KCC is entering the second year of its Strategic Congestion Management Programme, a programme of initiatives to be delivered between the financial years 2015/16 and 2020/21.

1.2.2 The initial aim of the programme was to enhance the effectiveness of the existing Highways Management Centre (HMC) through a technology refresh. This activity commenced in the 2015/16 financial year and is ongoing. This HMC is seen as an essential component which supports and strengthens the Council's 'Growth without Gridlock' strategy.

1.2.3 The enhancement of the HMC system will ensure that the mechanisms and protocols exist to promote intelligent choice of travel options from initial occupation. Through a wide range of dissemination tools conveying real-time travel information, intelligent choice will be made available to the wider community.

1.2.4 Data from the enhanced HMC will in turn be used to identify network 'hotspots' and invest in small scale (generally less than £500,000 each) network improvements to improve the transport network in a measurable way against a number of key performance indicators including journey time and journey time reliability, accident rates, air quality and bus punctuality amongst others.

1.2.5 Three such hotspots have been identified and improvements to these will be delivered from the SELEP fund in 2016-17. These are at:

- A229 Loose Road, Maidstone: Armstrong Road and Sheal's Crescent junctions;
- A292 Mace Lane and Wellesley Road junction, Ashford;
- A292 Somerset Road and Canterbury Road junction, Ashford.

1.2.6 In addition to the hotspot schemes, funding from SELEP will be used to provide a contribution to a pan-European project to introduce a connected Intelligent Transport System (C-ITS) corridor from Blackfriars in London to the Port of Dover via the M2 and A2 through Kent.

1.2.7 The total spend from the SELEP fund is anticipated to be £700,000 for the 2016-17 financial year; £300,000 contribution to the C-ITS corridor, £300,000 to improve both Ashford Ring Road junctions and £100,000 to improve the A229 Maidstone junction. These figures are independent of optimism bias, inflation or risk, and are discussed further in Chapter 5 below.

1.2.8 Two 'hotspot' schemes were delivered as part of the 2015-16 round of KSCMP spending. These were the A229 Bluebell Hill and Taddington Roundabout improvements south of Rochester.

1.2.9 Taken as a whole, the KSCMP scheme is a continuation of improvements being made by KCC to maximise the efficiency of the local highway network as traffic levels increase in line with development. Without the investment required to both improve sustainable transport and to mitigate the existing and forecast levels of congestion in Kent, there is concern that the viability of ambitious employment and residential development, required to fulfil the strategic economic growth objectives of the SELEP sub-region, will be hampered.

1.2.10 The implementation of the KSCMP will enable the creation of an estimated 2,000 jobs and 2,300 additional homes for the SELEP region within the six-year course of the scheme, which is consistent with the length of the SELEP Strategic Economic Plan. It will help to provide a transport environment which makes it easier for businesses and employees to travel to, and for work. Around 10% of the planned housing across the SELEP region relies on the KSCMP, which if delivered could provide significant increases in Gross Value Added (GVA) for the region.

1.3 Area Description

1.3.1 KCC and its 12 district councils administer most of the traditional county of Kent, a total of 3,352 km². The Medway Towns Council (MTC) is a unitary authority which administers the more densely populated remainder (192 km²) consisting of the urban agglomeration of Gillingham, Chatham, Rochester and Strood amongst others. Together, KCC and MTC have around 300 town and parish councils.

1.3.2 With regards to transport, Kent is well connected as High Speed 1 operates through the county offering frequent services from Ebbsfleet and Ashford International stations to a range of northern European destinations via the Channel Tunnel. It is home to the country's busiest and most successful ferry port at Dover, which is undergoing a £130 million expansion in 2016/17 to meet growing demand for cross-Channel freight. Kent is a major employment centre with over 56,000 businesses providing around 575,000 jobs.

1.3.3 The two major road corridors in Kent are the M2/A2 route from Dartford to Dover via the Medway Towns and Canterbury, and the M20 from south-east London to Folkestone via Maidstone and Ashford. Other trunk routes in the county include the A249 from Sittingbourne to Sheerness, the A2070/A259 route from Ashford towards Hastings in East Sussex, and the A21 from Sevenoaks also towards Hastings.

1.3.4 Kent also has more motorways by distance than any other county in the UK, totalling 173km. In addition to the M2 and M20 discussed above, part of the M25 runs through Kent, between Westerham and Dartford. The M26 motorway provides a short link between the M25 at Sevenoaks and the M20 near Wrotham.

1.4 Socio-Economic Characteristics of Study Area

1.4.1 The 2011 census indicates that the area administered by KCC has a population of around 1.51 million. The socio-economic characteristics of Kent include the following:

- Of residents aged 16 to 74, 78.6% (almost 720,000 people) are economically active; whilst 5.0% of the workforce is unemployed (compared to 6.0% across England);
- Kent's average household size is 2.34 people per household which compares to 2.4 in England;
- 6.6% of Kent residents aged 16 and over hold no qualifications, below the national average. An above average percentage (13.8%) hold Level 1 qualifications, with higher than average possession of higher levels;
- 20% of households do not own a car. Of those that do, single car ownership is slightly more common in Kent (43%) than across the rest of the nation (42%).

1.5 Background to the KSCMP Business Case

1.5.1 The UK Government's Local Growth White Paper, published in October 2010, set out the roles that local enterprise partnerships (LEPs) can play depending on their local priorities. The Chancellor of the Exchequer announced the first 11 zones in the 2011 Budget. The government has now created 39 LEPs.

1.5.2 Following a report by Lord Heseltine entitled "No Stone Unturned", a new approach to funding local major transport schemes that are to be constructed in England (outside London) during the 2015-2021 period was established. At its heart is a powerful case for decentralising economic powers from central government to local areas and leaders, as those best placed to understand and to address the opportunities and obstacles to growth in their own communities.

1.5.3 On 18 March 2013 the government published its response to the Heseltine review, accepting in full or in part 81 of Lord Heseltine's 89 recommendations. Each of the LEPs was invited to submit a Strategic Economic Plan (SEP) by 31 March 2014, outlining their local priorities to maximise growth.

1.5.4 In July 2014, the government negotiated a Growth Deal with all 39 LEPs, which awarded them a significant proportion of the £12 billion LGF.

1.5.5 The SELEP brings together key leaders from business, local government, further and higher education with the goal of creating the most enterprising economy in England through exploring opportunities for enterprise while addressing barriers to growth. The SELEP area covers greater Essex, Kent and East Sussex; it is the largest strategic enterprise partnership outside of London.

1.5.6 SELEP has secured £442.2 million in funding from the Government to boost economic growth from 2015/16 to 2020/21, with a particular focus on transport schemes that will bring new jobs and homes. This includes £358.2 million for new growth schemes on top of £74 million already committed for large transport projects, of which the Kent and Medway Economic Partnership, the local arm of SELEP, will receive an allocation of £104 million.

1.5.7 The Growth Deal resulted in £84.1 million invested in the SELEP area in the financial year 2015/16, and over the length of the funding deal 35,000 jobs, 18,000 new homes and over £100 million in private investment are expected to be delivered.

1.6 Purpose of this Document

1.6.1 The purpose of this document is to provide an evidence-based Business Case to secure £4.8m from SELEP's LGF allocation to progress the KSCMP.

1.6.2 Guidance for the preparation of Business Cases for Transport Schemes has been published by the Department for Transport (DfT), based on HM Treasury's advice on evidence-based decision making as set out in the "Green Book: Appraisal and Evaluation in Central Government".

1.6.3 This document is a Transport Business Case and as such uses the best practice "five case" model approach. This approach assesses whether schemes:

- Are supported by a robust case for change that fits with wider public policy objectives – the 'strategic case';
- Demonstrate value for money – the 'economic case';
- Are commercially viable – the 'commercial case';
- Are financially affordable – the 'financial case'; and
- Are achievable – the 'management case'.

1.6.4 The evidence gathered as part of the business case preparation process has been prepared using the tools and guidance provided by the DfT, most notably the transport appraisal guidance published in WebTAG. This approach ensures that the evidence produced is robust and consistent.

1.6.5 For the KSCMP it is proposed that a business case is submitted annually detailing only those elements of the scheme due to go forward in the following year. Therefore, a separate business case was published for the 2015/16 spending round and this business case will deal only with those elements of the scheme to be implemented in 2016/17. This is because there are no definitive plans for which measures will be implemented and in which locations beyond 2016/17; these will only become apparent as hotspots are identified and mitigation, feasibility work and prioritisation are undertaken.

1.7 Structure of the Document

1.7.1 This report is structured in accordance with "The Transport Business Cases", the DfT guidance on transport scheme appraisal, as updated in January 2013. Following this introduction, the remainder of the document is structured as follows:

- Chapter 2 provides a description of the scheme design;
- Chapter 3 states the Strategic Case;
- Chapter 4 presents the Economic Case including the Value for Money Statement
- Chapter 5 outlines the Financial Case;
- Chapter 6 details the Commercial Case; and
- Chapter 7 provides the Management Case.

2 KSCMP Detailed Scheme Description

2.1 A2-M2 Connected ITS Corridor

2.1.1 The UK government identified in its Road Investment Strategy in December 2014 a desire to introduce a Connected Intelligent Transport Systems (C-ITS) corridor as a scheme showcasing the possibilities for technology to provide safety improvements and capacity increases on the busiest sections of the trunk road and motorway network.

2.1.2 A pilot corridor from London to Dover was identified for a trial of C-ITS, starting on the A102 at the Blackwall Tunnel in London and continuing via the A2 and M2 to the Port of Dover. This corridor was selected for a number of reasons;

- It represents a varied and challenging environment for an ITS system to manage;
- It is presently a busy and congested route that serves urban areas, ports and multi-modal transfer points;
- It forms part of the comprehensive Trans-European Transport Network (TEN-T);
- It is located in an area with significant deprivation and it is hoped the technology could improve social mobility and provide new employment opportunities;
- It is an area with limited and inconsistent 3G telecommunication data coverage at present, so can showcase the benefits of full connectivity.

2.1.3 The UK government entered a partnership with the relevant highway authorities (Highways England, Transport for London, Greenwich Borough Council, Bexley Borough Council and KCC) to deliver the corridor, and received approval from the European Union (EU) to take the scheme forward. Support was also received from a series of technology stakeholders including Trafficmaster, TomTom, Inrix and members of the Automotive Electronics Systems Innovation Network (AESIN).

2.1.4 The ultimate goal of the C-ITS from the government's perspective is to develop new communication with road users, provide connections in UTMC, inter-urban and eventually pan-European spheres, and provide multi-modal transport solutions for both private users and freight; in this case, with short sea shipping from Dover and rail connections to High Speed 1 at Ebbsfleet International. It is also hoped that the project can deliver better incident management for the emergency services, improved traffic management for KCC, savings for freight operators and benefits to the environment through more efficient use of private cars and freight.

2.1.5 UK motorway infrastructure is presently accompanied by a high-speed National Roads Telecommunication Services (NRTS) system. It is proposed that the NRTS system will be utilised in the networking of new roadside transmitters which will share traffic and commercial data, demonstrating a fully connected network.

2.1.6 As the NRTS system is already in place alongside the M2, the motorway will be the first section of the pilot corridor to be trialled with C-ITS integration. This will represent phase 1 of the project which is expected to be on-line by early 2017. The rest of the corridor will be fitted with the communications technology by the end of 2017. It is anticipated that the first "connected cars" will be operating on the corridor in 2018, with trial cars will be adapted with factory-installed units to manage the data from the C-ITS. The initial operational phase of the system will deliver in-car messages on the following scenarios:

- Warnings of hazardous locations, slow vehicles, traffic jams, road works stationary vehicles and application of emergency braking;
- Proximity detection for emergency vehicles and motorcycles;
- In-vehicle signage;
- Probe vehicle data.

2.1.7 The pilot will also ultimately inform a cost-benefit analysis on the introduction of C-ITS as part of a decision of future investment. It is hoped that a successful pilot will lead to a blueprint for deployment on a wider scale and an open platform for encouraging the development of integrated and interoperable C-ITS.

2.1.8 The total cost of the infrastructure and implementation of the C-ITS will be £20 million, delivered with the support of £300,000 from the KSCMP 2016/17 programme. The trial will remain in place until at least 2021, and the findings of the pilot study will be ultimately disseminated through the EU.

2.2 Hotspot Identification

2.2.1 KCC produced a Congestion Strategy report in December 2013 which uses a combination of established best practices in order to set out plans to centre hotspot mitigation measures on areas of poor journey time reliability, alongside other factors including environmental impacts on the road network. The congestion strategy is an evolving framework aimed at targeting limited resources at the road network to provide the greatest net benefit.

2.2.2 The hotspot identification system uses multi-criteria analysis (MCA), a technique (or collection of techniques) for assessing decisions where the impacts are not expressed in the same units. It involves assigning weights to criteria, and then scoring options in terms of how well they perform against those criteria. The weighted scores are then summed, and these sums can be used to rank options.

2.2.3 MCA techniques can be used to identify a single most preferred option, to rank options, to shortlist a limited number of options for subsequent detailed appraisal, or simply to distinguish acceptable from non-acceptable possibilities.

2.2.4 The following criteria are included in the KCC MCA scoring methodology:

- Traffic volume;
- Journey time reliability;
- Route capacity;
- Strategic importance of the location;
- User perception;
- Crash record ratio;
- Bus route hierarchy;
- Bus punctuality; and
- Air quality.

2.2.5 An example of an MCA scoring table for Maidstone is included in Appendix A.

2.3 Hotspot Mitigation Measures

2.3.1 The hotspot schemes which have already been identified and will be delivered from the fund in 2016/17 are discussed below.

A292 Ashford Ring Road – Canterbury Road and Wellesley Road Junctions

2.3.2 These are two adjacent junctions on the Ashford Ring Road which are at present over capacity. The scheme plan is to realign the approach arms to each and change the signal staging and timing to maximise reserve capacity. The individual changes at each junction are essentially similar:

- Implementation of an indicative green arrow for right-turners from the A292;
- Addition of a flared lane on the side road approach;
- Provision of staggered pedestrian crossing phases.

A229 Loose Road/Armstrong Road Junction, Maidstone

2.3.3 This hotspot scheme aims to alleviate congestion at this urban junction in Maidstone through realignment of the approach arms to the crossroads with Armstrong Road/Park Way and the T-junction at Sheal's Crescent. The improvements made will be:

- Widening the A229 southbound to three lanes on approach to the crossroads;
- Widening Park Way to two lanes on approach to the crossroads;
- Narrowing the A229 northbound after the junction to one lane;
- Realigning the merge at Sheal's Crescent to remove conflict between both directions of the A229;
- Changing the signal staging to allow right turns from the A229 to proceed independently of through movements.

2.3.4 Drawings of the proposed improvements in Maidstone are included in Appendix B and C.

2.4 Complementary Measures

2.4.1 As proof of the commitment of KCC to make Kent a better, more accessible and more sustainable county, the KSCMP scheme is part of a wide ranging set of schemes which have already been delivered, are under construction or are planned in Kent. All of these schemes have the aim of improving accessibility in Kent through providing a safe and reliable sustainable transport network whilst reducing congestion, and enabling economic growth through development and reducing costs of travel for businesses, workers and residents.

3 Strategic Case

3.1 Introduction

3.1.1 This section sets out the 'case for change', by explaining the rationale for making investment and presenting evidence on the strategic policy fit of the proposed scheme. This section also sets out the scheme options under consideration.

3.1.2 The Strategic Case establishes the:

- Context for the business case, outlining the strategic aims and responsibilities of KCC;
- Transport-related problems that have been identified, using evidence to justify intervention and examining the impact of not making the investment;
- Specific, Measurable, Achievable, Realistic and Time-bound (SMART) objectives that solve the problem, identified through alignment with KCC's strategic aims and responsibilities;
- Measures for determining successful delivery of the objectives;
- Scheme scope, determining what the project will and will not deliver;
- Analysis of constraints and opportunities for investment on the KSCMP;
- Breakdown of interdependencies on which the successful delivery of the scheme depends;
- Details of main stakeholder(s); and
- Evaluation of the options considered.

3.2 Business Strategy

National Transport Priorities

3.2.1 The Government has long-term objectives aimed at improving the economy, environment and society. These are the three tenets against which major transport infrastructure projects are assessed, and will continue to be assessed in future.

3.2.2 In its National Infrastructure Plan 2014, the Government presented its vision for the UK transport system:

- Transport infrastructure can play a vital role in driving economic growth by improving the links that help to move goods and people around and by supporting the balanced, dynamic and low-carbon economy that is essential for future prosperity;
- Local transport systems must enable suburban areas to grow. The transport network must support good value and rapid movement of goods around the country. The transport system must be efficient but also resilient and responsive to infrequent an unexpected pressures; and
- Airports and ports are the gateways to international trade and the Government will work to improve the road and rail connectivity to major ports and airports.

3.2.3 These elements of the vision can be seen as being of direct relevance to the KSCMP scheme, which aims to improve journey time reliability, air quality, safety, bus punctuality, and enable growth in Kent. The C-ITS corridor in particular is an example of the Government's desire to improve road connectivity to major ports from which Kent stands to benefit.

Regional Transport Priorities

3.2.4 In March 2014, SELEP submitted their Strategic Economic Plan (SEP). Within the six year period covered by the SEP (2015/16 to 2020/21) several considerable developments are planned within Kent, including:

- Ebbsfleet Garden City (10,000 homes and 20,000 jobs);
- Paramount Park, Swanscombe Peninsula (27,000 jobs);
- Lodge Hill (5,000 homes and 5,000 jobs);
- Kent Science Park (3,000 jobs);
- Harlow Enterprise Zone (5,000+ jobs);
- Discovery Park Enterprise Zone (1,300 jobs);
- London Gateway container port (12,000 direct and 20,000 indirect jobs).

3.2.5 The SEP document outlines the case for investment into infrastructure, enterprise and employment that is required for the South East region's economy to continue its successful upward trajectory.

3.2.6 The Kent and Medway Growth Deal forms part of the SEP and indicates the intention to invest over £80 million each year over the six-year SEP plan, in order to:

- Substantially increase the delivery of housing and commercial developments;
- Deliver transport and broadband infrastructure to unlock growth;
- Back business expansion through better access to finance and support; and
- Deliver the skills that the local economy needs.

3.2.7 Strategic congestion management in the form of the KSCMP is established as a country-wide priority in the LGF. Traffic congestion is highlighted as a significant constraint to growth in the Canterbury district and in the town centres of Maidstone, Tonbridge, Tunbridge Wells and Sevenoaks. Therefore, Kent stands to benefit from the fulfilment of the criteria of the Kent and Medway Growth Deal.

Local Transport Priorities

3.2.8 Kent is South East England's fastest recovering region and has great potential for successful economic growth. In the last 20 years, Kent has seen 100,000 more people living in the county, housing stock increase by over 60,000 homes and 130,000 more cars on roads. This pace of change is set to accelerate further over the next 20 years with a projected 8 per cent population increase, accompanied by the presence of two of the UK's four Growth Areas in Thames Gateway and Ashford.

3.2.9 Local growth is predicted to result in 250,000 extra journeys on Kent's roads by 2026. Coupled with a forecast increase in international traffic this leads to tackling congestion being regarded as one of the main priorities for Kent. KCC's framework for regeneration "Unlocking Kent's Potential" defines what Kent should look like in 20 years' time and includes as 1 of its 5 priorities "delivering growth without transport gridlock" - by designing communities that will encourage walking, cycling, and healthy leisure activities. Based on this "Growth without gridlock: A transport delivery plan for Kent" establishes transport priorities for the next 20 to 30 years to support Kent's Environment Strategy target of reducing greenhouse gas emissions by 20% by 2020 and 80% by 2050.

3.2.10 "Growth without Gridlock" recognises that road transport is responsible for around 30% of Kent's greenhouse gas emissions and that the way forward is to provide low carbon transport options allied with better planning to reduce the need to travel, which in turn will support economic growth, housing growth and tackle climate change.

3.2.11 The Plan states that: "the private car will continue to remain the most popular and dominant form of transport for our residents and these expectations and demands increase pressure on our transport network, on our environment and on us as individuals. This reliance is also the reason why our road network is congested and in response our vision is to create a high quality integrated transport network which will create opportunities for real transport choice as well as enabling economic growth and regeneration". Some of the key transport challenges identified by the Plan are:

- Transferring existing and new car trips onto public transport, walking and cycling, especially for short journeys;
- Tackling congestion hotspots;
- Integrating rail services and improving connectivity between stations; and
- Providing sufficient transport infrastructure to mitigate the impact of the planned development including walking and cycling routes.

3.2.12 Kent's third "Local Transport Plan (LTP3), 2011-16" sets out KCC's Strategy and Implementation Plans for local transport investment in the short term. It proposes a new approach to prioritising investment in transport infrastructure in order to support housing and employment in Kent's Growth Areas and Growth Points, make Kent a safer and healthier county, improve access to jobs and services especially in disadvantaged areas, and cut carbon emissions.

3.2.13 Its planned measures are prioritised under five themes: Growth without Gridlock, A Safer and Healthier County, Supporting Independence, Tackling a Changing Climate and Enjoying Life in Kent. Under each theme the Plan prioritises a range of sustainable transport initiatives, by area and by mode. Whilst some of these initiatives have already been put in place or are in progress, a number of them provide the basis for the proposals prioritised by the SELEP for capital investment support, including all those for sustainable transport. These initiatives have also subsequently been aligned with the local area development and regeneration plan produced or in the process of being produced by the 12 District or Borough Councils in the County.

3.2.14 The KSCMP aligns strongly to these local strategies and priorities, by aiming to deliver growth and alleviate congestion "gridlock", by providing infrastructure to mitigate the anticipated transport effects of growth, by showing a commitment to safety and sustainability through innovative use of ITS and by delivering the enhancements required to drive jobs and growth for the county as a whole.

3.3 Problems Identified

3.3.1 The 'key issues' for Kent, as identified by KCC's LTP3 are:

- Transport congestion;
- Supporting economic growth;
- The need to improve access to jobs and services;
- The need for a resilient network;
- Importance as a UK gateway; and
- A safer and healthier county.

Transport Congestion

3.3.2 Kent's LTP3 identified a number of challenges for Kent. Key areas of concern are as follows:

- In a DfT study, 23% of adults said congestion was a problem most or all of the time on their general road journeys;
- In the South East people travel further on average than any other region, at over 8,300 miles per person per year;
- The region has a larger proportion of the UK's road traffic than any other, at 16%.
- Kent's dispersed settlement pattern makes the car the most suitable mode of transport;
- Kent's international traffic has an impact; and
- The housing growth planned for Kent could result in an extra 250,000 car journeys on the County's roads every day.

Supporting Economic Growth

3.3.3 Sustainable economic growth and regeneration is reliant on comprehensive and resilient transport networks. These networks are essential to increasing business efficiency by generating time savings and improved reliability for business travellers, freight and logistics operations. They support clusters of economic activity, expand labour market catchments, and facilitate business-to-business interactions.

3.3.4 Kent's economy is not as prosperous as other parts of the South East, with a Gross Value Added (GVA) per head of population (£18,994) well below the regional average (£25,843), and relatively high unemployment rates in some areas. These problems are particularly acute in areas of East Kent and around the coastal fringe, which until recently have suffered from relatively poor road and rail links.

3.3.5 In order to achieve the scale of economic growth necessary to support sustainable development in the County's Growth Areas and the regeneration of its coastal towns, it is vital that business and retail sites are well connected to reliable and integrated multi-modal transport networks.

Improving Access to Jobs and Services

3.3.6 Relative disadvantage is the capacity to participate in or have access to the forms of employment, occupation, education, recreation, family and social activities which are enjoyed by the majority of the population. Poverty exists all over Kent and is not confined to specific areas. Nevertheless, it is most strongly associated with the County's coastal areas. There are significant pockets of disadvantage in the Kent Thameside boroughs of Dartford and Gravesham, as well as the East Kent coastal towns, interspersed with some localised areas of high affluence.

The Need for a Resilient Network

3.3.7 A resilient network is one that can withstand and respond to disruption and incidents. This can be in reaction to a sudden event such as an accident or structural failure, long term changes due to climate change, or gradual deterioration of the network due to a lack of maintenance. There was a National Indicator (NI 168) which measures the percentage of principal roads (motorways and trunk roads) where maintenance should be considered. For 2009-10, 6% of Kent's principal roads qualified, identical to the national average.

UK Gateway

3.3.8 The Port of Dover is Europe's busiest Roll-on Roll-off (Ro-Ro) ferry port for both freight and passenger traffic. Over the past two decades, the number of road haulage vehicles using the Port has more than doubled to over 2.3 million units. With 2.9 million tourist vehicles also passing through Dover each year and as the UK's second busiest cruise port, this equates to almost 14 million passengers per annum.

3.3.9 Both the Port of Dover and the Government have forecast substantial growth in Ro-Ro freight traffic of up to 85% between 2005 and 2030. To facilitate this, the port is undergoing a £140m expansion in 2016-17.

A Safer Healthier County

3.3.10 Key areas of concern are as follows:

- Some 23.4% of Kent's residents are obese, which is higher than the national average, and 31% of the County's children are overweight;
- The South East mean temperature rose by between 1.4 and 1.8°C in the period 1961 to 2006;
- Kent has the largest total carbon emissions of any County, with 11,879 kilotonnes of CO_2;
- Many of Kent's roadside air quality sites failed to meet the annual mean NO_2 objective; and
- There are significant health inequalities within Kent.

3.4 Impact of Not Changing

3.4.1 Substantial housing and employment growth is planned for Kent and the South East. The County contains two of the country's four Growth Areas at Thames Gateway Kent and Ashford and two Growth Points at Dover and Maidstone. The South East Plan included a target to provide over 128,000 new homes and over 165,000 jobs in Kent by 2026 and KCC estimates that, if delivered, this growth could result in an extra 250,000 car journeys on Kent's roads every day. The KSCMP is therefore essential to support these new jobs and houses without causing the transport network to grind to a halt. Specific do nothing outcomes will include:

- The constraints of the existing transport conditions will act as an inhibitor to growth with private sector investment attracted to other areas with better accessibility;

- The network will not be resilient enough to respond to disruption and resilience to incidents will continue to weaken without the scheme;
- The significant pockets of disadvantage in Kent will worsen;
- Kent's reputation as the UK's front door may be damaged without effective highway management; and
- The ongoing Air Quality issues will be exacerbated without the mitigation afforded by the scheme.

3.5 Internal Drivers for Change

3.5.1 A key delivery strand of "Growth without Gridlock" outlines how economic growth and regeneration can be delivered in a sustainable way and what infrastructure is needed to deliver an integrated transport network which is fit for purpose in the 21st Century. If Kent is to accommodate this growth, its transport network must be well managed and have sufficient capacity and resilience to provide for efficient and reliable journeys.

3.6 External Drivers for Change

3.6.1 Journey reliability is fundamentally the primary driver and the planned growth of housing and jobs across the South East supports the assertion that the existing problems are likely to worsen in the future.

3.7 Objectives

3.7.1 The scheme objectives have been defined to address directly the problems discussed earlier in this chapter. They align closely with the business strategies for the scheme promoters, SELEP and for Central Government – most obviously in terms of the Government's broad goals for transport.

3.7.2 The desired outcomes from each objective have been considered and are shown in Table 1.

Table 1: Objectives and Desired Outcomes

Objective	Desired Outcome
Alleviate congestion by allowing better flow of traffic	Improve car journey times
Supporting economic development in Kent	Improve journey time reliability
To promote accessibility to jobs and services for all	Increase public transport modal split and reduce public transport journey times
Provide a resilient network that is able to respond to disruption and incidents	Improvement of the ability of the transport system to function during adverse conditions and quickly recover to acceptable levels of service after an event
Improve air quality	Reduce carbon dioxide and other greenhouse gas emissions

3.8 Measures for success

3.8.1 Successful delivery against the scheme objectives will be monitored as part of the post construction monitoring and evaluation, details of which are discussed in Chapter 7 (the Management Case) of this report.

3.8.2 A programme of monitoring will be put in place prior to construction, then again at one-year and five-year post construction. It is envisaged that monitoring will include before and after conditions in relation to:

- Average daily traffic by peak/non-peak periods;
- Average AM and PM journey times on key routes;
- Day to Day travel time variability;
- Flows to capacity;
- Average annual CO_2 emissions;
- Average annual NO_2 and particulate emissions;
- Annual average daily and peak hour passenger boardings;
- Bus travel time by peak period; and
- Mode share (%).

3.9 Scope

3.9.1 A detailed scheme description outlining the scope of the KSCMP scheme and in particular the facets of the scheme being carried forward in 2016/17 is provided in Chapter 2.

3.10 Constraints

3.10.1 The M2 Connected ITS Corridor will have quantifiable engineering works associated with it; however there are few examples of this kind of innovative implementation to benchmark against. Its deliverability also relies on support from the IT sector and from car manufacturers in providing the vehicles and equipment that can communicate with and report from the corridor. Much of the funding for the project also originates from other bodies; all of these factors are out with the direct control of KCC. As the C-ITS scheme is ultimately a laboratory testbed to inform a future cost-benefit analysis, there will be significant unknowns with regards to costs and timescales.

3.10.2 For the hotspot mitigation schemes it is expected that the scheme prioritisation process will ensure that the individual schemes will be simple to deliver with minimal constraints. Similar schemes have already been enacted as part of the 2015/16 tranche of the KSCMP.

3.11 Inter-dependencies

3.11.1 There are internal and external factors upon which the successful delivery of the KSCMP is dependent. The proposed scheme conforms to priorities set by the national, regional and local policy environments. Successful delivery will require continued alignment with policy priorities and subsequent political support.

3.11.2 Inter-dependencies with regards to the C-ITS, the interdependencies with manufacturers, technology operators and other road authorities have been described amongst the Constraints above in chapter 3.10.

3.11.3 A list of risks has been prepared as part of the management case (Chapter 7). The delivery of the KSCMP is dependent on these risks either not arising or being sufficiently mitigated so that scheme delivery remains unaffected.

3.11.4 For the purposes of this section of the business case, therefore, it is sufficient to summarise the key areas of risk / dependency.

3.11.5 The key inter-dependencies can be summarised under the headings of project delivery and project funding, namely:

Project Delivery

- Concurrency with multiple suppliers;
- Teething problems with operations;
- Competent staff;
- Any land acquisition / CPO procedures taking longer than allowed;
- Unforeseen Statutory Services;
- Unexpected difficulties during construction; and
- Increased environmental requirements.

Project Funding

- Changes / uncertainty over funding streams;
- Project overspend; and
- Political changes of direction.

3.12 Stakeholders

3.12.1 Consultation with the community, members, and local representatives is a vital part of a scheme's development. If undertaken successfully and inclusively, consultation can ensure the success of a project and enables great certainty of delivery to both time and budget.

3.12.2 A formal consultation process in line with KCCs own strategy is currently being undertaken with the following being consulted:

- ***Kent County Council*** is the highway authority and project sponsor for the transport element. The scheme's management and development is the responsibility of the authority's Major Projects Group within Highways. Kent is the planning authority for transport schemes;
- ***District Councils*** are supportive of the proposed scheme and are responsible for the Local Development Plans and are the local planning authority;
- ***Town and Parish Councils*** are supportive of the proposed scheme;

- ***Highways England*** is responsible for trunk roads and motorways. Highways England are major stakeholders on the C-ITS programme particularly, as it takes place on their Strategic Route Network;
- ***Local residents and Public Transport providers*** will benefit from improved journey times and a more resilient and reliable network.

3.12.3 The communications and stakeholder management strategy for the project is outlined in the Management Case (Section 7).

3.12.4 As each of the individual hotspot schemes progresses, and a work plan for delivery of each is developed, stakeholders such as local bus operators and nearby businesses and residences will be consulted as to the nature of the works and any diversions or disruptions expected.

3.13 Options

3.13.1 Three funding options have been identified, namely:

- Do nothing - Without investment the journey times that occur will continue. Buses will suffer from delays and varying journeys and congestion will only increase as described in chapter 3.4, "Impact of Not Changing";
- Reduced investment - Provide a small amount of funding to tackle priority areas; and;
- Maximum investment - Provide additional funding to bring about all of the described improvements.

3.13.2 The "Maximum Investment" option involves the selection of and intervention in "hotspot" schemes, in the manner described in Chapter 2.3 of this report. It is designed to target the investment where it can generate the most benefit from the available capital funding package. Additionally, as the investment is targeted at the growth areas in the county and SELEP region the delivery of the full committed investment will be crucial in delivering the growth targeted in these areas and mitigating the transport effects of the additional trip generation that growth will bring.

3.13.3 In the event of the "reduced investment" option being selected, this utility would be reduced by curtailing the multi-criteria analysis, postponing or shelving one or more "hotspot" schemes, or targeting the available investment on a more limited area. This runs the risk of failing to alleviate one or more of the issues described in Chapter 3.4, "Impact of Not Changing", either in individual areas or across the county as a whole.

3.13.4 The preferred option identified by KCC is the Maximum Investment option which will facilitate growth across the county and not just in limited areas. Investment will improve efficiency and reliability of journeys and influence modal choice, providing better alignment with the strategies and priorities at the national, regional and local level.

4 Economic Case

4.1 General KCC Approach to Scheme Economic Case

4.1.1 *General Overview of Approach to Economic Case*

The economic case is one of five strands of evidence required to support the scheme transport business case. KCC's general approach to the economic case has been determined by the need for it to be proportionate to the scale, scope and cost of the proposed scheme and the preparation time available. This approach is fully consistent with Department for Transport advice to scheme promoters (KCC) and adjudicators (SELEP). This advice recurs in the following DfT guidelines:

- Transport Analysis Guidance (WebTAG) (The Proportionate Update Process January 2014);
- Value For Money advice note, December 2013 (sections 1.4, 1.17, 5.3);
- The Transport Business Cases, January 2013 (Sections, 1.4, 2.7, 6.2);
- LEP Assurance Framework, December 2014 (Sections 5.6, 5.7, Annex A); and
- HM Treasury The Green Book, July 2011 (Appraisal and Evaluation in Central Government).

However, none of the above guidance specifies the parameters of what constitutes a proportionate approach to appraisal. Therefore, KCC has applied best judgement to decide how much rigour there should be in the scheme economic case.

4.1.2 *Quantitative and Qualitative Economic Appraisal*

In line with the proportionate approach, KCC has prepared partly quantitative and partly qualitative evidence to support the scheme economic case. Generally, for a scheme with relatively large cost (>£5m), the economic appraisal has been substantiated with quantified outcomes. Conversely for a scheme with relatively small cost (<£5m), mainly qualitative evidence has been assembled.

It has also been inappropriate to calculate monetised economic impacts for certain KCC schemes for which the LGF bid is not primarily aimed at achieving transport user benefits. Here, the main scheme objective has been, for example, to enable a more prosperous economy and community by improving public realm, or to save unnecessary future expense by maintaining existing transport assets more effectively.

4.1.3 *Components of Economic Case*

The economic case has initially considered all aspects of scheme performance and likely impacts, in line with the TAG criteria outlined in the Appraisal Summary Table (AST), broadly:

- Economic prosperity and efficiency –
  - User travel costs, congestion, reliability, regeneration and wider economy;
- Environment –
  - Noise, air quality, greenhouse gases, landscape, townscape, heritage, biodiversity and water;
- Social well-being –
  - Accidents, physical activity, journey quality, value for non-users, affordable travel, security, access to opportunities/door-to-door options and severance;
- Public accounts –
  - Cost to transport budget, indirect tax receipts and value for money (VfM).

However, many of these aspects are insignificant, or not easily assessed, in the context of the KCC scheme in question. Therefore, the economic case has focussed on economic efficiency for transport users, decongestion, reliability, greenhouse gases (carbon), safety, capital cost and VfM, as the core aspects for appraisal.

4.1.4 *Quantitative Evidence for Economic Case*

Where the predicted economic outcomes from the scheme have been quantified and monetised, the appraisal method used in the economic case has largely followed the non-modelling approach identified in TAG. This is centred on a 2010, present value (PV) cost and benefit analysis which weighs up the net economic savings to scheme users, against the net economic costs to public accounts, of the investment. Here, the net impacts are derived by subtracting the with-scheme outcomes from the without-scheme outcomes.

Generally, economic appraisal software has not been used to assess the schemes, because of the disproportionate costs, resources and data inputs that would be entailed. This has precluded use of TUBA, COBALT, INCA, QUADRO and TfL Urban Design Toolkit. The hotspot schemes have undergone modelling in LINSIG in order to quantify delay reductions.

The time period for the economic appraisal is matched to the context of the scheme, ranging from a 60-year horizon for a longer-term one-off investment, to a 1-year horizon for a shorter-term, staged or packaged investment. Intermediate appraisal terms have been used to suit the likely duration of a particular scheme's impacts.

In the quantified economic approach, manual calculations, or the TAG Marginal External Costs technique, have been used to assess the following scheme impacts: travel time and delay savings for transport users; vehicle kilometre and decongestion savings for society; journey time reliability improvements for users; accident savings for users; health benefits for active mode users; carbon emission savings for society; and the capital cost to public accounts of preparing and constructing the scheme.

Standard TAG economic appraisal summary tables have not largely been produced, owing to the limited scope of the KCC schemes and because neither the required breakdown of benefits, by user-type and journey-purpose, nor segmentation of costs by investment item, have been available. This has ruled out inclusion of Transport Economic Efficiency (TEE) and Public Accounts (PA) tables. However, a summary table for Analysis of Monetised Costs and Benefits (AMCB) has generally been included in the quantified economic case.

A recommended TAG and 'Green Book' method has been followed to convert monetised scheme economic costs and benefits from their year of occurrence to 2010 PV equivalents. In essence, this entailed the following steps:

- Converting year-of-estimate capital costs to a 'base cost', by adjusting for real construction cost increase between estimate year and year of cost occurrence;
- Converting base cost to 2010 prices, by adjusting for GDP deflation;
- Discounting year-on-year costs and benefits to 2010 at 3.5% per annum; and
- Adjusting 2010 PV costs and benefits from 'factor cost' to 'market prices', by allowing for indirect taxation (+19% increment).
- Final summation of the scheme PV outcomes gives a quantified value for present value benefit (PVB) and present value cost (PVC). From these, the Net Present Value (NPV) and Benefit to Cost (BCR) can be calculated as follows;

$$NPV = PVB - PVC;\ BCR = \frac{PVB}{PVC}$$

4.1.5 *Qualitative Evidence for Economic Case*

Where the potential economic outcomes from the scheme have been not been quantified and monetised, they have been assessed by aligning with a qualitative scale. This appraisal method for the economic case has largely followed the steps outlined in the DfT 'Value for Money' approach. The qualitative method is considered to be appropriate for schemes of modest cost and scope, which do not merit an elaborate, quantified economic case.

A sequence of six steps has been traced, to attribute a qualitative scale to the scheme's economic impacts, as follows:

- Define an initial BCR (for usually monetised impacts); and
- Work out an adjustment to the BCR (for sometimes monetised impacts);
- Both against a 5-point scale (poor/low/medium/high/very high);
- Undertake a qualitative assessment (for rarely monetised impacts), against a 7-point scale (slightly/moderately/largely beneficial, neutral, slightly/moderately/ largely adverse);
- Combine items above, to give initial an VfM, against a 4-point scale (low/medium/high/very high);
- Make a risk assessment, to derive a further adjustment to the initial VfM, using the 7-point scale; and
- Finalise the overall VfM, by adjusting the initial VfM for risk, using the 4-point scale.

4.1.6 Qualitative evidence used to support the economic case is based around applying an order of magnitude to a likely scheme outcome, rather than by calculating a precise, quantified, impact value.

4.2 Proportionality Assessment

4.2.1 HM Treasury's Green Book states that all new proposals should be subject to comprehensive but proportionate assessment, wherever it is practicable, so as best to promote public interest.

4.2.2 Table 2 discusses TAG Appraisal Summary Table (AST) impacts and outlines the key proportionality assumptions made through the development of the KSCMP package of measures and the appraisal process. The assumption table provides supplementary and supporting information to the proportionality assessment.

Table 2: Proportionality Assumptions

Impact	C-ITS Corridor	Hotspot Schemes
Economy: Business users and transport providers	Journey time benefits will be estimated with respect to previous ITS interventions. This assumed benefit will be appraised using a spreadsheet model. The model makes use of WebTAG values and methods (TAG Unit A1.3 November 2014).	Journey time benefits have been assessed using desktop research and appraised using a spreadsheet model. The model makes use of WebTAG values and methods (TAG Unit A1.3 November 2014).
Economy: Reliability impact on business users	Journey time reliability results have been derived using guidance as described in TAG unit A1.3 (November 2014). Given that the corridor is partially urban and partially rural, urban road figures have been used as these are more readily quantified.	Journey time reliability results have been derived using guidance for urban roads as described in TAG unit A1.3 (November 2014).
Economy: Regeneration	Positive regeneration impacts are anticipated across Kent; however, it is not judged appropriate to complete the assessment (TAG Unit A2.2 January 2014) for such a low cost scheme which is likely to have very diffused regeneration benefits. A qualitative score has been applied using professional judgement.	
Economy: Wider impacts	Positive wider impacts would be expected to accrue across Kent, but the impacts are expected to be dispersed rather than in measurable concentrations in a few locations. A qualitative score has been applied using professional judgement.	
Environmental: Noise	The proposed scheme is expected to result in minimal impact in terms of noise and vibration, therefore a quantitative assessment has not been carried out (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement.	
Environmental: Air quality and Greenhouse gases	There is considerable evidence from integrated ITS projects around the world that a benefit to local air quality is achieved. Levels of reduction of hydrocarbon, carbon monoxide and nitrous oxides of 3.5% to 5% at peak periods repeatedly arise as a by-product of integrated ITS. A qualitative score has been applied using professional judgement	The proposed scheme would be expected to reduce congestion in urban areas resulting in fewer vehicles idling at congestion and pollution 'hotspots'. However given the scope of the scheme it is inappropriate to perform detailed air quality testing (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement

Impact	C-ITS Corridor	Hotspot Schemes
Environmental: Landscape	Any change to landscape value is expected to be small and limited to the corridors and junctions covered in the scheme. A qualitative score has been applied using professional judgement.	
Environmental: Townscape	No change in townscape is expected as implementation is limited to the immediate M2-A2 corridor only. A qualitative score has been applied using professional judgement	Although the urban hotspot schemes are expected to result in townscape changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.
Environmental: Historic environment	No change in historic environment is expected as implementation is limited to the immediate M2-A2 corridor only. A qualitative score has been applied using professional judgement	Although the urban hotspot schemes are expected to result in environmental changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.
Environmental: Biodiversity	Ecological impacts are unlikely with the introduction of any of the component parts of the programme. Works could potentially impact on protected species and habitats where vegetation clearance is required or where works are within or close to a sensitive site. A qualitative score has been applied using professional judgement.	
Environmental: Water environment	Proposed installation of C-ITS equipment at the roadside or hotspot mitigation schemes are unlikely to significantly affect the water environment. A qualitative score has been applied using professional judgement.	
Social: Commuting and other users	Journey time benefits will be estimated with respect to previous ITS interventions. This assumed benefit will be appraised using a spreadsheet model. The model makes use of WebTAG values and methods (TAG Unit A1.3 November 2014).	Journey time benefits have been assessed using desktop research and appraised using a spreadsheet model. The model makes use of WebTAG values and methods (TAG Unit A1.3 November 2014).
Social: Reliability impact on Commuting and Other users	Journey time reliability results have been derived using guidance as described in TAG unit A1.3 (November 2014). The figures for urban journey time reliability have been used for the hotspot schemes, and have been assumed as a best estimate for the C-ITS scheme.	
Social: Physical activity	The proposed scheme is expected to result in minimal impact in terms of physical activity therefore a quantitative assessment (TAG Unit A4.1 November 2014) has not been carried out, particularly given the low cost of the scheme. A qualitative score has been applied using professional judgement.	

Impact	C-ITS Corridor	Hotspot Schemes
Social: Journey quality	C-ITS has the potential to reduce journey frustration as it can keep drivers informed and allow them to avoid queues. A qualitative score has been applied using professional judgement.	There are unlikely to be significant effects to pedestrian and cyclist journey quality. Due to the low cost of the scheme and the diffused locations of the improvements, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.
Social: Accidents	C-ITS is expected to result in a reduction of accidents and increase road safety by warning users of hazards ahead, although given the low cost of the scheme it is not appropriate to undertake a full assessment (TAG Unit A4.1 November 2014). A qualitative score has been applied using professional judgement.	It is not anticipated that the hotspot schemes will have a discernible effect on accident rates. A qualitative score has been applied using professional judgement.
Social: Security	C-ITS is expected to result in an improvement in security as communication of locations and issues will be simplified. A qualitative score has been applied using professional judgement.	Due to the low cost of the scheme and the sparing distribution of impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.
Social: Access to services	Minor improvements in access to a number of services are expected. The C-ITS corridor will slightly improve access to major ports, airports and facilities in Greater London and Dover. A qualitative score has been applied using professional judgement.	Minor improvements in access to a number of services are expected. The hotspot schemes will deliver more accessibility to retail, education and leisure. A qualitative score has been applied using professional judgement.
Social: Affordability	There is not expected to be any impact on personal affordability with the scheme. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). Instead, a qualitative score has been applied using professional judgement.	
Social: Severance	There is not expected to be any change in severance resulting from the scheme; pedestrian crossings and signal phases will remain in situ at all hotspot sites. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.	
Social: Option and non-use values	The scheme being appraised does not include any measures that will substantially change the availability of transport services within the study area. A qualitative score has been applied in line with TAG Unit A4.1 (November 2014).	

4.3 Options Appraised

4.3.1 The evolution of the KSCMP scheme was presented as part of the Strategic Case in Section 3. The "Maximum Investment" option was selected as it will facilitate growth across the county and not just limited areas. Investment will improve efficiency and reliability of journeys and influence modal choice. Therefore, only the "Maximum investment" option will be appraised below as compared to the Do Nothing alternative.

4.4 Appraisal Assumptions

Appraisal Period and Future Years

4.4.1 The economic appraisal period has been chosen to be consistent with those used for the KSCMP strands delivered in the last business case, namely a six year term which in this case equates to 2016 to 2022. It is expected that the benefits of the hotspot schemes will continue beyond the appraisal horizon, however these additional benefits have not been quantified as part of this particular appraisal. The C-ITS corridor will be under trial until the end of 2021 and reviewed at this time, and so this forms a reasonable horizon for the appraisal of benefits for that project.

4.4.2 Delay reductions have been derived from LINSIG modelling on the hotspot schemes, whereas journey time improvements have been assumed for the C-ITS corridor based on professional estimates.

User Classes and Time periods

4.4.3 The spreadsheet model splits the traffic flows into different vehicle categories and different journey purposes, namely:

- Car - Commuting;
- Car - Business;
- Car - Other;
- Light goods vehicles (LGV) - Business;
- Light goods vehicles (LGV) - Other;
- Other goods (OGV) - Business;
- Public service vehicle (PSV) - Commuting;
- Public service vehicle (PSV) - Business; and
- Public service vehicle (PSV) - Other.

4.4.4 The spreadsheet model uses the following time periods:

- Average Weekday AM Peak hour = 07:00 – 08:00; and
- Average Weekday PM Peak hour = 17:00 – 18:00.

Fixed Demand Mechanisms

4.4.5 The spreadsheet based model for this scheme is a Fixed Demand Model. Therefore, the model is not assessed for Variable Demand. As no additional or abstracted trips have been assigned, it is not necessary to apply the Rule of Half to these.

Discounting

4.4.6 In line with TAG Unit A1.1 (November 2014), costs have been discounted and presented in net present values (2010) with a discount rate of 3.5% for each future year applied.

Market Prices Adjustment

4.4.7 In line with TAG Unit A1.1 (November 2014), the indirect tax correction factor of 1.19 has been used to convert all values estimated in factor costs to market prices.

4.5 Value for Money Method

4.5.1 To assess Value for Money (VfM), the assessment has started by summing the monetised impacts to establish an initial Benefit to Cost Ratio (BCR) which provides an estimate of how the costs of a scheme relate to the value of monetised benefits that the scheme creates.

4.5.2 The initial BCR has been assessed within a WebTAG compliant framework drawing on the following:

- Benefits appraisal – a proportionate assessment of monetised economic benefits, in accordance with WebTAG and local VfM advice, namely:
  - Business users and providers travel time and vehicle operating cost impacts;
  - Commuting and other users travel time and vehicle operating cost; and
- Cost to the broad transport budget.

4.5.3 This initial BCR has then been adjusted to account for impacts which have not been monetised, namely:

- Economy;

- Reliability impact on business, commuter and other users;
- Regeneration;
- Wider impacts;

- Environment;
  - Noise;
  - Air quality;
  - Greenhouse gases;
  - Landscape;
- Social;
  - Physical activity;
  - Journey quality;
  - Accidents;
  - Reliability; and
  - Option and non-use values.

4.5.4 Once the impacts that can be expressed in monetary terms have been calculated the remaining non-monetised impacts of the KSCMP have been captured qualitatively, namely:

- Environment;
  - Townscape;
  - Biodiversity;
  - Water environment;
- Social;
  - Access to services;
  - Affordability; and
  - Severance.

4.5.5 Finally, a Value for Money statement has been produced which considers all of the above.

4.6 Initial BCR

Assessment of Economic Impacts

4.6.1 It is inherently difficult to establish a BCR value for the C-ITS corridor as it is an innovative development with few comparable case studies against which to judge key performance indicators. Part of the project's remit is to develop the feasibility of a business case for similar implementations. Therefore, only a broad high-level estimate of the potential benefits can be made. Comparisons will therefore be drawn with the benefits likely to be obtained from the most similar ITS project delivered by KCC, namely the HMC technology refresh, with anticipated benefits of 1% on average journey time. The hotspot schemes, with quantifiable LINSIG outputs, do not suffer from this constraint. WebTAG values and methods (TAG Unit A1.3 November 2014) have been used to convert journey time savings into economic benefits.

4.6.2 The modelling approach adopts a 4-stage methodology (outlined in Figure 4.1) comprising DfT traffic volume data in the form of 2014 AADT information, which was growthed to the appropriate traffic levels using the National Road Traffic Forecast (NRTF) Central growth estimate. The growths applied vary by year through the modelling approach, as shown below in Table 3.

Table 3: Annualised Traffic Growth from NRTF

Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Growth from 2014 AADT	3.0%	4.2%	5.4%	6.7%	8.0%	9.3%

4.6.3 The growth data was combined with recent MIDAS speed data (August 2015) for the M2 and trunk road sections of the A2, combined with LINSIG modelling outputs from hotspot mitigation tests. These are input into the spreadsheet model which in turn calculates journey time savings and converts these to market values consistent with WebTAG methodology.

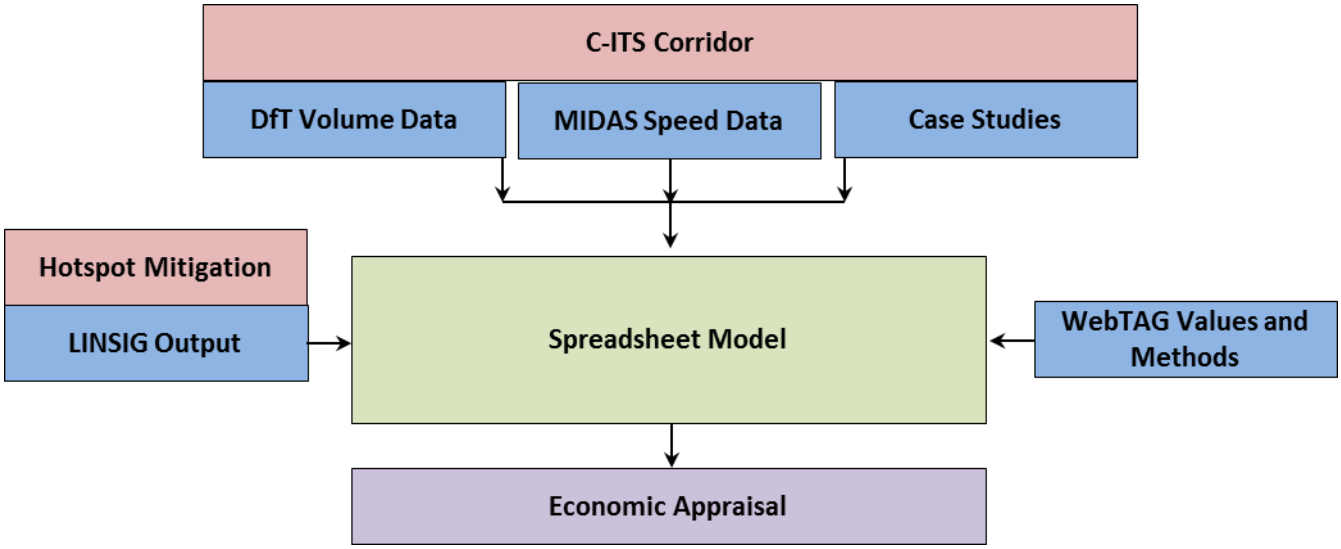

Figure 4.1: Modelling Approach

4.6.4 The counter and speed data have been combined in order to generate a baseline journey time over the corridor. The anticipated 1% reduction in journey time identified from desktop research of other ITS schemes have been used to amend the existing journey times in the spreadsheet model which has determined the resulting travel time benefits.

4.6.5 There is no assignment simulation iteration invoked in the model.

4.6.6 The assessment has been performed over AM and PM peak hour periods, covering weekdays. Benefits and costs have been annualised over a 6 year appraisal period between 2016 and 2022. Although this then extends one year beyond the end of the KSCMP scheme, it allows a consistent comparison with the 2015/16 business case.

4.6.7 The annualisation process involved the calculation of benefits for each individual year based on the anticipated NRTF traffic growth shown above and the benefits expected to accrue as a result; each has been discounted by the appropriate rate to 2010 values by 3.5% per year. Modifications to the inputs to the spreadsheet model have been used to calculate these effects. Costs have not been annualised as they are expected to be incurred in full in the first year of the scheme (2016), and are converted to 2010 discounted values on that basis.

Journey Time Costs

4.6.8 The results of this assessment indicate that road users will experience time saving benefits of £2.157m (2010 prices and values).

User Benefits by Journey Purpose

4.6.9 The user benefits outlined above are shown below by journey purpose:

- Business - £0.643m;
- Commuting - £0.577m; and
- Other - £0.937m.

4.6.10 It can be seen that some 30% of the travel time benefits accrue to business users, with another 27% accruing to commuters and 43% with other journey purposes.

User Benefits by Time Period

4.6.11 The user benefits outlined above are shown below by time period:

- AM Peak - £1.189m; and
- PM Peak - £0.967m.

4.6.12 It can be seen that some 55% of the travel time benefits accrue in the morning peak with 45% accruing in the evening peak.

Investment Costs

4.6.13 Section 5 (the financial case) sets out the costs of implementation of the scheme (£0.790m) for 2016/17, including risk and inflation. In addition, an uplift of 10% for optimism bias has been applied in line with WebTAG unit A1.2 (November 2014) for a scheme of this type and at this stage; the 10% figure is derived from the Supplementary Green Book Guidance on Optimism Bias for a low expenditure equipment/development scheme. The resulting discounted scheme cost in market prices (i.e. inclusive of indirect taxation) for economic appraisal is £0.726m (2010 prices and values).

Initial BCR

4.6.14 The costs and benefits outlined above show that the Initial BCR of the scheme, based on standard monetised values, is 2.97. This represents the benefits for the core elements of the scheme, and is considered high value for money according to Department for Transport guidance1.

4.7 Adjusted BCR

Impacts on the Economy

Reliability Impact on Business Users

4.7.1 WebTAG Unit A1.3 (November 2014) provides guidance for monetisation of changes in journey time reliability. Results have been derived using this aforementioned guidance. The value of journey time reliability for business users is estimated to be £0.098m.

Regeneration

4.7.2 Positive regeneration impacts are anticipated across Kent, however, it is not judged appropriate to complete the assessment (TAG Unit A2.2 January 2014) for such a low cost scheme which is likely to have very diffused regeneration benefits. A qualitative impact score of **neutral** has been applied using professional judgement.

Wider Impacts

4.7.3 Positive wider impacts would be expected to accrue with the introduction of the KSCMP, but the impacts are expected to be dispersed rather than in measurable concentrations in a few locations. A qualitative impact score of **slightly beneficial** has been applied using professional judgement.

Impacts on the Environment

Noise

4.7.4 The proposed scheme is expected to result in minimal impact in terms of noise and vibration, therefore a quantitative assessment has not been carried out (TAG Unit A3 November 2014). A qualitative impact score of **neutral** has been applied using professional judgement.

[1] Value for Money Assessment: Advice Note for Local Transport Decision Makers, December 2013

Air quality and Greenhouse gases

4.7.5 There is considerable evidence from integrated ITS projects around the world that a benefit to local air quality is achieved. Levels of reduction of hydrocarbon, carbon monoxide and nitrous oxides of 3.5% to 5% at peak periods repeatedly arise as a by-product of integrated ITS. The proposed hotspot schemes would be expected to reduce congestion in urban areas resulting in fewer vehicles idling at congestion and pollution 'hotspots'. However given the scope of the scheme it is inappropriate to complete detailed worksheets (TAG Unit A3 November 2014). A qualitative impact score of **slightly beneficial** has been applied using professional judgement.

Landscape

4.7.6 Any change to landscape value is expected to be small and limited to the corridors and junctions covered in the scheme. A qualitative impact score of **neutral** has been applied using professional judgement.

Social Impacts

Reliability Impact on Commuter and Other Users

4.7.7 WebTAG Unit A1.3 (November 2014) provides guidance for monetisation of changes in journey time reliability. Results have been derived using this aforementioned guidance. The value of journey time reliability for commuter and non-work users is estimated to be £0.193m.

Physical Activity

4.7.8 The proposed scheme is expected to result in minimal impact in terms of physical activity therefore a quantitative assessment (TAG Unit A4.1 November 2014) has not been carried out, particularly given the low cost of the scheme. A qualitative impact score of **neutral** has been applied using professional judgement.

Journey Quality

4.7.9 C-ITS has the potential to reduce journey frustration as it can keep drivers informed and allow them to avoid queues. There are unlikely to be significant effects to pedestrian and cyclist journey quality. Due to the low cost of the scheme and the diffused locations of the improvements, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative impact score of **slightly beneficial** has been applied using professional judgement.

Accidents

4.7.10 C-ITS is expected to result in a reduction of accidents and increase road safety by warning users of hazards ahead, although given the low cost of the scheme it is not appropriate to undertake a full assessment (TAG Unit A4.1 November 2014). It is not anticipated that the hotspot schemes will have a discernible effect on accident rates. A qualitative impact score of **slightly beneficial** has been applied using professional judgement.

Option and Non-use Values

4.7.11 The scheme being appraised does not include any measures that will substantially change the availability of transport services within the study area. A qualitative impact score of **neutral** has been applied in line with TAG Unit A4.1 (November 2014).

BCR Adjustment

4.7.12 Other than for reliability impacts the findings of the assessments are not considered to be significant enough to warrant any increase or decrease in the initial BCR.

4.7.13 As outlined previously, journey time reliability results have been derived using guidance as described in TAG unit A1.3 (November 2014). The results of this adjustment is to increase the present value of benefits by £0.291m to £2.448m and the BCR from 2.97 to 3.37 representing high value for money.

4.8 Qualitative Impacts

Impacts on the Environment

Townscape

4.8.1 No change in townscape is expected as a result of the C-ITS scheme as implementation is limited to the immediate M2-A2 corridor only. Although the urban hotspot schemes are expected to result in townscape changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score of **neutral** has been applied using professional judgement.

Historic Environment

4.8.2 No change in historic environment is expected as a result of the C-ITS scheme as implementation is limited to the immediate M2-A2 corridor only. Although the urban hotspot schemes are expected to result in environmental changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score of **neutral** has been applied using professional judgement.

Biodiversity

4.8.3 Ecological impacts are unlikely with the introduction of any of the component parts of the programme. Works could potentially impact on protected species and habitats where vegetation clearance is required or where works are within or close to a sensitive site. A qualitative score of **neutral** has been applied using professional judgement.

Water Environment

4.8.4 Proposed installation of traffic control measures or hotspot mitigation schemes are unlikely to significantly affect the water environment. A qualitative score of **neutral** has been applied using professional judgement.

Social Impacts

Security

4.8.5 C-ITS is expected to result in an improvement in security as communication of locations and issues will be simplified; the emergency services will have more ready access to this data as well. Due to the low cost of this and the hotspot schemes and the sparing distribution of impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score of **slightly beneficial** has been applied using professional judgement.

Access to Services

4.8.6 Minor improvements in access to a number of services are expected; the hotspot schemes will deliver more accessibility to retail, education and leisure, whereas the C-ITS corridor will slightly improve access to major ports, airports and facilities in Greater London and Dover. Due to the low cost of the scheme and its dispersed impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score of **slightly beneficial** has been applied using professional judgement.

Affordability

4.8.7 There is not expected to be any impact on personal affordability with the scheme. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). Instead, a qualitative score of **neutral** has been applied using professional judgement.

Severance

4.8.8 There is not expected to be any change in severance resulting from the scheme; pedestrian crossings and signal phases will remain in situ at all hotspot sites. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). Instead, a qualitative score of **neutral** has been applied using professional judgement.

Overall Qualitative Impact

4.8.9 The findings of the qualitative assessments are mostly neutral and slightly beneficial, and as such are not considered to be significant enough to warrant any increase or decrease to the adjusted BCR category of High.

4.9 Appraisal Summary Table

The quantitative and qualitative assessments of impacts made above have been input to the Appraisal Summary Table (AST) shown as Table 4 provided overleaf.

Table 4: Appraisal Summary Table

Impacts		Summary of key impacts	Assessment		
			Quantitative	Qualitative	Monetary £(NPV)
Economy	Business users & transport providers	Journey time benefits for the C-ITS scheme were estimated with respect to previous ITS interventions; the hotspot scheme journey time benefits were assessed using desktop research. These assumed and calculated benefits were appraised using a spreadsheet model. The model makes use of WebTAG values and methods (TAG Unit A1.3 November 2014).	User benefits at 2010 prices.	N/A	£0.643m
	Reliability impact on Business users	Journey time reliability results have been derived using guidance as described in TAG unit A1.3 (November 2014). The figures for urban journey time reliability have been used for the hotspot schemes, and have been assumed as a best estimate for the C-ITS scheme.	User benefits at 2010 prices.	N/A	£0.098m
	Regeneration	Positive regeneration impacts are anticipated across Kent; however, it is not judged appropriate to complete the assessment (TAG Unit A2.2 January 2014) for such a low cost scheme which is likely to have very diffused regeneration benefits. A qualitative score has been applied using professional judgement.	N/A	Neutral	N/A
Environmental	Noise	The proposed scheme is expected to result in minimal impact in terms of noise and vibration, therefore a quantitative assessment has not been carried out (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement.		Neutral	
	Air Quality	There is considerable evidence from integrated ITS projects around the world that a benefit to local air quality is achieved. The proposed hotspot schemes would be expected to reduce congestion in urban areas resulting in fewer vehicles idling at congestion and pollution hotspots. However given the scope of the scheme it is inappropriate to perform detailed air quality testing (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement.		Slightly beneficial	
	Greenhouse gases	Levels of reduction of hydrocarbon, carbon monoxide and nitrous oxides of 3.5% to 5% at peak periods repeatedly arise as a by-product of integrated ITS. A qualitative score has been applied using professional judgement.		Slightly beneficial	
	Landscape	Any change to landscape value is expected to be small and limited to the corridors and junctions covered in the scheme. Such impacts are not, therefore, assessed in detail. A qualitative score has been applied using professional judgement.		Neutral	
	Townscape	No change in townscape is expected as a result of the C-ITS scheme as implementation is limited to the immediate M2-A2 corridor only. Although the urban hotspot schemes are expected to result in townscape changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.		Neutral	
	Historic Environment	No change in historic environment is expected as a result of the C-ITS scheme as implementation is limited to the immediate M2-A2 corridor only. Although the urban hotspot schemes are expected to result in environmental changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.		Neutral	
	Biodiversity	Ecological impacts are unlikely with the introduction of any of the component parts of the programme. Works could potentially impact on protected species and habitats where vegetation clearance is required or where works are within or close to a sensitive site. A qualitative score has been applied using professional judgement.		Neutral	
	Water Environment	Proposed installation of C-ITS at the roadside or hotspot mitigation schemes are unlikely to significantly affect the water environment. A qualitative score has been applied using professional judgement.		Neutral	
Social	Commuting and Other users	Journey time benefits for the C-ITS scheme were estimated with respect to previous ITS interventions; the hotspot scheme journey time benefits were assessed using desktop research. These assumed and calculated benefits were appraised using a spreadsheet model. The model makes use of WebTAG values and methods (TAG Unit A1.3 November 2014).	User benefits at 2010 prices.	N/A	£1.514m

Impacts		Summary of key impacts	Assessment		
			Quantitative	Qualitative	Monetary £(NPV)
	Reliability impact on Commuting and Other users	Journey time reliability results have been derived using guidance as described in TAG unit A1.3 (November 2014). The figures for urban journey time reliability have been used for the hotspot schemes, and have been assumed as a best estimate for the C-ITS scheme.	User benefits at 2010 prices.	N/A	£0.193m
	Physical activity	The proposed scheme is expected to result in minimal impact in terms of physical activity therefore a quantitative assessment (TAG Unit A4.1 November 2014) has not been carried out, particularly given the low cost of the scheme. A qualitative score has been applied using professional judgement.	N/A	Neutral	N/A
	Journey quality	C-ITS has the potential to reduce journey frustration as it can keep drivers informed and allow them to avoid queues. There are unlikely to be significant effects to pedestrian and cyclist journey quality. Due to the low cost of the scheme and the diffused locations of the improvements, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.		Slightly beneficial	
	Accidents	C-ITS is expected to result in a reduction of accidents and increase road safety by warning users of hazards ahead, although given the low cost of the scheme it is not appropriate to undertake a full assessment (TAG Unit A4.1 November 2014). It is not anticipated that the hotspot schemes will have a discernible effect on accident rates. A qualitative impact score has been applied using professional judgement.		Slightly beneficial	
	Security	C-ITS is expected to result in an improvement in security as communication of locations and issues will be simplified. Due to the low cost of this and the hotspot schemes and the sparing distribution of impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets).		Slightly beneficial	
	Access to services	Minor improvements in access to a number of services are expected; the hotspot schemes will deliver more accessibility to retail, education and leisure, whereas the C-ITS corridor will slightly improve access to major ports, airports and facilities in Greater London and Dover. Due to the low cost of the scheme and its dispersed impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative impact score has been applied using professional judgement.		Slightly beneficial	
	Affordability	There is not expected to be any impact on personal affordability with the scheme. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.		Neutral	
	Severance	There is not expected to be any change in severance resulting from the scheme; pedestrian crossings and signal phases will remain in situ at all hotspot sites. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). Instead, a qualitative score has been applied using professional judgement.		Neutral	
	Option and non-use values	The scheme being appraised does not include any measures that will substantially change the availability of transport services within the study area. A qualitative score has been applied in line with TAG Unit A4.1 (November 2014).		Neutral	
Public Accounts	Cost to Broad Transport Budget	Capital costs have been assigned to each scheme within the project, and then adjusted for inflation (from 2010 prices) and for risk and optimism bias.	Scheme cost at 2010 prices including optimism bias	N/A	£0.726m
	Indirect Tax Revenues	No indirect tax revenues are anticipated from this scheme.	N/A	N/A	£0

4.10 Value for Money Statement

4.10.1 The VfM has been prepared in accordance with the DfT's "Value for money assessment: advice note for local transport decision makers". The overall qualitative outcome is High, on a 4-point scale. This VfM is based on the quantified initial BCR for the scheme of 2.97 (i.e. High), with further adjustments for non-quantified BCR components and qualitative outcomes. It is anticipated that the qualitative effects will not have a substantial effect on the VfM category; in any case, as none of the effects are judged to be adverse there is no likelihood of a reduction in the VfM category. The net result is an adjusted BCR of 3.37 and a VfM in the High category, representing good value for money.

4.11 Sensitivity Testing

4.11.1 The NPV and BCR values for the scheme are partially dependent on a series of estimates which allow the benefits and costs to be appropriately monetised. Sensitivity tests have been undertaken to ensure that variation of these estimates within a reasonable scale does not result large changes to NPV or BCR.

Optimism Bias

4.11.2 A 10% Optimism Bias has been applied to the scheme costs, derived from the Supplementary Green Book Guidance on Optimism Bias for a low expenditure equipment/development scheme. The overall cost and BCR are sensitive to the optimism bias as shown below in Table 5.

Table 5: Sensitivity Tests on Optimism Bias

Optimism Bias	Scheme cost at undiscounted 2010 base prices	Initial BCR	Adjusted BCR
10%	£892,810	2.97	3.37
20%	£973,975	2.72	3.09
30%	£1,055,140	2.51	2.85
40%	£1,136,304	2.33	2.65
50%	£1,217,469	2.18	2.47

C-ITS Corridor Benefits

4.11.3 A journey time saving of 1% has been assumed for the C-ITS corridor, based on observation of previous similar projects. The benefit of the C-ITS corridor and BCR are sensitive to the journey time savings offered by the scheme in the proportion shown below in Table 6.

Table 6: Sensitivity Tests on Benefits of C-ITS Implementation

C-ITS journey time saving	Benefits of C-ITS corridor at undiscounted 2010 base prices	Initial BCR	Adjusted BCR
1.0%	£1,171,387	2.97	3.37
0.8%	£937,110	2.65	3.02
0.6%	£702,832	2.32	2.66
0.4%	£468,555	2.00	2.31
0.2%	£234,277	1.68	1.96

Traffic Growth

4.11.4 The traffic growth on the network over the scheme appraisal period has been estimated by updating the observed 2014 traffic flows using the National Road Traffic Forecast Central growth estimate. The overall scheme benefits and BCR are sensitive to traffic growth as shown below in Table 7.

Table 7: Sensitivity Tests on Traffic Growth

Growth Scenario	Scheme benefits at undiscounted 2010 base prices	Initial BCR	Adjusted BCR
No growth	£2,284,900	2.77	3.15
NRTF Low growth	£2,402,578	2.91	3.31
NRTF Central growth	£2,447,961	2.97	3.37
NRTF High growth	£2,485,548	3.01	3.42

4.11.5 The above Tables 5, 6 and 7 shows that even very large variations in the estimates used, of up to 50% optimism bias and a drop of three-fifths in C-ITS journey time benefits, do not reduce the BCR to less than 2. This suggests that the scheme is not overly sensitive to any of the above factors and will continue to represent high Value for Money.

5 Financial Case

5.1 Introduction

5.1.1 This chapter presents The Financial Case for the KSCMP scheme. It concentrates on the affordability of the proposal, its funding arrangements and technical accounting issues. The total outturn costs and expenditure profile are presented, along with an assessment of the impact of the proposed deal on the Department's budgets and accounts.

5.1.2 Capital costs have been calculated for the Do-Maximum funding option only, because there are not expected to be any alternative construction costs that would be incurred in the Do-Northing only and not in the Do-Maximum.

5.1.3 Only the costs which will be incurred subsequent to a successful funding bid have been considered. 'Sunk' costs, which represent expenditure incurred prior to funding approval and which cannot be retrieved, have not been included. For this reason, no costs for the HMC Technology Refresh (which were spent in the 2015/16 funding round) have been considered in this business case.

5.2 Capital Cost Components at 2015 Prices

5.2.1 The capital required to fund the project is £4.8m for the period 2015 to 2021. With £0.831m spent in the previous financial year, this leaves a fund of £3.969m available. The anticipated spend for 2016/17 will be an initial £700,000. Table 8 shows the scheme capital costs as estimated in 2015 prices.

Table 8: Components of Investment Cost (2015/16)

Cost Category	**£**
M2 Connected ITS Scheme	300,000
A292 Mace Lane/Wellesley Road and Somerset Road/Canterbury Road junctions, Ashford	300,000
A229 Loose Road, Maidstone: Armstrong Road and Sheal's Crescent junctions	100,000
Total Base Cost 2015 prices	**700,000**

5.3 Inflation to 2016 Prices

5.3.1 Table 9 provides a base cost estimate of the investment which incorporates real cost increases. The average of Consumer Price Index forecasts for 2016 is 1.9%[2], while construction costs are forecast to increase by 4.5% in the south east for the same period[3]. Therefore the base investment costs, including real cost increases have been calculated as follows:

$$\boldsymbol{cost} = \text{£}\mathbf{700,000} \times \frac{\mathbf{1.045}}{\mathbf{1.019}} = \text{£}\mathbf{717,860}$$

Table 9: Base Scheme Costs (2016 prices)

Cost Category	**£**
M2 Connected ITS Scheme	307,655
A292 Mace Lane/Wellesley Road and Somerset Road/Canterbury Road junctions, Ashford	307,655
A229 Loose Road, Maidstone: Armstrong Road and Sheal's Crescent junctions	102,552
Total Base Cost 2016 prices	**717,860**

5.4 Quantitative Risk Assessment

5.4.1 A 10% risk contingency has been applied in line with best practice for work of this nature. The quantitative risk assessment carried out in Chapter 7 (Table 14) of this report has highlighted a number of risks regarding the certainty of the financial case for the scheme which could result in cost increases. These are replicated below in Table 10.

[2] Forecasts for the UK economy: a comparison of independent forecasts; No. 335, March 2015
[3] Sweett Tender price Update United Kingdom Q3 2015

Table 10: Qualitative Risk Assessment for Financial Case

Risk description	Likelihood	Impact	Likelihood x Impact	Mitigation
Concurrency with Multiple Suppliers: dependencies and overlaps occur with the use of multiple suppliers and concurrent contracts.	3	3	9	Allow float in programme, consider coordination with main contractor.
Competent Staff: Shortage of skilled resources to operate / maintain the IT systems.	4	3	12	Allowance for training within the programme. Consider possible secondment of individuals into the HMC.
Equipment Location: Locations for equipment restricted by land ownership issues.	3	1	3	Ascertain land ownership issues at earliest opportunity.
Unforeseen Statutory Services: Availability or time taken to obtain information relating to locations of statutory undertakers apparatus	3	3	9	Early applications with Statutory Undertakers, contingency allocations.
Unexpected Difficulties During Construction: Archaeological finds, contractor performance, missed road bookings, equipment theft etc.	1	1	1	Desktop study. Quality Control process, method statements and site audits and supervision. Obtain internal agreement for flexibility of requirements. Site Management.
Increased Environmental Requirements: Environment Agency expresses concerns about proposals.	2	4	8	Early and ongoing consultation.

5.5 Optimism Bias

5.5.1 Optimism Bias adjustments are designed to deal with the 'systematic tendency of project appraisers to be overly optimistic' with regard to a project's 'costs, benefits and duration'. To reflect the current status of scheme designs and costs, an Optimism Bias uplift of 10% has been applied to scheme costs as part of the Economic Case, therefore ensuring that the economic appraisal is robust. The selection of the 10% figure is based upon guidance in the Green Book Supplementary Advice as described in paragraph 4.6.13 above.

5.5.2 Optimism Bias adjustments are not intended for use in estimating actual scheme outturn costs for funding requests and are therefore not included in the costs.

5.6 Final Scheme Costs

5.6.1 Table 11 below shows the final scheme costs for the 2016/17 funding bid, including risk and inflation but excluding optimism bias and indirect taxation.

Table 11: Summary of Final Scheme Costs (2016 prices)

Cost Type	Cost (£)
Scheme Cost	700,000
Inflation	17,870
Risk Allowance	71,787
Total	**789,657**

5.7 Spend Profile

5.7.1 An estimated outturn spend profile for the KSCMP is shown in Table 12, split by financial year.

Table 12: Outturn Spend Profile

Estimated Spend	Total	15/16	16/17	17/18	18/19	19/20	20/21
Total Costs (£m)	4.8000	0.8310	0.7897	0.7948	0.7948	0.7948	0.7948

5.8 Whole Life Costs

5.8.1 The spend profile for the whole life of the C-ITS scheme is such that KCC's costs will be entirely covered in the 2016/17 financial year; the maintenance budget for the scheme will be covered by other stakeholders, primarily Highways England and DfT.

5.8.2 It is not anticipated that the hotspot schemes will generate any additional whole-life costs to those currently occurring, as they involve the modification of existing signalised junctions that are presently in the highway maintenance cycle. Therefore, no additional whole-life costs should be ascribed.

5.9 Section 151 officer sign off

5.9.1 A signed letter by KCC's Section 151 officer providing appropriate project assurances is contained as Appendix D.

5.10 Funding Assumptions

5.10.1 The total remaining project cost is estimated at £3.969 million which will be fully LEP funded and each yearly tranche of which will be granted dependent on the business case.

6 Commercial Case

6.1 Introduction

6.1.1 The commercial case provides evidence on the commercial viability of the scheme and the procurement strategy that will be used. It sets out the financial implications of the proposed procurement strategy and presents evidence on risk allocation and transfer, contract timetables and implementation timescale as well as details of the capability and skills of the team delivering the project.

6.1.2 The outcomes which the procurement strategy must deliver are to:

- Achieve cost certainty, or certainty that the scheme can be delivered within the available funding constraints;
- Minimise further preparation costs with respect to scheme design by ensuring best value, and appropriate quality;
- Obtain contractor experience and input to the construction programme to ensure the implementation programme is robust and achievable; and
- Obtain contractor input to risk management and appraisals, including mitigation measures, to capitalise at an early stage on opportunities to reduce construction risk and improve out-turn certainty thereby reducing risks to a level that is As Low as Reasonably Practicable.

6.2 C-ITS Corridor Procurement

6.2.1 The Department for Transport and Highways England will procure the feasibility studies and most of the infrastructure required to deliver the C-ITS corridor. Highways England has devised a procurement strategy setting out their approach to procurement of goods, services and construction expertise.

6.2.2 The strategy is structured around value for money, delivery and sustainability and sets out a prioritised plan of actions. The requirement for suppliers to demonstrate an ability to meet quality and Quality Management System (QMS) requirements will be required. Activities will be procured through the DfT's, partners and Highways England's existing framework contracts.

6.2.3 The C-ITS corridor is a pilot deployment and the study will determine the most appropriate technologies, which have been developed over many years, and the appropriate communications technologies and applications necessary to deliver a number of applications from the launch of the project.

6.2.4 Most of the deployment activities planned to be carried out by partners during the C-ITS implementation will be procured and delivered following the studies needed to prepare project implementation (feasibility, evaluation, testing and validation). To secure the programme, and to deliver early confidence and outcomes, Highways England performed procurement for the first feasibility study between April and June 2015, to consider the infrastructure requirements for the roadside equipment and for the complementary in-vehicle systems. The corridor feasibility study (data models, services and in-vehicle technologies) was procured in July 2015.

6.2.5 The proposed C-ITS deployments will use mature and proven technologies that will deliver connectivity within a road corridor with heavy traffic flow and mixed speeds. The installation of the roadside infrastructure can be achieved with minimal intrusion to the highway and be deployed without the requirement for public consultation or local Orders.

6.2.6 As a result, and given the above, there is a mature market for the procurement and delivery of the C-ITS corridor, even if the development itself represents a technology pilot.

6.3 Hotspot Scheme Procurement

6.3.1 KCC have identified two procurement options for the delivery of their LEP funded schemes. The alternative options are:

Full OJEU tender

6.3.2 This option is required for schemes with an estimated value of over £4,322,012.

6.3.3 KCC will then need to opt for an 'open' tender, where anyone may submit a tender, or a 'restricted' tender, where a Pre-Qualification is used to whittle down the open market to a pre-determined number of tenderers. This process takes approximately one month and the first part is a 47 day minimum period for KCC to publish a contract notice on the OJEU website.

6.3.4 The minimum tender period is 6 weeks but could be longer for larger schemes. Once the tenders are received they must be assessed and a preferred supplier identified. There is a mandatory 10 day 'standstill' period, during which unsuccessful tenderers may challenge the intention to award to the preferred contractor.

Delivery through existing Amey Highways Term Maintenance Contract (HTMC)

6.3.5 This option is strictly not procurement as the HTMC is an existing contract. The HTMC is based on a Schedule of Rates agreed at the inception of the contract. The price for each individual scheme is determined by identifying the quantities of each required item into a Bill of Quantities. Amey may price 'star' items if no rate already exists for the required item.

6.3.6 If the scope of a specific scheme is different from the item coverage within the HTMC contract a new rate can be negotiated. The HTMC contains an upper limit in terms of scheme value which is £100,000; however, this can potentially be increased with agreement from KCC procurement, or the works can be split up into smaller discreet packages with values less than £100,000.

6.4 Procurement Strategy

6.4.1 The preferred procurement route for the KSCMP scheme is through its Amey HTMC.

6.4.2 This option has been selected as the value of the scheme is less than the OJEU scheme value threshold. The Amey HTMC has already delivered the hotspot schemes in the 2015/16 financial year and provides similar interventions in the form of construction and maintenance on the Kent highways network. The fact that the contracts are already in place and a mature market for project delivery has already been explored/tendered will help to alleviate potential risks and disbenefits which may otherwise occur from external (OJEU) procurement.

6.5 Potential for Risk Transfer

6.5.1 It is expected that many of the design risks will only be able to be resolved through rigorous design and review processes, once the design options are clear and the scope of land acquisition, planning requirements, environmental requirements and statutory services issues are fully identified, the primary risks will be related to construction. There is potential for transferring these risks through the construction procurement process. This will be explored further as the scheme progresses.

7 Management Case

7.1 Introduction

7.1.1 The management case assesses the deliverability of the project, testing project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance.

7.1.2 It sets out a plan to ensure that the benefits set out in the economic case are realised and includes measures to assess and evaluate this.

7.2 Evidence of Similar Projects

7.2.1 It is anticipated that primarily, delivery of the C-ITS scheme will rest outwith KCC's sphere of influence, with the major project stakeholders being DfT and Highways England. KCC is committing to supporting the ITS group leading the project, participating in its Steering and Working Groups and assisting with policy development and stakeholder engagement.

7.2.2 Kent has a long history of delivering and making use of Intelligent Transport Systems (ITS) to carry out its transport policy objectives. In particular, there are anticipated synergies between the HMC technology refresh and the C-ITS scheme, with data from each informing the other in turn. As the HMC technology refresh is ongoing, there is significant ITS expertise presently in-house at KCC.

7.2.3 Furthermore, ITS has been previously utilised by KCC to realise the goals set in its Local Transport Plans for Kent, examples include:

- Extension of traffic control and monitoring tools (UTC, SCOOT, pedestrian and cycle crossings, variable message signs) to improve safety and reduce congestion in urban areas;
- Countywide rollout of the Kent Bus location and real time information system to improve journey times and reliability and promote the use of public transport;
- Monitoring and modelling the impacts of traffic management on air quality and assisting the DfT TRAMAQ research programme; and
- Managing traffic on the network by using variable message signs to inform drivers of car park space availability and general traffic congestion.

7.3 Project Dependencies

7.3.1 The delivery of the C-ITS project is dependent on funding and support from Highways England and other stakeholders. This funding is presently assured and in place, with support from the European Union. There are no external dependencies associated with the hotspot schemes, with procurement contracts in place as described above in the Commercial Case.

7.4 Governance, Organisation Structure, Roles and Assurance – Hotspot Schemes

7.4.1 KCC have set up a clear and robust structure to provide accountability and an effectual decision making process for the management of the LEP funded schemes. The KSCMP scheme has a designated Project Sponsor (Andrew Westwood) who is an appropriately trained and experienced member of KCC staff.

7.4.2 Figure 7.1 overleaf provides an outline of the overall governance structure implemented to manage the delivery of each scheme.

7.4.3 A detailed breakdown of the meetings (along with the attendees, scope and output of each) which make up the established governance process is set out below.

Project Steering Group (PSG) Meetings

7.4.4 PSG meetings are held fortnightly to discuss progress on the scheme and will be chaired by Andrew Westwood. Attendees include representatives from each stage of the LEP scheme (i.e. KCC Bid Team, KCC PMs, Amey design team and construction manager). Progress is discussed in technical detail raising any issues or concerns for all to action. A progress report, minutes of meeting and an update on programme dates are provided ahead of the Programme Board (PB) meeting for collation and production of the Highlight Report.

Highlight Report

7.4.5 The Progress Reports sent by Andrew Westwood comprise of the following updates; general progress, project finances, issues, risks and governance meeting dates. The Highlight Report identifies any areas of concern or where decisions are required by the PB meeting or higher to the KCC LEP Programme Manager. An agreed version of the Highlight Report is issued to the PB meeting attendees during the meeting.

Bid / Design / Construction	High level Agenda	Frequency	Attendees	Format	Scope	Agenda Items	Key Deliverables/Feedback	Templates
Sponsoring Group	Bid Design Construction	Monthly - Can be called in emergency if required	**Chair: TR** BC/RW/MG Supported by IPM attendees as required	Face to face meeting, rotating venue	To discuss programme (i.e. high level progress/preview next steps and discuss and resolve issues.	LEP programme (high level) progress to date Programme Financial reporting Next steps Issues/Risk/Change Actions	Minutes of Meeting Action/Decision Log Output distributed to MG	**Agenda** **Minutes** **Decision list**
Sponsoring Group Progress Report	Decisions Needed	Monthly	MG/JW	Report	To record outstanding actions/issues that require a decision made by the board		Action list ready for the Steering Group	**Action List**
Programme Board Meeting	Bid Design Construction	Monthly	**Chair: MG** MG/KCC Promoters/KCC PMs/ AQ or RC/SW/PC/JW	Face to face meeting, rotating venue	To discuss progress/preview next steps and discuss and resolve issues	LEP programme progress to date Project financial reporting Next steps Issues/Risk/Change Actions	Minutes of Meeting Action List Output distributed to all attendees	**Agenda** **Minutes**
Highlight Report	Identify key points for Programme Meeting	Monthly	JW/MG	Face to face meeting/report	JW to collate and streamline all reports highlighting areas of interest for the programme meeting. To be fed back to MG by report/meeting		Highlight report for MG to use for Programme Meeting. Highlight report shared with PR attendees.	**Highlight Report**
Steering Group Meeting	Progress Update	Monthly/Fortnightly as required	**Chair: KCC PMs** All input staff - KCC Bidding/KCC Promoters/KCC PMs/Amey Design/TMC/JW	Face to face meeting	Individual meetings per project (including each stage of the LEP process to discuss progress in detail).	LEP project progress to date/MS Programme Project financial reporting Issues/Risk/Change Actions	MS Programme Update Progress update in template for each project	**Progress Report**

List of Initials:

BC	Barbara Cooper
RW	Roger Wilkin
TR	Tim Read
MG	Mary Gillett
AQ	Andrew Quilter
RC	Richard Cowling
SW	Steve Whittaker
PC	Paul Couchman
JW	Joanne Whittaker

Figure 7.1: KCC Project Governance Structure

Programme Board (PB) Meeting

7.4.6 The PB meeting is held monthly and is chaired by the KCC LEP Programme Manager. Attendees include representatives from all three stages of the schemes (i.e. KCC LEP Management, KCC LEP Bidding, KCC Sponsors, KCC PMs, Amey Account Manager, Amey Technical Advisors, Amey Construction representatives). This meeting discusses project progress to date, drilling into detail if there is an issue or action (as identified in the PSG meeting), financial progress, next steps and actions. Outputs of this meeting are the Highlight Report and the minutes of meeting.

Escalation Report

7.4.7 A list of actions and decisions that the PB meeting was unable to resolve is prepared ready for the Sponsoring Group (SG) meeting to discuss and ultimately resolve.

Sponsoring Group (SG) Meeting

7.4.8 The SG is held monthly and will be chaired by Tim Read (KCC Head of Transportation). Attendees are Barbara Cooper (Corporate Director), Roger Wilkin (Director of Highways, Transportation and Waste), Tim Read and Mary Gillett (KCC Major Projects Planning Manager). This meeting discusses high-level programme progress to date, financial progress, next steps and closes out any actions from the escalation report. Output is sent to Mary Gillett for distribution. Technical advisors are invited if necessary to expand upon an issue. All actions from the start of this meeting cycle are to be closed out by the SG when they meet (i.e. no actions roll over to subsequent meetings).

Project Roles and Responsibilities

Role	**Name**
KCC SELEP Schemes Delivery Manager	Mary Gillett
Project Sponsor	Louise Rowlands
KCC Project Manager	Jamie Watson
Amey HTMC Contact	Martin Addison

7.5 Governance, Organisation Structure, Roles and Assurance – C-ITS Corridor

7.5.1 The organisational structure of the C-ITS scheme as a whole is such that the programme will be coordinated by DfT, who will deliver the Steering Group at the EU level. The partners and major sub-contractors involved in the corridor implementation are all experienced in using embedded Project Management, control and Governance processes, such as the PRINCE2 methodology, to run projects of this scale. The organisational structure of the scheme is shown below in Figure 7.2.

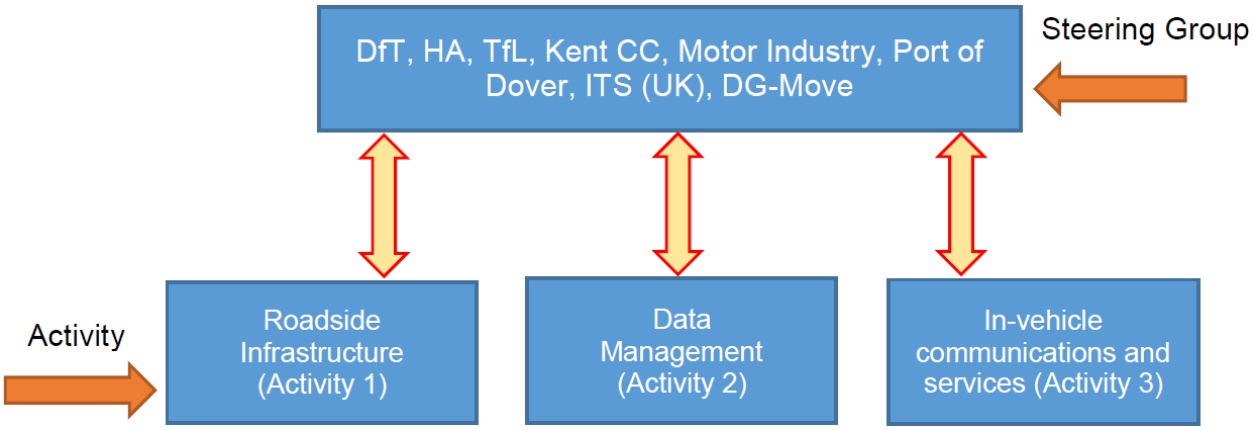

Figure 7.2: C-ITS Scheme Organisational Structure

7.5.2 DfT will also provide the Project Manager, who will be responsible for;

- Policy and project development, including project manager of feasibility study;
- Defining and managing the project related governance processes, procedures and templates;
- The interfaces between the partners and the overall quality of the programme;
- The project timelines and to ensure deliverables are prepared as originally agreed;
- The flow of information on the programme and secretariat for the Activity Groups;
- Chairing the project and programme reviews.

7.5.3 The Highways Agency will lead on matters relating to highway infrastructure. A dedicated Project Officer will be responsible for;

- Coordinating the role of the relevant highway authorities within the Study and Corridor delivery;
- Approving the works and programming delivery of roadside vehicle communication installations;

- Appointing a dedicated financial officer to manage the collection, checking and compilation of financial reports and other administrative information from all of the other parties.

Activity Leads

7.5.4 There are three primary activities associated with the C-ITS scheme, namely Roadside Infrastructure, Data Management and In-vehicle Communications and Services. The work under each Activity is the responsibility of the respective Activity Leaders who will be responsible for the completion of high quality deliverables within their Activity according to the overall project timeline. Activity leaders will meet regularly with the coordinator to ensure communication between each package and resolve any issues between the packages. Their specific roles include:

- Compiling project status reports summarising the progress made by the Group;
- Ensuring that their deliverables are achieved on time, within budget and to a high quality;
- Levelling the risk issues and defining the appropriate mitigation;
- Notifying the coordinator of any potential problems within the Activity.

Steering Group

7.5.5 The Steering Group will consist of the highway authorities engaged in the Corridor namely Highways England, Transport for London (also representing the London Borough of Greenwich and Bexley Council) and KCC; the motor vehicle industry (Visteon and the Automotive Association); the Port of Dover; ITS UK and a representative from DG-Move. Further consideration will be given to private sector service providers (Inrix, Trafficmaster and Tom Tom) who will also be invited to support the Action.

7.5.6 The Steering Group will be responsible for reviewing the coordinator's day-to-day decisions and will be tasked with resolving any disputes which may arise during the project. The Steering Group will also be responsible for reviewing the coordinator's day-to-day decisions and will be tasked with resolving any disputes which may arise during the project, as well as for providing a strategic guide to the programme over its life. It will be responsible for the management of knowledge, intellectual property and innovation-related activities. The six-monthly, annual and final reports will be validated by the Steering Group before being distributed by the project coordinator.

Assurance

7.5.7 In order to ensure timely delivery of programme deliverables, the programme coordinator will be responsible for managing the programme against a dynamic project plan, mainly documented in MS Project, Gantt chart format (or equivalent when it is necessary e.g. Excel file), which will be shared with the Steering Group on a regular basis as updates are made. Specific tasks here include:

- Continuous tracking of deliverables and milestone status: The status of the deliverables and milestones will be tracked by the project coordinator. Progress against agreed milestones will be charted against the programme and discussed at Activity leader meetings;
- Project reporting: The project status reports will provide a valuable reference for evaluating project progress;
- Project Milestones versus budget: The coordinator will control the budget making sure that the deliverables can be covered within the initial budget amount set for each activity. A good balance between the time and the quality criteria will have to be assessed by the coordinator to maintain the budget;
- Risk analysis: The coordinator will maintain and follow-up a 'risk log' in a programme collaborative workspace accessible by each member of the partnership. The coordinator and the Activity members will be asked to update the log on as necessary. The risk log will enable the consortium to assess and to level the risks in order to anticipate and avoid any possible issues. If/when issues occur, an issue log including the change management log will be also carefully managed by the coordinator with regular communication with the Activity leaders (via review meetings) and the Steering Group;

- Monthly Activity leader meeting: This will allow the programme coordinator to identify whether technical and infrastructure targets are being met, including those based on infrastructure and technology performance, vehicle on road availability performance, data quality and availability and safety incident reporting.

7.6 Suitability and Availability of Resources

7.6.1 The hotspot schemes and the KCC element of the C-ITS corridor are intended to be delivered using a collaborative approach between KCC staff and their appointed support organisation Amey. KCC have identified appropriately trained and experienced staff that will be the responsible for the delivery of the scheme. The identified staff fulfilling the Project Sponsor and Project Manager roles for the scheme have been ring-fenced to support the scheme throughout its duration and will have more junior staff available to support them.

7.6.2 Furthermore, the Project Sponsor and Project Manager will utilise appropriate staff from two existing contracts with Amey. Design and technical services support will be provided through the Technical and Environmental Services Contract (TESC) which is active until at least 2018. Amey have a dedicated multi-discipline team located in Maidstone to support the LGF funded schemes. KCC will also utilise dedicated Amey resource through the existing HTMC contract to undertake the construction of the scheme and also to provide early contractor involvement (ECI), where appropriate, to the design process to ensure best value.

7.7 Project Plan

7.7.1 Key project milestones for 2016/17 from business case submission to completion are shown below in the project plan. These exclude the HMC Technology Refresh plans which are due to run until March 2016.

- Complete C-ITS feasibility studies end Q1 2016
- Complete C-ITS procurement end Q3 2016
- C-ITS network operations commence end Q3 2016
- Completion of network hotspot schemes end Q4 2016
- Complete C-ITS deployment (Phase 1) end Q1 2017
- Complete C-ITS deployment (Phase 2) end Q4 2017

7.7.2 A detailed project plan and Gantt chart for the C-ITS corridor implementation are shown below in Table 13 and Figure 7.3 respectively.

Table 13: Activity Plan and Critical Path for C-ITS Corridor Implementation

Activities	Expected results	Milestones	Critical path	Means of verification
Activity 1: Project management				
1.1 Co-ordinate project delivery	Qualitative action management	Cost control, schedule maintenance, deliverables attained, right and relevant communication	No	No delay eventually. High quality deliverables. Good and controlled governance conclusion.
1.2 Project Implementation and delivery	Good synchronisation between studies and deployment phases. Successful deployment phases.	Delivery of roadside infrastructure and in-vehicle communication systems. Bundles of applications/ services. Vehicle to Interface and, ultimately, Vehicle to Vehicle operations.	No	Through deliverables
1.3 Communicate on activity and progress	Effective communication supporting project management delivery.	Industry days. EU satisfaction with progress on Action.	No	Partner satisfaction. Road user engagement.
1.4 Project monitoring and reporting	Good governance. Valuable and high quality reports	Review meetings. Information meetings. Decision meetings. Risks and issues monitoring	No	Governance and reports

1.5 Project communications	Good and agreed understanding within the consortium at all levels	Internal and external communication flow and frequency. Communication materials (presentations, emails, Newsletters etc.). Review meetings	No	Communication. Governance and frequencies.
1.6 Financial management of project	Accurate, consistent, and reliable financial management.	Monthly reports (internal monitoring) Annual reports (for the EU commission)	No	No additional costs incurred. Reports delivered
Activity 2: Deliver Corridor C-ITS services and applications				
2.1 Identification of the locations and detailed site design for roadside infrastructure	The appropriate and low cost infrastructure designs depending on site variability.	Definition of appropriate installation process.	Yes	The identification of less infrastructure based receivers, as part of the Study.
2.2 The selection of Day One services/ applications and future opportunities	Services delivered sufficient to develop on road Vehicle to Interface services.	Identification of bundles of applications.	Yes	Outcomes of feasibility report for services and systems; service agreements signed.
2.3 Design systems for roadside and vehicle communications	Market ready and appropriate systems design	Highway authorities and vehicle system manufacturers sign off designs.	Yes	Signed off site acceptance tests for communications systems.
2.4 Develop proposals to integrate real-time traffic information from a wide range of data services	Real-time traffic information for the Corridor available to a wide variety of users/applications.	Information streams available to users in DATEXII or other appropriate format.	No	Outcome of feasibility report for services and systems.
2.5 Determine programme for installation of technology and services.	Procurement for infrastructure and technology delivered on programme.	Programme agreed by all partners.	Yes	Feasibility report for services and systems/infrastructure.

2.6 Establishing the framework for assessment of costs and likely benefits of the Action	Identification of costs and benefits associated with the Corridor.	Bundles of applications assessed using methods consistent with EC's C-ITS Platform.	No	Feasibility reports for services and systems and infrastructure.
2.7 Develop appropriate business cases for the appropriate technologies	Determine whether the investment is justified in value for money terms against benefits, strategic fit, achievability and affordability.	Definition of the information and methodology necessary to support a series of decisions	No	Feasibility reports for services and systems
2.8 Detailed monitoring proposals	A report on the appropriate measurements to be adopted, KPIs, and performance monitoring.	Monitoring proposals agreed by all parties.	No	Evaluation plan signed off.
Activity 3: Install communications infrastructure				
3.1 Manage the installation of the communication services along the A2/M2 where NRTS in place and within A2 London and A2 Kent, as recommended by the Study.	Good management from the relevant project manager.	Definition of appropriate installation process, and suitable monitoring tools.	Yes	Secure project management services for the infrastructure deployment via appropriate contractual mechanisms – e.g. NRTS contract.
Activity 4: Undertake services and system development				
4.1 The installation of in-vehicle communications.	Good management from the relevant project manager.	Definition of appropriate installation process, and suitable monitoring tools.	Yes	Commercial agreements.
4.2 Day One services to be delivered.	To deliver a bundle of relatively simple services which are easy to implement with limited costs.	In-vehicle service delivery.	Yes	Feasibility report for services and systems.

4.3 Provide infrastructure to improve granularity of data and scope of network covered	Widespread coverage of traffic information collecting infrastructure	Network of data management agreed with partners.	No	Feasibility reports for infrastructure and services and systems. Evaluation of area covered and services provided.
4.4 To pilot travel information and real-time traffic information services for the Corridor.	Coverage of high-quality seamless traffic information across the Corridor.	Understand whether drivers using the Corridor make better informed judgements using improved data.	Yes	User evaluation assessments to determine the availability and quality of information to enable decisions to be made en-route.
Activity 5: Network operations				
5.1 The management and integration of the communication systems	Well managed operation from the network operators and system providers.	Setting of appropriate and relevant operational process	No	Feasibility report for services and systems
5.2 Testing and operation of roadside infrastructure	Good and harmonised management of infrastructure and in-vehicle technology.	Full Vehicle to Interface operations	Yes	Testing outputs as well as user evaluation assessments.
5.3 Testing and operation of in-vehicle technologies				
5.4 Management of the Corridor project, including access to the service and customer support	Provision of an interoperable C-ITS and data management, across three highway authorities			
Activity 6: Study				
6.1 Deployment Report (infrastructure)	Reports on the roadside and in-vehicle infrastructure which can provide the blueprint for further deployment.	Successful Vehicle to Interface infrastructure pilot	Yes	Agreement of ex ante report by the Steering Group.
6.2 Ex Ante Report				

6.3 Project Evaluation Report	A report which provides clear evidence of impact of the Action in terms of road user, transport network and societal benefits.	Successful Vehicle to Interface operations on the pilot corridor	Yes	Agreement of Evaluation Report by Steering Group.

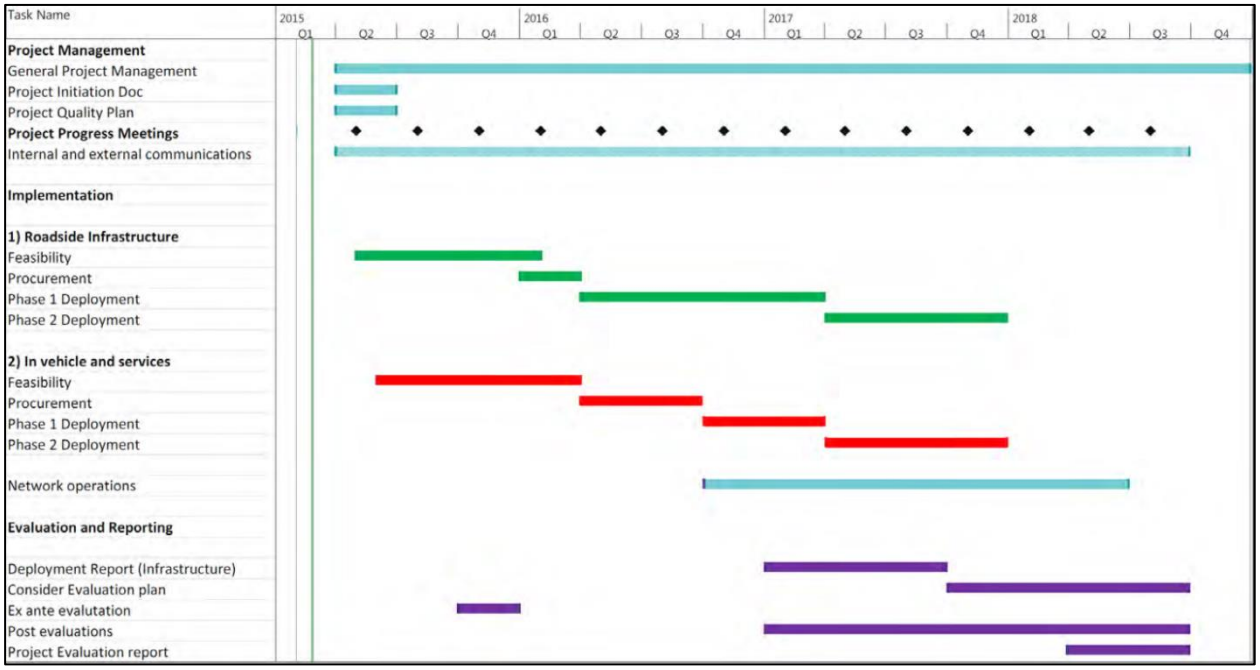

Figure 7.3: C-ITS Scheme Gantt Chart

7.7.3 The hotspot schemes will be delivered using the Amey HTMC contract. As such, these will be delivered by the maintenance teams associated with this contract, and the precise timing of delivery for each will be dependent on the availability of those contractors.

7.8 Communications and Engagement Management and Action Plan

Aims and objectives

7.8.1 The aim of the communication strategy is to ensure that there is awareness of the work and the reasons for making these interventions. It needs to provide awareness of the particular schemes and why they are being developed.

7.8.2 The objective of the communication strategy is to enable clear understanding of the project and what will happen as a result of the changes.

Communication Plans and Target Audiences

7.8.3 The communication and visibility plan for the C-ITS scheme will operate independently of KCC's communications and engagement management and action plan. Details about the C-ITS scheme including key messages and scheme information will be delivered through industry and local interest open days, new traffic signs on the corridor, press releases issued by the Steering Group, other partners in EU Commission projects, and through electronic letterheads disseminated by contractors and partners. A detailed set of communication techniques and objectives is described in paragraph 7.8.8.

7.8.4 The target audiences for the C-ITS scheme include scheme stakeholders, interested parties at the EU level, as well as the general public and those affected by the scheme.

The hotspot schemes will mainly impact on the public when construction is involved. There may be an impact on strategic partners when the scheme is close to the strategic network and it is likely that the communications may have to be in conjunction with Highways England. It is currently expected that the financial year 2016/17 hotspot schemes will only require limited resources from communications related to scheme start dates and awareness of the scheme and no specific consultation or design support. Key Messages

7.8.5 The main message from KCC's perspective is about the intention to make journeys more reliable for people travelling in the county.

Tactics: Communications Tools/Channels

7.8.6 The communication will be channelled according to the scope of the scheme. This will depend on each individual element and could utilise any of the below mediums.

- Local news media PR;
- National trade PR;
- Social media (e.g. LinkedIn, Twitter, Facebook, Yammer);
- Online presence;
- Presentations at other people's events; and
- Printed materials.

7.8.7 The C-ITS scheme has a committed programme of communication techniques and objectives:

- European policy dissemination and shared learning using existing European Commission structures including the C-ITS Platform, ITS Committee, and EIP projects and supervisory board, as well as other Europe-wide ITS platforms, including ERTICO;
- Engaging with stakeholders across the UK and Europe to help build understanding within the transport sector of the project through activities such as Stakeholder forums;
- A contact database for each of the organisations within the stakeholder target audiences segmented by level of interest and communications disseminated accordingly;
- A website and sub-site for both the public and stakeholders;
- An e-newsletter which will be a main tool to drive traffic towards the site and the learnings within it;
- A social media plan;
- A digital animation video;
- Publications to keep people up to date as the Action progresses, including a bi-annual newsletter for all stakeholders;
- Media liaison to ensure extensive media coverage of key milestones and raise awareness of the benefit of TEN-T Activities to the UK and Europe;
- Launch, industry partner, stakeholder and dissemination events;
- A strategy for one to one meetings with key influencers;
- A stakeholder Communications Plan detailing key messages and key milestones.

Communications resources

7.8.8 The budget for communication of the C-ITS corridor is costed within that project. No additional resources will be required from KCC for communications strategy.

7.8.9 The budget for communicating the hotspot schemes will be allocated according to the scheme being developed depending on its likely impact on the travelling public. This will be decided on a sub project basis and discussed with the communications team at the start of the financial year.

7.9 Contract Management

7.9.1 The project will be managed by KCCs project manager (Andrew Westwood) with officers from their in house design team and contracts team delivering the works streams with support from the partnering Engineering Consultants (Amey) providing additional resources where required and specialist services that cannot be provided in house.

7.9.2 The senior user (Mary Gillett) on the Programme Board will also be a representative from the Council's Major Projects Planning team who are responsible for submitting the business case. This will ensure the project delivers the objectives identified within the original business case.

7.10 Risk Management

7.10.1 Project risk is managed as an on-going process as part of the scheme governance structure, as set out in sections 7.4 and 7.5 of this report.

7.10.2 The KSCMP risk register is maintained and updated at each of the two-weekly Project Steering Group meetings. Responsibility for the risk register being maintained is held by the KCC PM and is reported as part of the monthly Progress Reports. An example scheme risk register is shown in Figure 7.4 below.

Figure 7.4: Example Project Risk Register

7.10.3 Any high residual impact risks are then identified on the highlight report for discussion at the Programme Board (PB) meeting. Required mitigation measures are discussed and agreed at the PB meeting and actioned by the KCC PM as appropriate.

7.10.4 The risk management process for the C-ITS programme will be based on the PRINCE2 project management methodology to ensure that risks are identified, assessed in terms of their likely impact and probability, and can therefore be appropriately prioritised. In this way the risks with the greatest impact and the greatest probability of occurring can be addressed first, and risks with lower probability of occurrence and lower loss can be handled in descending order. Identifying ways of tackling these risks is an integral part of this process, which also considers the opportunity cost of the proposed mitigating actions, to ensure that the chosen action taken is both appropriate and cost effective.

7.10.5 This process follows widely recognized good principles for effective Risk Management, ensuring that risk will be an integral part of the organisational processes and part of the decision making process. It will explicitly address uncertainty and assumptions in a systematic and structured way based on the best available information at the time. It will be able to be tailored to suit the situation and need, be transparent, inclusive dynamic, iterative and responsive to change. The risk management strategy will be capable of continual improvement and enhancement, and can be continually or periodically re-assessed.

7.10.6 In line with these principles, initial risks were been identified during the inception and development stages of the programme as listed in Table 14. These risks will be continually reviewed and re-assessed going forward as part of the defined management processes for the programme. New risks will be raised and discussed as they are identified, assessed, tracked and acted upon as agreed by the programme coordinator and Steering Group as appropriate.

7.10.7 The C-ITS programme coordinator will maintain and follow-up a 'risk log' in a programme collaborative workspace accessible by each member of the partnership. The coordinator and C-ITS providers will be asked to update the log on as necessary. The risk log will enable the consortium to assess and to level the risks in order to anticipate and avoid any possible issues. If/when issues occur, an issue log including the change management log will be also carefully managed by the coordinator with regular communication with the Activity leaders (via review meetings) and the Steering Group.

7.11 Scheme Risks

7.11.1 As with any transport scheme there are a number of risks and issues that must be managed. Through the management arrangements established to progress the KSCMP scheme, there are risk management arrangements in place. For the purposes of this Business Case, the main risks associated with proposed investment to progress the KSCMP are summarised in Table 14 below under the headings of project delivery and project funding. Risks associated with the ongoing HMC Refresh and C-ITS corridor (as identified in the EU funding bid) have also been highlighted.

Table 14: Scheme Risks

Risk description	Likelihood	Impact	Likelihood x Impact	Mitigation
Project Delivery				
Concurrency with Multiple Suppliers: dependencies and overlaps occur with the use of multiple suppliers and concurrent contracts.	3	3	9	Allow float in programme, consider coordination with main contractor.
Integration: Integration with existing systems and other new systems present teething problems, or compatibility issues.	1	3	3	Specify compliant systems and accurate specification of the Works Information.
Competent Staff: Shortage of skilled resources to operate / maintain the IT systems.	4	3	12	Allowance for training within the programme. Consider possible secondment of individuals into the HMC.
Equipment Location: Locations for equipment restricted by land ownership issues.	3	1	3	Ascertain land ownership issues at earliest opportunity.
Unforeseen Statutory Services: Availability or time taken to obtain information relating to locations of statutory undertakers apparatus	3	3	9	Early applications with Statutory Undertakers, contingency allocations.
Unexpected Difficulties During Construction: Archaeological finds, contractor performance, missed road bookings, equipment theft etc.	1	1	1	Desktop study. Quality Control process, method statements and site audits and supervision. Obtain internal agreement for flexibility of requirements. Site Management.
Increased Environmental Requirements: Environment Agency expresses concerns about proposals.	2	4	8	Early and ongoing consultation.
Project Funding				

Changes / Uncertainty Over Funding Streams: The funding for the KSCMP is not available.	1	5	5	Development of robust Business Case approved by the SELEP. Regular discussion of LGF with SELEP.
Project Overspend: Failure to deliver the scheme within available funding.	1	5	5	Careful project management.
Political Changes of Direction: Changes to Local Authority/SELEP Strategic Direction	2	5	10	On-going discussions with all organisations involved to ensure compatibility and consistency with Strategic Direction.
HMC Refresh				
UTMC system issues: Installation/integration difficulties, trouble removing legacy system, bugs, lack of staff training.	3	3	9	Allow time for installation, training and issue detection. Co-ordinate with engineers.
Futureproofing: System does not meet ITS/GUI needs in the future, requiring another technology refresh	2	4	8	Make choices in accordance with HMC Technology Review report with regards to innovation and future development
M2-A2 C-ITS Corridor				
High staff turnover.	2	3	6	Resource to be regularly reviewed, as part of project and risk management.
The risk is that the infrastructure will not support the interventions.	2	1	2	Early engagement with NRTS providers and other local authority partners.
The risk is that the services may not be developed fully to deliver on Day one leading to delays in project delivery	3	3	9	Early engagement with service providers/ ensure brief is clear in feasibility study
The risk is that systems for roadside communications are not designed appropriately leading to inability to deliver services to users.	2	3	6	Ensure specification for development includes full testing requirements and commercial levers to encourage a successful outcome.
The risk is that the right resource will not be available to deliver suitable proposals.	2	2	4	Use the right procurement mechanisms and commercial levers to ensure the right resource produces the proposals.
The risk is that partners will not be available to determine the programme in the timescales required.	2	3	6	Ensure this activity is scheduled early on in the plan as part of the feasibility study/ begin early engagement with partners such as NRTS.

The risk is that an existing framework is not appropriate for costs and benefits	2	3	6	Engage early with colleagues involved in cost-benefit analysis to ensure what is delivered offers value for money.
The risk is that no technologies deliver value for money for in-vehicle systems	2	3	6	Engage early with in-vehicle systems industry to understand commercial models for services.
Monitoring of outcomes is difficult leading to lack of ability to demonstrate effectiveness of services	2	3	6	Early engagement and agreement by stakeholders of monitoring needs to ensure a successful evaluation –
Lack of good project management will lead to delays in installation of the communications services.	2	3	6	Ensure good specification for project management and project manager identified has appropriate qualifications and technical understanding, alongside good relationships in all areas
Lack of ability to get onto the network (due to other works) will lead to delays in programme.	3	3	9	Early engagement and liaison with partners in SE Region to ensure this work is programmed in early and alongside existing planned work.
Poor selection of day one services will lead to inability to deliver/delays to programme	2	2	4	Early engagement through steering group to ensure ambition is appropriate to deliver successful outcomes on Day One.
Risk is that the infrastructure does not achieve the outcomes desired leading to inability to deliver the services	2	2	4	Early definition of services required and granularity of data needed to deliver those services, alongside early engagement with suppliers (e.g. NRTS)
Risk is that travel and traffic information is not received seamlessly in vehicle leading to lack of delivery of outcomes	2	3	6	Initial testing using small sample of (Agency) vehicles to deliver initial results to determine full roll out of services on A2/M2.
Inability to integrate the communications systems will lead to lack of delivery of services in vehicles	3	3	9	Early engagement with vehicle systems manufacturers alongside roadside communications suppliers
Risk is that testing regime does not cover all the requirements to be tested leading to failure to deliver some of the services	3	2	6	Ensure robust testing regime is provided to test infrastructure delivery as well as in-vehicle service delivery. Early engagement with in-vehicle systems developers will be key.

Risk is that testing regime does not cover all the requirements to be tested leading to failure to deliver some of the services. C-ITS provision is not interoperable across the 3 4ways authorities leading to failure of some of the outcomes of the Action	3	2	6	Early engagement between authorities to ensure common services are agreed and steering group is used to ensure ambition delivers the right level of outcomes.
Information gained from the pilot is insufficient to inform the report leading to inability to develop the blue print for further deployment	3	2	6	Early engagement between authorities to ensure common services are agreed and steering group is used to ensure ambition delivers the right level of outcomes.
Report conclusions do not match anticipated programme/outcomes leading to project delays/stop	2	3	6	Set realistic expectations for project at the start including timescales and outcomes.
Evaluation determines that the pilot has not delivered the anticipated outcomes or is unable to determine whether the project has delivered anything due to difficulty in data collection	2	3	6	Ensure performance measurements are appropriate to determine recommendations for further roll out of C-ITS infrastructure provision and services.

	Value	**5**	**4**	**3**	**2**	**1**
Table Key	Likelihood	Very High	High	Significant	Low	Almost impossible
	Impact	Catastrophic	Critical	Major	Marginal	Negligible

7.11.2 In considering the need to manage the risks associated with this important scheme, there are considerable and possibly greater risks of not proceeding with the KSCMP. These risks have previously been outlined and are as follows:

- The constraints of the existing transport conditions will act as an inhibitor to growth with private sector investment attracted to other areas with better accessibility;
- The network will not be resilient enough to respond to disruption and resilience to incidents will continue to weaken without the scheme;
- The significant pockets of disadvantage in Kent will worsen;
- Kent's reputation as the UK's front door may be damaged without effective highway management; and
- The ongoing Air Quality issues in Kent will be exacerbated without the mitigation afforded by the scheme.

7.12 Benefits Realisation and Monitoring

7.12.1 Tracking of the scheme benefits will be a key element in understanding the success of a specific intervention. The realisation of benefits is intrinsically linked to the Monitoring and Evaluation plan.

7.12.2 Figure 7.5 shows the KSCMP logic map for the six-year scheme, beginning with the HMC Technology Refresh. The logic map identifies the scheme objectives along with the associated expected outcomes. The map is 'read' from left to right, leading you through a time sequence from the objectives, through implementation to outcomes.

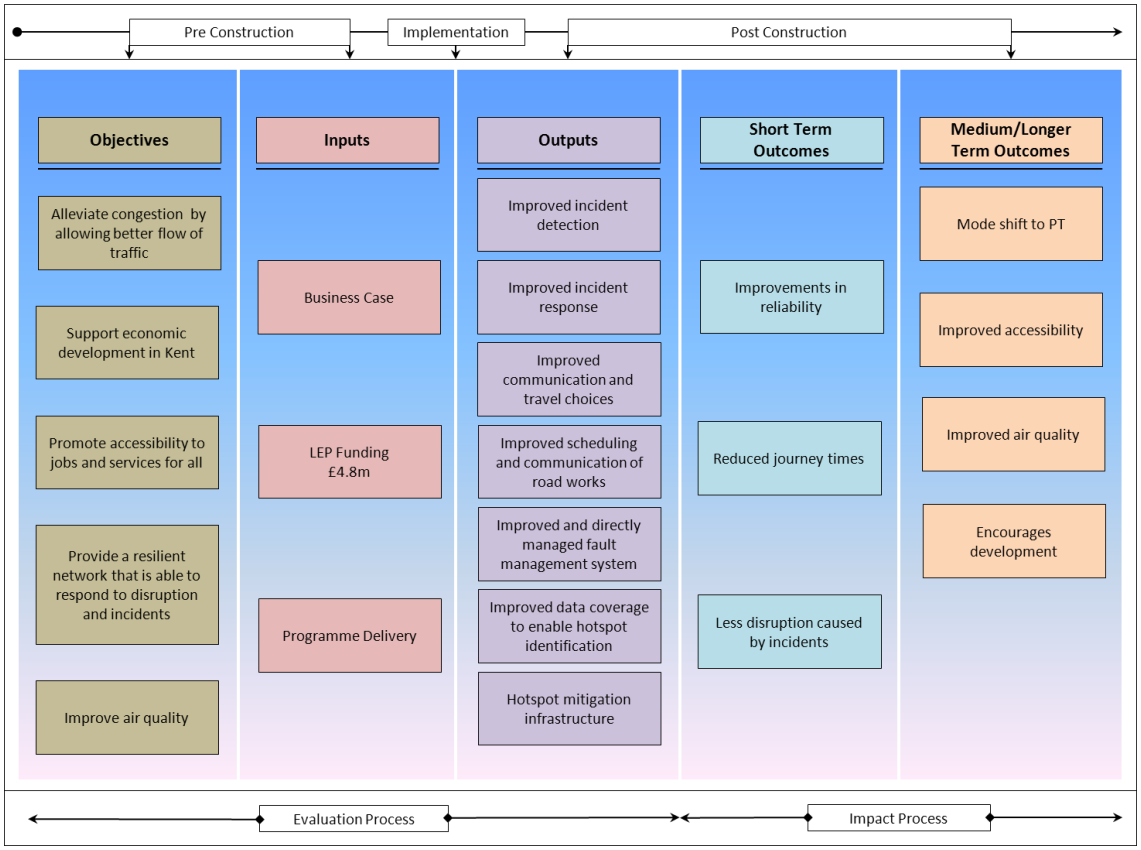

Figure 7.5: KSCMP Logic Map

7.12.3 The scheme objectives (as outlined in section 3.7) have been used to develop the desired outputs and outcomes for the scheme. The desired outputs are the actual benefits that are expected to be derived from the scheme and are directly linked to the original set of objectives. The definition of outputs and outcomes are:

- **Outputs** – tangible effects that are funded and produced directly as a result of the scheme; and
- **Outcomes** – final impacts brought about by the scheme in the short and medium/long term.

7.12.4 To determine whether the scheme benefits are being realised, the outputs and outcomes have been converted into measurable indicators of scheme benefits; these are set out in Table 15.

Table 15: Scheme Benefit Indicators

Objective	**Indicator**
Alleviate congestion by allowing better flow of traffic	Car journey times
Supporting economic development in Kent	Travel time variability
To promote accessibility to jobs and services for all	Public transport modal split; Public transport passenger boardings; Public transport journey times
Provide a resilient network that is able to respond to disruption and incidents	Flow to capacity variation; vehicle journey time variation
Improve air quality	Carbon and Nitrogen dioxide emissions

7.12.5 Table 16 below provides a summary of the proposed measurement metrics and thresholds of acceptability that will be used to evaluate the benefits of the scheme.

Table 16: Outcome Measurement and Acceptability Thresholds

Monitoring Indicator	**Measurement**	**Acceptable Threshold**
Car journey times	Car journey times (AM & PM peak hours)	% reduction from existing
Travel time variability	Mean journey time variation using GIS data (Am & PM peak hour)	Reduction from existing
Public transport modal split; public transport passenger boardings	% of PT trips within Kent	% increase from existing
Public transport journey times	Reduced journey times (AM & PM peak hours)	% reduction from existing
Flow to capacity variation	Junction ratios of flow to capacity (AM & PM peak hours)	Reduction from existing
Carbon and Nitrogen dioxide emissions	Recorded carbon nitrogen dioxide emissions	% reduction from existing

7.12.6 KCC will conduct a full evaluation of the impact of the scheme in the period after it is completed. The Council will prepare evaluation reports one year and five years after scheme opening, using the information to be collected as set out above to gauge the impact of the scheme on the traffic network, and assess the success of the scheme in meeting the objectives of the KSCMP. Unexpected effects of the scheme will be reported upon and, where appropriate, remedial measures identified.

Appendix A Example Scoring Table

Appendix B Ashford Ring Road Scheme Drawing

Appendix C A229/Armstrong Road, Maidstone Scheme Drawing

Appendix D Section 151 Officer Letter