MOTT MACDONALD

Cambridge South East Transport Phase 2

Outline Business Case - Executive Summary

15 May 2020

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Glossary of Terms

Analysis of Monetised Cost and Benefits (AMCB) table: Summarises the monetised impacts of a scheme that are included in the scheme's Net Present Value and Benefit-Cost Ratio.

Appraisal Summary Table (AST): Provides a complete summary of the scheme impacts, including the scheme's monetised impacts and non-monetised impacts (both quantitative and qualitative).

Assumption: A statement which is not yet known to be true. It can be a bridge in the planning process to answer an uncertainty, and to allow scope and plans to be developed

Benefit Cost Ratio (BCR): Benefit Cost Ratio, is an indicator of the overall value for money of a project or proposal.

CaCC: Cambridge City Council

CCC: Cambridgeshire County Council

Cambridge Autonomous Metro (CAM): CAM is the proposed metro style system for Greater Cambridge.

Committed Schemes: Where a scheme has been deemed likely to proceed and is therefore included within the option appraisals.

Conservation Area: An area designated under Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest and with a character or appearance which is desirable to preserve or enhance.

Context: The setting of a site or area, including factors such as traffic, activities and land uses as well as landscape and built form.

Controls: Risk response activities that are undertaken as business as usual. These are identified as an aide-memoire, to draw attention to the purpose and aim of standard procedures and drive appropriate focus. Typically, controls will not incur any additional cost to delivery.

Countryside: The rural environment and its associated communities.

Cumulative Impact: The summation of effects that result from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.

Department of Transport (DfT): is a ministerial department, supported by 24 agencies and public bodies that plans and invests in transport infrastructure in the UK.

Dependency: An activity or activities which cannot be undertaken or completed until another scope of work has completed or reached a defined stage or point.

Early Assessment Sifting Tool (EAST): Early Assessment Sifting Tool is used by DfT, to quickly summarise and present evidence on options. INSET is an enhancement of EAST and follows the same broad principles and approach.

Effect: The consequence of the scale of any change to the baseline environment, i.e. impact, on the environmental receptor, taking account of its particular value or sensitivity.

Element: A component part of the landscape (for example, roads, hedges, woods).

Emerging Scheme: The best performing route alignment option for CSET phase 2 based on assessment to date.

Enhancement: Landscape improvement through restoration, reconstruction or creation.

Environment: Our physical surroundings including air, water and land.

Environmental Impact Assessment (EIA): A formal, structured process of evaluating the likely environmental impacts of a proposed scheme, considering inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

Exclusion: An activity or product that has been specifically removed or omitted from the scope of work for the defined project.

Fall-backs: Contingency actions taken in response to a risk impact. Generally, risks that are tolerated should have fall-back actions identified, as should significant risks that are being treated, where the treatment has a significant likelihood of not fully mitigating the risk.

Full Business Case (FBC): The culmination of the three-stage business case process is the Full Business Case. This follows on from initial exploratory work to establish the strategic need for intervention in the Strategic Outline Business Case and the optioneering and appraisal work undertaken in the Outline Business Case. Generally, an investment committee will consider the Full Business Case then make a recommendation to ministers. Ministers will decide whether a proposal should proceed to implementation, however as funding and powers for transport investment have been devolved to the Greater Cambridge Partnership (GCP) as part of the Greater Cambridge City Deal, the decision to implement the scheme resides with GCP.

Form: The layout (structure and urban grain), density, scale (height and massing), appearance (materials and details) and landscape of development.

Gross Domestic Product (GDP): A measure of the total value of goods produced and services provided in an area.

Gross Value Added (GVA): A measure of the economic productivity of an area.

High Quality Public Transport (HQPT): High Quality Public Transport, is a transport system that includes a range of features such as high levels of segregation, junction priority, high quality infrastructure (shelters, CCTV, real time, lighting, seating, help points etc), and high quality vehicles to name but a few.

Heritage Asset: A building, monument, site, place, area or landscape of historic value.

Investment Sifting and Evaluation Tool (INSET): INSET is Mott MacDonald's evaluation tool used in the optioneering process. INSET is an enhancement and expansion of EAST.

Issue: A significant unanticipated event, or a risk which has impacted or has a >99% likelihood of occurrence, that affects the achievement of the project objectives.

Landform: Combination of slope and elevation that produce the shape and form of the land.

Landscape: The character and appearance of land, including its shape, form, ecology, natural features, colours and elements and the way these components combine. Landscape character can be expressed through landscape appraisal, and maps or plans. In towns 'townscape' describes the same concept.

Landscape Character: The distinct and recognisable pattern of elements that occur consistently in a particular type of landscape, and how this is perceived by people. It reflects

particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place of different areas of the landscape.

Landscape Feature: A prominent eye-catching element, for example, wooded hilltop or church spire.

Landscape Quality: Based on judgements about the physical state of the landscape, and about its intactness, from visual, functional, and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.

Landscape Sensitivity: The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects on its character.

Land Use: The primary use of the land, including both rural and urban activities.

Local Liaison Forum (LLF): The LFF provide a link between a project team and the local community.

Multi Criteria Assessment Framework (MCAF): Multi-Criteria Assessment Frameworks are used in the optioneering assessment process and allow options to be assessed against a range of criteria linked to the scheme objectives as well as wider policy and strategy objectives.

Methodology: The specific approach and techniques used for a given study.

Mitigation: Measures, including any process, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual effects of a development project.

Modal Shift: A shift from one transport type to another e.g. road travel to rail travel.

Movement: People and vehicles going to and passing through buildings, places and spaces. The movement network can be shown on plans, by space syntax analysis, by highway designations, by figure and ground diagrams, through data on origins and destinations or pedestrian flows, by desire lines, by details of public transport services, by walk bands or by details of cycle routes.

Nomis: A service provided by the Office for National Statistics, ONS, that provides free access to the most detailed and up-to-date UK labour market statistics from official sources.

Option Appraisal Report (OAR): The Options Appraisal Report sets out the process undertaken to identify and assess options, leading to the selection of the preferred option.

Outline Business Case (OBC): Is the second phase of the process which reconfirms the conclusions set out in the Strategic Outline Business Case (SOBC). The OBC focuses on the detailed assessment of the options to find the best solution.

Prince 2: PRojects **IN C**ontrolled **E**nvironments is a process-based method for effective project management, used extensively by the UK Government. It adopts a product-based planning approach to project management with emphasis on dividing projects into manageable and controllable stages.

Public Accounts (PA) table: Records the investment and operating costs incurred by a public sector in delivering the scheme.

Receptor: Something that makes up the environmental baseline e.g. humans or other biological species, elements of the physical environment including water, air and soil assets that make up the cultural heritage of an area.

Risk (Threat): An uncertain event or set of circumstances that, should it occur, will have an adverse effect on the achievement of the objectives of the project.

Risk (Opportunity): An uncertain event or set of circumstances that, should it be exploited, will have a positive effect on the achievement of the objectives of the project.

SATURN: Simulation and Assignment of Traffic in Urban Road Networks, is a computer program that calculates route choices between origin and destination.

Social and Distributional Impacts (SDI): considers the variance of transport intervention impacts across different social groups.

Strategic Outline Business Case (SOBC): This sets out the need for intervention (the case for change) and how this will meet strategic aims and objectives (the strategic fit). It provides suggested or preferred ways forward and presents the evidence for a decision.

Strategic View: The line of sight from a particular point to an important landmark or skyline.

Sustainability: The principle that the environment should be protected in such a condition and to such a degree that ensures new development meets the needs of the present without compromising the ability of future generations to meet their own needs.

Topography: A description or representation of artificial or natural features on or off the ground.

Townscape: Physical and social characteristics of the built and unbuilt urban environment and the way in which those characteristics are perceived. The physical characteristics are expressed by the development form of buildings, structures and space, whilst the social characteristics are determined by how the physical characteristics are used and managed.

Transport Appraisal Guidance (TAG): The DfT's Transport Appraisal Guidance (often referred to as TAG)

Transparent Economic Assessment Model (TEAM): TEAM is a tool designed to calculate the economic impacts and benefits of proposed infrastructure interventions and policy measures.

Tranquillity: A state of calm or quiet.

Transport Economic Efficiency (TEE) table: Summarises the monetised impacts against different user groups.

Transport User Benefit Appraisal (TUBA): TUBA is an economic appraisal computer program developed for the Department for Transport (DfT) for appraising multi modal transport studies.

Uncertainty: A condition where the outcome can only be estimated.

Visual Impact: Change in the appearance of the landscape as a result of development. This can be positive (i.e. beneficial or an improvement) or negative (i.e. adverse or a detraction).

Wider Economic Benefits (WEBs): improvements in economic benefits that are acknowledged, but which are not typically captured in traditional transport cost-benefit analysis.

1 Executive Summary

This document is the Executive Summary of the Outline Business Case (OBC) that makes the case for securing devolved City Deal funding for the delivery of Phase 2 of the Cambridge South East Transport (CSET) scheme. The multi phased scheme will deliver improvements to the A1307 corridor between the Cambridge Biomedical Campus at its north western edge to the junctions of the A11 with the A1307 and A505, providing improved connectivity for peripheral communities such as: Linton, the Abingtons, Babraham, Pampisford, Sawston, Stapleford and Great and Little Shelford.

The OBC consists of the five cases that form the DfT's Transport Business Case process with detail of what is included within each case outlined within this Executive Summary. The five cases are:

- The **Strategic Case** which determines whether an investment is needed, either now or in the future. It demonstrates the case for change – that is, a clear rationale for making the investment and strategic fit, how an investment will further the aims and objectives of the organisation. The Strategic Case is presented in document 403394-MMD-BCA-00-RP-BC-0247.
- The **Economic Case** which assesses options to identify all their impacts, and the resulting value for money, to fulfil the Treasury's requirements for appraisal and demonstrating value for taxpayers' money. The Economic Case is presented in document 403394-MMD-BCA-00-RP-BC-0292.
- The **Financial Case** which outlines the affordability of the preferred option, its funding arrangements and technical accounting issues. The case also presents the financial profile of the preferred scheme option and an overview of how the scheme will be funded. The Financial Case is presented in document 403394-MMD-BCA-00-RP-BC-0293.
- The **Commercial Case** which provides evidence on the commercial viability of a proposal and the procurement strategy that is used to engage the market. It presents evidence on risk allocation and transfer, contract timescales and implementation timescale as well as details of the capability and skills of the team delivering the project. The Commercial Case is presented in document 403394-MMD-BCA-00-RP-BC-0231.
- The **Management Case** which assesses whether a proposal is deliverable. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance (e.g. a Gateway Review). The Management Case is presented in document 403394-MMD-BCA-00-RP-BC-0277.

1.1 Context

The CSET scheme is a priority for the Greater Cambridge Partnership (GCP), creating a vital link to ease congestion, offer sustainable travel choices, connect communities and support growth.

The CSET scheme has also been classified as the first phase of the future Cambridgeshire Autonomous Metro (CAM)[1], thus increasing its priority. CAM is the planned future metro network for Greater Cambridge and the wider region that would see a high-quality tram-like system, running on rubber tyres, being introduced as a flexible form of public transport, running both over and underground. This new metro network would connect housing and employment

[1] consultcambs.uk.engagementhq.com

sites across Greater Cambridge to provide quick and easy journeys for people to travel without the reliance on cars. Plans for CAM are at an early stage of development, with a Strategic Outline Business Case (SOBC) having been completed in January 2019.

This Business Case to secure delivery of the CSET Phase 2 scheme should be considered as a contribution to the first phase of CAM, with ambitions to extend CAM to Haverhill in the future.

1.1.1 Cambridge and the 2031 Vision

Cambridge is one of the fastest growing cities in the UK and Europe with a world-class reputation for education, research and knowledge-based industries[2]. The city and surrounding region are at the forefront of high technology, leading the way in the software and bioscience industries. Cambridge Biomedical Campus (CBC), to the south of central Cambridge is one of the largest biomedical research clusters in the world and is at the heart of much of the growth experienced in the area over recent years. Maintaining and growing the success of Cambridge is not only important for residents, employers and academia, it is also critical to the UK's long-term economic plan[3], which seeks to improve productivity and international competitiveness.

The vision for Cambridge is set out in the 2018 Cambridge Local Plan, presenting policies and proposals for future development and spatial planning requirements in Cambridge to 2031. Developed with South Cambridgeshire District Council, the plan considers the development and spatial planning requirements for Cambridge and South Cambridgeshire, with a focus on maintaining and enhancing the success of the area. Within the plan, growth is identified to take place across Cambridge North West, Cambridge Southern Fringe, Cambourne, Bourn Airfield and employment hubs at West Cambridge and the Cambridge Biomedical Campus, with 33,500 new homes and 44,000 new jobs anticipated by the year 2031.

The rate at which residential and commercial development is forecast to be delivered across Cambridge and South Cambridgeshire will place significant pressure on the existing transport network, on which demand is currently exceeding capacity. Investment in transport infrastructure is therefore vital to support the continued economic growth within Greater Cambridge and to ensure quality of life for its residents and employees is not compromised.

1.1.1.1 The Role of South East Cambridge

Building upon recent growth concentrated at Cambridge Biomedical Campus (CBC), extensive development, both commercial and residential, is anticipated to be delivered at a rapid rate across south east Cambridge as investors seek to seize opportunities presented. The vision outlined in the 2018 Local Plan for south Cambridge is 'to create attractive, well integrated, accessible and sustainable new neighbourhoods for Cambridge'[4].

Addenbrooke's Hospital, south of the city of Cambridge is a major employment centre and a renowned teaching hospital linked to Cambridge University. The hospital is part of the rapidly growing CBC which currently employs 17,250 workers and is expected to employ over 30,000 workers by the time it is complete in 2031[5].The Biomedical Campus is therefore expected to house 15-20% of all employment within the Cambridge city local authority administrative area.

The biomedical industry requires a highly skilled and variable workforce. Due to the relatively scarce supply of such a workforce, the catchment area can extend a considerable distance from the campus. Consequently, reliable and efficient transport provision is required so that both the

[2] https://cambridgenetwork.co.uk/news/cambridge-one-of-uks-fastest-growing-cities-until-2019/ [Accessed 23/01/2020]
[3] https://www.gov.uk/government/publications/the-governments-long-term-economic-plan [Accessed 23/01/2020]
[4] Cambridge Local Plan; October 2018
[5] Cambridgeshire Local Transport Plan 2011-2031 (2015)

workforce and visitors to the campus are able to access it by sustainable means and support it in achieving its full economic potential.

In addition to rapid growth at the CBC, further residential and commercial investment in south east Cambridge is anticipated. It is anticipated that over 4,000 job opportunities will be created across Babraham Research Campus and Granta Park, whilst an additional 4,260 new homes are expected to be delivered in Haverhill.

Supporting infrastructure must be provided to ensure anticipated growth is accommodated in a sustainable manner to prevent growth stagnation and secure the longevity of investment and growth. Further details of future growth in Cambridge, and the vital role which will be played by south east Cambridge can be found in the Strategic Case of this OBC. Here, the issues and opportunities associated with the scale and pace of growth outlined above are articulated and expanded on in further detail.

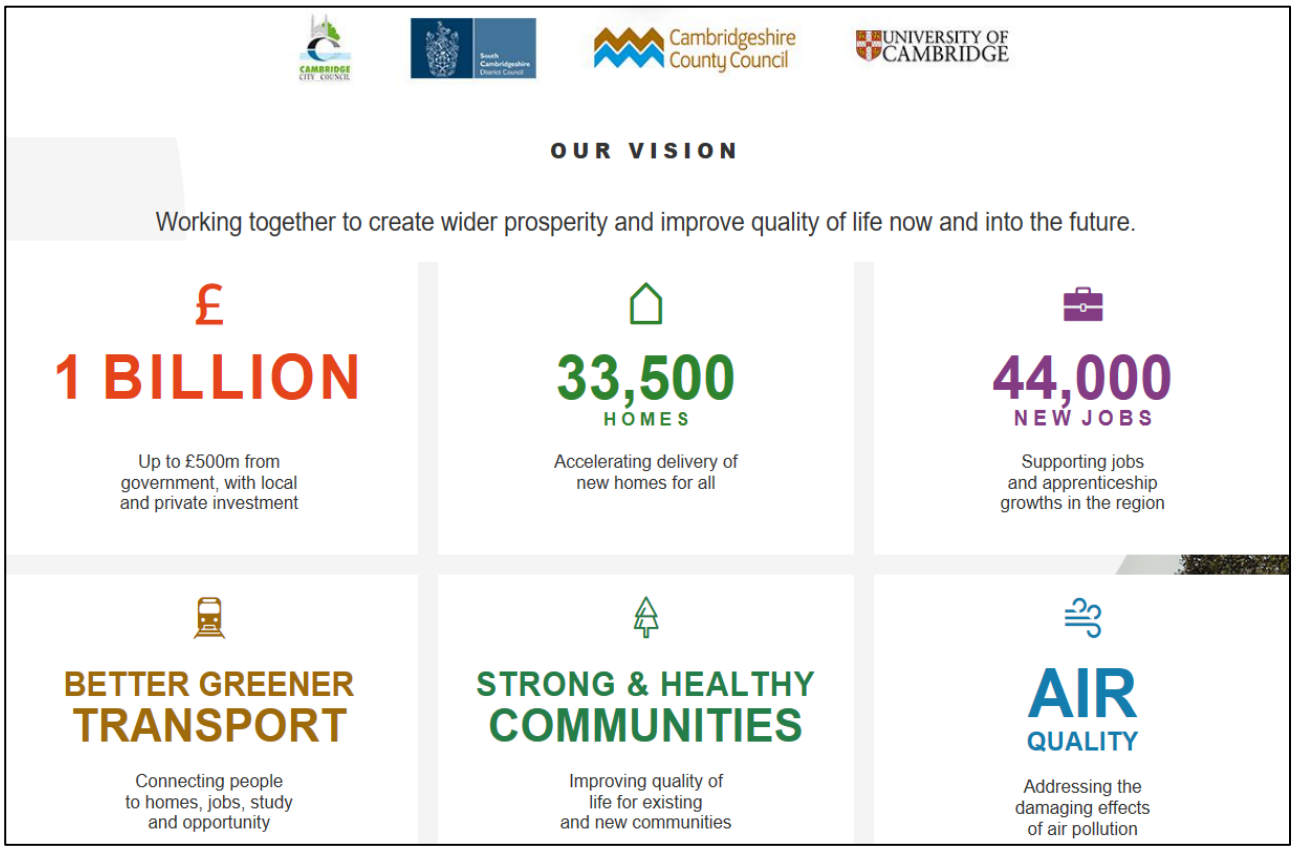
1.1.2 Greater Cambridge Partnership

The Greater Cambridge Partnership (GCP), comprising of Cambridge City Council; Cambridgeshire County Council; South Cambridgeshire District Council; the University of Cambridge and a business representative, is the local delivery body entrusted with economic development in Greater Cambridgeshire. Consequently, GCP has the authority to award and distribute funds devolved from central Government as part of the Greater Cambridge City Deal that will support such economic development.

GCP has a mandate to maintain and grow Greater Cambridge, supporting the acceleration and creation of growth identified under the Local Plan. GCP must ultimately implement strategies to accommodate new and existing employers and employees. Fundamental to this is the provision of a transport network across the region which is well connected; accessible; sustainable; and ensures ease of movement for all users.

The overarching vision for GCP is illustrated in Figure 1.1 followed by its key objectives in Figure 1.2.

Figure 1.1: GCP's Vision



Source: GCP

Figure 1.2: GCP's Key Objectives

Source: GCP

1.2 A1307 Corridor

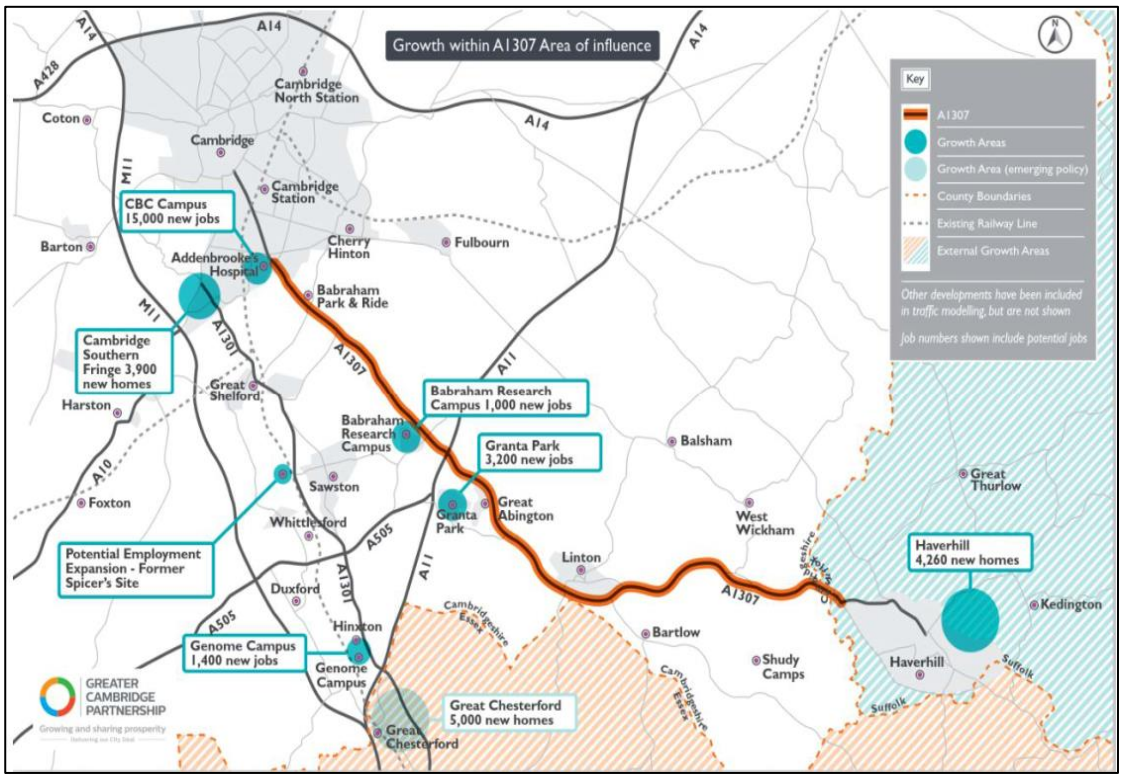
The A1307 corridor is one of Cambridge's key radial routes providing access to central Cambridge from the south east. The corridor stretches from the A1 at Alconbury, south easterly beyond Haverhill, Suffolk. The route provides a link to major employment sites in the area such as the Babraham Research Campus, Granta Park and Cambridge Biomedical Campus whilst also serving several communities in the hinterland of Cambridge, including Linton, Sawston, Stapleford and the Shelfords.

The route currently suffers from significant congestion and delay during peak times which is detailed and evidenced in the Strategic Case. Furthermore, there have been a significant number of road collisions recorded along the route over the last five years, suggesting that road safety improvements along the route are required.

In addition, expected growth across Greater Cambridge will result in a significant proportion of new residents and new employees travelling to and from Cambridge from the south east. The A1307 corridor will also be the main route to connect the future employment sites to new housing in the south east of Cambridgeshire and the western edge of Suffolk and Essex, thus exacerbating existing pressures along the route.

Figure 1.3 illustrates the A1307 corridor and committed and expected (non-committed) growth areas along it.

Figure 1.3: A1307 Key Growth Areas



Source: GCP

It is for these reasons that the A1307 corridor has been identified by the GCP for transport infrastructure investment under the City Deal (which is detailed in the Strategic Case); to relieve existing pressures and crucially, enable growth to take place across the Greater Cambridge area. Such investment is also required to provide road safety improvements and enhance the quality of life of existing and future residents and employees.

1.3 The Scheme

The CSET scheme has been divided into separate packages of works, delivered in two phases:

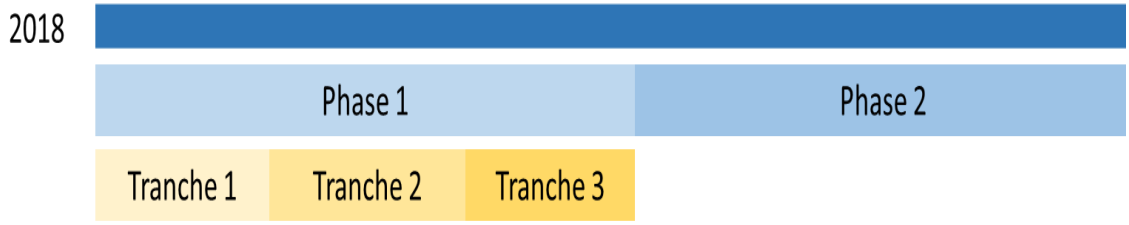
- Phase 1; and
- Phase 2.

Phase 1 of the CSET scheme consists of 15 discrete small to medium works packages to improve public transport and walking and cycling provision between Cambridge and Linton, along the A1307 corridor. Phase 1 has been divided into three separate tranches to enable incremental delivery of the scheme package. All three Phase 1 tranches will deliver early improvements to the route in advance of the Phase 2 works and will complement and enhance the measures proposed.

Phase 2 will provide a long-term solution to transport issues along the A1307 corridor and permit growth in the area to continue by delivering a new public transport route between the A11/A1307 junction and the Cambridge Biomedical Campus (CBC). A Non-Motorised User (NMU) route will be provided alongside the new route and a new Travel Hub facility will also be built near to the A11/A1307/A505 junction as part of these works. A Travel Hub is defined as an interchange which allows people from the surrounding areas to access sustainable transport networks, such as public transport, walking and cycling routes.

Figure 1.4 below illustrates the delivery of the CSET scheme in its entirety.

Figure 1.4: CSET Delivery



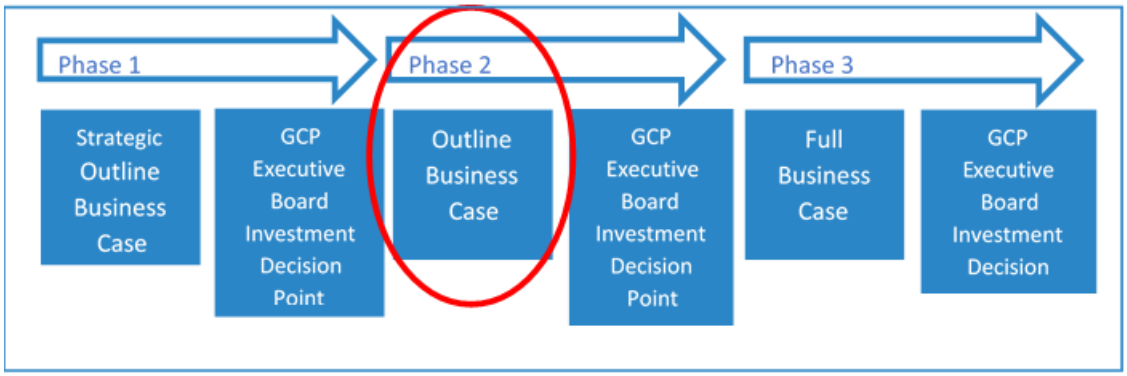
Source: Mott MacDonald

1.4 Scope of the Outline Business Case (OBC)

This Outline Business Case (OBC) Executive Summary is for Phase 2 of the CSET scheme, Phase 2 consists of the introduction of a dedicated public transport route with a new Non-Motorised User (NMU) route alongside it and a Travel Hub facility near the A11/A1307/A505 junction. The purpose of this OBC is to expand upon the findings of the SOBC, update the evidence base and the need for intervention and, following an appropriate appraisal process, present a preferred solution. The OBC also defines how the scheme will be funded, procured and delivered.

Figure 1.5 illustrates the Business Case process that the GCP has adopted for this scheme. It can be seen that the process undertaken by GCP in preparing the OBC aligns with the process as set out in DfT's *'The Transport Business Case'.* Consideration has also been given to GCP's independent assurance framework. A Full Business Case (FBC) for Phase 1 of the CSET scheme has been developed in parallel to this document and will be submitted to the GCP Executive Board in mid-2020.

Figure 1.5: CSET Phase 2 Business Case Process



Source: Mott MacDonald

In line with Department for Transport (DfT) requirements, the five separate documents noted at the start of this Executive Summary that constitute this OBC:

- Define the scope of the proposed scheme;
- Refresh the evidence base underpinning the need for investment;
- Confirm the scheme objectives;
- Update the case for change (the Strategic Case), confirming how the scheme fits with national, regional and local strategy and policy;
- Develop shortlisted options and document the appraisal process to determine a preferred option;
- Document evidence on expected impacts, including Value for Money (VfM), Wider Economic Benefits (WEB's) and Environmental and Social impacts and state the assumptions made (the Economic Case);
- Provide a breakdown of scheme costs, and funding requirements on a per annum basis. An overview of how costs have been derived will also be provided (Financial Case);
- Detail the procurement options considered and the basis for the selection of a preferred procurement option, as well as contractual arrangements for pricing and payment mechanisms and risk allocations (Commercial Case); and
- Set out clear proposals for governance, project planning, risk management, stakeholder management and evaluation (Management Case).

1.5 Document Structure

The remainder of this Executive Summary has been structured in accordance with the Five-Case model for Transport Business Cases in that it provides a summary of the key findings and outcomes of each of the five cases:

- **The Strategic Case** (document reference: 403394-MMD-BCA-00-RP-BC-0247)
- **The Economic Case** (document reference: 403394-MMD-BCA-00-RP-BC-0292)
- **The Financial Case** (document reference: 403394-MMD-BCA-00-RP-BC-0293)
- **The Commercial Case** (document reference: 403394-MMD-BCA-00-RP-BC-0231)
- **The Management Case** (document reference: 403394-MMD-BCA-00-RP-BC-0277)

1.6 Strategic Case

The Strategic Case identifies and presents the evidence base of the need for intervention in the study area and sets out the CSET Phase 2 scheme aims and objectives. This summary outlines the key stages in the development of the scheme options considered for Phase 2 and the preferred scheme option.

1.6.1 Policy Review

To ensure scheme development is aligned and supportive of wider national, regional and local policy and strategy a policy review was undertaken which examined a comprehensive range of policy and strategies, developed by the UK Government, Greater Cambridgeshire organisations, and local Cambridge bodies. There are consistent policy themes across all organisations, with a strong focus on sustainable transport, relieving congestion, improving active travel infrastructure, improving air quality, and delivering improvements to the provision and reliability of public transport.

The CSET Phase 2 scheme will enable the local authorities and organisations to meet both transport and economic goals, without exacerbating existing congestion and environmental issues. The CSET Phase 2 scheme is specifically mentioned across a number of local and regional documents as an important component of transport plans in Greater Cambridge.

1.6.2 Problems/Opportunities

A review of baseline evidence was undertaken in line with eight assessment themes, both strategic and transport specific, to understand the problems and opportunities present within the study area and relevant to the CSET Phase 2 that transport investment may alleviate and/or support. The eight themes were identified as:

- Socio Economic Overview, consisting of population and employment and skills data;
- Economy and Business;
- Land Use and Development;
- How People Travel;
- Environment;
- Wider Transport Provision, consisting of rail and bus provision, Park & Ride provision and walking and cycling provision;
- Highways Network and Traffic; and
- Road Safety

Problems and issues were first identified during the earlier stages of the Business Case process; but were reviewed within this thematic framework at OBC stage. The problems and opportunities are summarised, in the following tables and have formed a key role in both confirming/setting scheme objectives and option development for CSET Phase 2.

Population	Issues	Opportunities
	• The population of Cambridge and Cambridgeshire is growing rapidly and there is an increasing academic population. However, the current transport infrastructure is not evolving at a pace which matches population increase. • Transport infrastructure which is inadequately equipped to accommodate a rapidly growing population may force people to relocate away from the area, slowing the rate of economic growth which has recently been experienced. • Cambridge's dense population is overspilling into the periphery. A large proportion of the overspill are choosing to live to the south east of Cambridge and commute into Cambridge, placing increased pressure on radial routes in and out of central Cambridge.	• A greater number of people living in the area will create indirect and induced economic impacts, spending their incomes locally and using local services, resulting in growth in the local economy. • A sustainable transport network will allow Cambridgeshire to continue its success in academia, technology and research through close ties between campuses enabling knowledge sharing and innovation. A transport system that supports growth of the area and economic growth will benefit the wider UK economy. • Futureproofing existing transport infrastructure will support the requirements of future generations and will ensure a successful and sustainable future for Cambridgeshire. • Cambridge has a large student population who are more likely to use public transport and cycle modes of transportation. Enhancing the sustainable transport options will benefit the future growth of the Universities in Cambridge, enabling Cambridge and in turn the UK to maintain its international competitiveness while also relieving pressure on the transport network. • Providing a safe cycle and walking route will provide residents and students with travel options and will contribute to health and wellbeing.

Employment and Skills	Issues	Opportunities
	• Highly skilled professionals are required to fill a large proportion of the jobs on offer in Cambridgeshire. Employers in Cambridgeshire therefore recruit from outside of the immediate area in order to find individuals who meet the specific requirements of job roles on offer. • As a result, a large number of individuals work in Cambridgeshire but live outside of the area, leading to a high number of peak time commuters. • High numbers of commuters are causing congestion problems during peak times, particularly in south east Cambridgeshire as individuals travel to employment opportunities in central Cambridge and further sites along the A1307.	• Cambridgeshire has a large proportion of people working in professional, scientific and technical activities compared to the national average. Increased employment within these sectors presents the opportunity to further excel Cambridgeshire, and in particular south Cambridgeshire as a destination of excellence in science and industry. Thereby attracting more jobs, employment opportunities and investment and boosting the local economy. • CSET Phase 2 will provide attractive sustainable travel options that will help to accommodate existing and future commuter demand, providing a more efficient and sustainable transport network overall. Enhanced public transport and provision of an additional Travel Hub will alleviate pressure on the A1307.

Economy and Business	Issues	Opportunities
	• Cambridge is strategically important for attracting international investors into the UK and maintaining the UK's international competitiveness. However, this relies on Cambridgeshire continuing to offer strong links between businesses, training campuses and housing developments. • Rapid business creation and the number of businesses choosing to locate in Cambridgeshire has increased pressure on the existing transport network. • The existing transport network is inadequately equipped to accommodate current demand. If the network does not evolve at the same rate as economic growth, this problem will inevitably worsen. • Businesses may be deterred from investing if accessing the employment site is difficult for their workforce. • Existing businesses may struggle to attract labour from outside of the local area as journey times are long and unreliable. This may also deter investors and businesses locating to the area. • The rate of business start-ups has slightly declined recently. Cambridgeshire must establish the reason for this and seek to address concerns.	• Cambridgeshire has a worldwide reputation and strong existing economic base, and one which continues to grow. Infrastructure to support and facilitate continued access to employment and homes will equip the area to deal with expansion and thus support sustainable economic growth. • The proposed Travel Hub will improve accessibility to key employment sites, including Babraham Research Campus, Granta Park and Cambridge Biomedical Campus, encouraging investment and supporting existing businesses. This will also alleviate pressure on the A1307. • Cambridgeshire must ensure that sustainable modes of travel are attractive to an ever-increasing number of commuters. The proposed scheme will provide a viable alternative to private car travel, reducing congestion along key routes and providing benefits for the environment and quality of life.

Land Use and Development	Issues	Opportunities
	• The level of planned development in Greater Cambridge will increase pressure on the existing transport network, resulting in deteriorating journey times and journey time reliability. • Increased demand on the road network across south east and central Cambridge will result in congestion and associated air quality issues. • Planned employment space may be left vacant if accessing the sites is deemed unattractive and inaccessible by the potential workforce. • Planned development may not come to fruition at the rate anticipated in the Local Plan if transport infrastructure is not in place to support development and expansion.	• Addressing issues associated with Cambridgeshire's transport network will encourage planned development to come to fruition. Development will bring forward an unprecedented number of opportunities for economic growth. • CSET Phase 2 will improve active travel infrastructure along a section of the A1307, improving connectivity for pedestrians and cyclists. Improved active travel links will encourage commuters to adopt more sustainable modes of travel. • Preparing the transport network for future growth will secure a prosperous future for Cambridgeshire and encourage growth, post Local Plan period, and provide economic benefits to the rest of the UK.

How People Travel	Issues	Opportunities
	• Cambridge and South Cambridgeshire are net importers of people for work purposes. However, the transport network is not equipped to accommodate the number of inbound commuters. • 63% of Cambridge and South Cambridgeshire's workforce commute by car or van resulting in congestion and associated air quality issues across many of central Cambridge's key radial routes. • Ongoing growth at key employment sites across south east Cambridge and central Cambridge will result in increased commuter demand on the A1307 corridor where there is a lack of alternate travel modes to car. • The CBC employs a large number of people and is a significant generator of travel demand. 40% of staff at the campus access the site from the south east, using the A1307, resulting in congestion and delays at peak times.	• An increased number of sustainable travel options across south east Cambridge may encourage a modal shift away from car travel resulting in a more sustainable travel environment. • Improved public transport and walking and cycling provision across south east Cambridge could attract potential employees to opportunities in the area which will be essential to securing future growth of businesses in the area. • The proposed Travel Hub facility Is strategically located to intercept a large number of journeys heading into central Cambridge and towards the CBC and Babraham Research Campus. The onward public transport route and NMU route would provide a more sustainable link to key destinations whilst also providing journey time savings and journey time reliability for users.

Environment	Issues	Opportunities
Air Quality	• Vehicle exhaust and other emissions can have an impact on air quality, increasing NO2 and PM10 and PM2.5 concentrations that can be harmful to human health if they exceed certain levels in the atmosphere.	• Public Transport (PT) schemes are considered to have lower environmental impacts because they are able to move a greater number of people per unit of pollutant emitted. This scheme would encourage fewer private vehicles entering Cambridge where there is an air quality management problem, by providing high quality public transport. • A medium-term move to electric or other non-fossil fuel powered public transport vehicles will reduce NO2 emissions.
Noise	• The scheme is located in a largely rural environment which will experience some increases in noise along the route and adjacent to the Travel Hub.	• Noise mitigation in the form of earth bunds or acoustic barriers will be included in the design to minimise noise intrusion on sensitive receptors close to the route or Travel Hub.
Greenhouse Gases	• The government policy requires all development to deliver net zero carbon at the national level, which requires changes at every level in society.	• The scheme will lead to greater use of public transport in vehicles that are likely to be electric or other zero carbon powered vehicles in the medium term. Thus, the scheme should support GCPs move to meet government policy. • Landscape planting will provide a small amount of offsetting potential by carbon sequestration where belts of trees are planted as part of the scheme
Biodiversity	• There are Habitats of Principle Importance (HPIs) along the proposed route corridor which have the potential to be fragmented or isolated. This could cause an adverse impact on a range of protected species.	• There are opportunities for Biodiversity Net Gain along the proposed route corridor by planting ecologically valuable habitats. • There are opportunities to develop wildlife corridors by prioritising linking current areas of habitat together.

		• The immediate fields around the Nine Wells Nature Reserve are likely to be acquired by the scheme and would be planted up to increase biodiversity value around the reserve.
Landscape	• The current landscape in the area is open fields in a slightly elevated position. The introduction of access roads and hard engineering into the landscape is likely to have an adverse impact.	• There are opportunities for landscape mitigation to be planted to screen the Travel Hubs, so they have less impact on the landscape. • The design of the route would be carried out in a manner that minimised visual intrusion and impacts on landscape character, this would be achieved by changing the vertical profile of the route and sensitive planting along the route.
Heritage and Archaeology	• There are known archaeological remains of regional and potentially national significance within the footprint of the proposed route corridor.	• The scheme will be assessed using aerial photographic interpretation, geophysical surveys and trial trenching to better understand the buried archaeology along the route. This will increase knowledge and understanding of the setting around Wandlebury and the Magog Scheduled Monuments. • There is potential to incorporate some of the scheme drainage discharge into Hobson Brook – which is a heritage feature running towards the city and which is frequently dry. Increasing flows in the drainage feature could have heritage benefits which need to be assessed.
Water Resources	• The scheme crosses the flood plain of the River Granta and is within the footprint of the Source Protection Zone 2 of groundwater fed public water supplies	• The scheme design that crosses the River Granta will ensure that there is no increase in flood risk arising from the construction of the bridge(s) over the river. • There is opportunity to create water related habitat to compensate for lost flood storage in the River Granta flood plain. • The scheme will have SuDS drainage installed along the route and in the Travel Hub – this will ensure runoff does not contribute to flood risk whilst also ensuring runoff discharged to infiltrate into the ground does not affect the quality of groundwater that is used for public water supplies. • Opportunities to help with any wider flood management plans being developed by the Environment Agency will be explored during the EIA phase of the project.
Green Belt	• The proposed route corridor sits largely within the Cambridge Green Belt which has strong protection at both local and national level.	• Appropriate landscaping and sensitive routing of the scheme. Or siting of the Travel Hub will minimise impacts on Green Belt function.

Rail and Bus Provision	Issues	Opportunities
	• South east Cambridge is detached from the rail network forcing rail users to undertake lengthy multi-modal journeys, enduring inefficient interchanges and inadequate coverage. • Congestion along the A1307, coupled with multiple stops make bus journey times excessively lengthy and uncompetitive when compared with car travel. Discouraging uptake of bus travel. • The A1307 is not directly served by the Cambridgeshire Guided Busway. As such for commutes that start in locations where the busway is a convenient travel option, passengers will need to change to regular bus services to continue to employment locations along the A1307 corridor, beyond the CBC. Although tickets are transferable, the perception of a break in journey and the possibility of missing connections due to delay may lead to potential users still opting to travel by car.	• Improvements to public transport provision across south east Cambridge could encourage uptake, reducing the proportion of journeys undertaken by private car. • A reduction in the proportion of private car journeys across south east Cambridge could benefit the environment, creating a sustainable travel environment across south east Cambridge. • Better public transport connectivity, with services for key employment hubs could encourage commuters to adopt public transport as their primary mode of transport. • Possibility to integrate staff bus services to key employment hubs into the public transport network • Improved active transport routes delivered in tandem with new public transport infrastructure could encourage a greater number of multi-modal journeys.

Highways Network and Traffic	Issues	Opportunities
	• Heavy traffic flows are regularly experienced along the section of the A1307 approaching the CBC from the South. This is evidenced in ATC data analysed. Increasingly unattractive conditions are likely to deter further investment, restricting growth potential of the wider area. • Increasing demand across the A1307 corridor has had an impact on capacity, journey time reliability and possibly road safety. • Demand on the corridor is likely to increase, worsening congestion and journey times for users of the A1307. • The CBC is key attractor of vehicle trips along the A1307. With growth at the campus projected, traffic flows are likely to increase which will have an adverse impact on journey times along the route.	• Proposed improvements to the transport infrastructure along the A1307 will facilitate more reliable and accessible multi-modal journeys. This will incentivise shifts away from private car usage and reduce congestion around the CBC, ensuring growth continues. • Proposed infrastructure for public transport, walking and cycling along the A1307 will encourage the uptake of sustainable travel options along the corridor and reduce the demand on the road network. • Alternative modal options will reduce the dominance of car travel along the A1307, reducing congestion along the corridor and providing more sustainable travel options for users. • Congestion could be considered a key constraint for business investment and growth. Reducing congestion and improving transport provision could help improve network resilience. In tandem this could help encourage investment.

Road Safety	Issues	Opportunities
	• A high number of collisions have been recorded along the A1307 between Addenbrookes Hospital and A1307/A11 may be associated with high volumes of traffic for some sections of the route and congestion and delay. • A number of recorded collisions may be associated with high vehicle speeds for some parts of the route. This may contribute to the perception that the route is not safe for pedestrians and cyclists and discourage uptake.	• Alternative sustainable travel options will reduce the dominance of car travel along the A1307, thereby reducing congestion and delay along the corridor and will subsequently have a benefit to road safety. • Further improvements to cycling and walking provision will build upon interventions delivered in CSET Phase 1 to improve road safety for a number of users.

Park & Ride Provision	Issues	Opportunities
	• Despite Cambridgeshire's existing Park & Ride network, facilities are not well positioned to serve demand associated with growing economic hubs across south east Cambridge. • Ongoing development across south east Cambridge will place increased pressure on the Babraham Road Park & Ride site. Capacity here will not be able to accommodate demand.	• A strategically located Travel Hub facility could encourage a larger proportion of users to opt for more sustainable modes of travel- Parking at the Travel Hub and using public transport or cycling or walking for their onward journey. • A new Travel Hub facility in south east Cambridge will accommodate increasing demand for parking capacity across the area.

Walking and Cycling Provision	Issues	Opportunities
	• There is a lack of continuous active travel routes within the study area. The area particularly lacks connections to/from more rural settlements to the south east of Cambridge. • Alternate routes which are intended to serve the purpose of connecting south east Cambridge to central Cambridge do not adequately serve route demand. • Crossing points along the A1307 are few and far between and inadequately designed for NMU's, forcing users to cross high speed traffic unsafely. • It is likely that inadequate active travel provision along theA1307 for cyclists and pedestrians is a factor in low uptake of active travel modes along this route.	• Improved active travel infrastructure along the corridor could encourage increased uptake of cycling and walking, contributing to improved wellbeing and quality of life. • Higher uptake of active travel modes could reduce greenhouse gas emissions associated with car travel. • Adoption of active travel modes as a commuter transport mode could reduce congestion along the A1307 corridor as the modal share of active travel is maximised, improving journey reliability for public transport, further supporting modal shift away from car use. • The delivery of a Travel Hub could provide an efficient interchange between multiple transport modes, making sustainable travel easy and attractive for users, encouraging uptake of sustainable modes.

1.6.3 Aims and Objectives

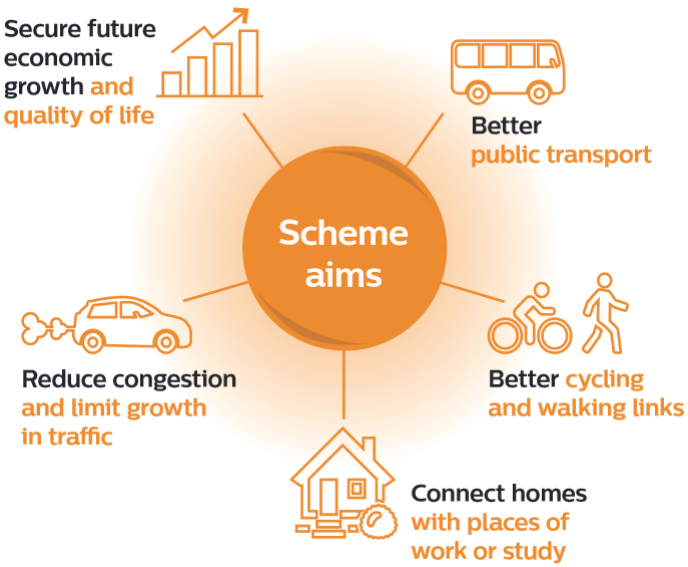
Scheme objectives were established at OBC stage to reflect updates to the evidence base and to guide the development and appraisal of the scheme. The following transport challenges associated with future growth to 2031 were identified:

- Traffic in Cambridge will increase by over 30% in the morning peak;
- Traffic in South Cambridgeshire will increase by almost 40% in the morning peak; and
- The time spent in congestion will more than double.

To tackle these challenges, GCP identified the following Transport Aims:

Ease congestion and prioritise greener and active travel, making it easier for people to travel by bus, rail, cycle or on foot to improve average journey times.	Keep the Greater Cambridge area well connected to the regional and national transport network, opening up opportunities by working closely with strategic partners.	Reallocate limited road space in the city centre and invest in public transport to make bus travel quicker and more reliable.
Build an extensive network of new cycle ways, directly connecting people to homes, jobs, study and opportunity, across the city and neighbouring villages.	Help make people's journeys and lives easier by making use of research and investing in cutting edge technology.	Connect Cambridge with strategically important towns and cities by improving our rail stations, supporting the creation of new ones and financing new rail links.

In addition to the GCP Transport Aims set out above, five study specific aims were developed, which are illustrated in the infographic below[6].



Coupled with both the policy review and the thematic evidence review, the study aims for the overarching CSET scheme, together with the GCP Transport Aims aided the development of the scheme specific objectives developed for this OBC.

[6] https://www.greatercambridge.org.uk/transport/transport-projects/cambridge_south_east_study/ [Accessed 14 May 2019]

The scheme objectives set out below have been designed to be Specific, Measurable, Achievable. Realistic, and Time Bound (SMART).

1
- **Support the continued growth of Cambridge and south Cambridge's economy.**
- Deliver journey time savings for commuters travelling by public transport to job opportunities in south east Cambridge and central Cambridge.
- Improve journey time reliability for users of the A1307 corridor.
- Provide the transport infrastructure necessary to sustain economic growth.

2
- **Relieve congestion and improve air quality in south east Cambridge.**
- Encourage use of sustainable transport modes for journeys through south east Cambridge and into central Cambridge.
- Enhance quality of life by relieving congestion and improving air quality in south east Cambridge.
- Relieve pressure at network pinch points.

3
- **Improve active travel infrastructure and public transport provision in south east Cambridge.**
- Deliver a High Quality Public Transport (HQPT) offer between Cambridge and Haverhill.
- Increase frequency of public transport services during peak periods.
- Reduce severance for cyclists, pedestrians and equestrians.
- Increase uptake of sustainable transport modes for commuter journeys.

4
- **Improve road safety for all users of the A1307 corridor.**
- Reduce the number of accidents at identified accident clusters along the corridor.
- Reduce the number of speed related incidents along the corridor.
- Improve the safety of crossing movements for cyclists, pedestrians and equestrians.

5
- **Improve connectivity to employment sites in south east Cambridge and central Cambridge.**
- Provide improved access to the Granta Park, Addenbrooke's Hospital, Cambridge Biomedical Campus (CBC) and a number of other employment sites in south east Cambridge.
- Increase modal options for commuters travelling to and from employment sites in south east Cambridge and central Cambridge by delivering a HQPT network and improved active travel routes for users.

The development of scheme options was guided by these objectives.

1.6.4 Options

Potential options for the public transport route alignment and the Travel Hub facility were generated and appraised as part of a bespoke four stage process.

Table 1.1: CSET Option Generation Process

CSET Option Generation Stage	Description
1A	Identify Route Alignment Options
1B	Route Alignment Sift
1C	Package Route Alignment Options and Travel Hub Options and Assess Feasible Option packages
2	Define Option Shortlist through INSET Sift and then Quantitively Appraise Shortlist to Identify an indicative preferred Option

1.6.5 Travel Hub Sites

A total of eleven Travel Hub sites were identified through the option generation and appraisal process and developed on the following criteria:

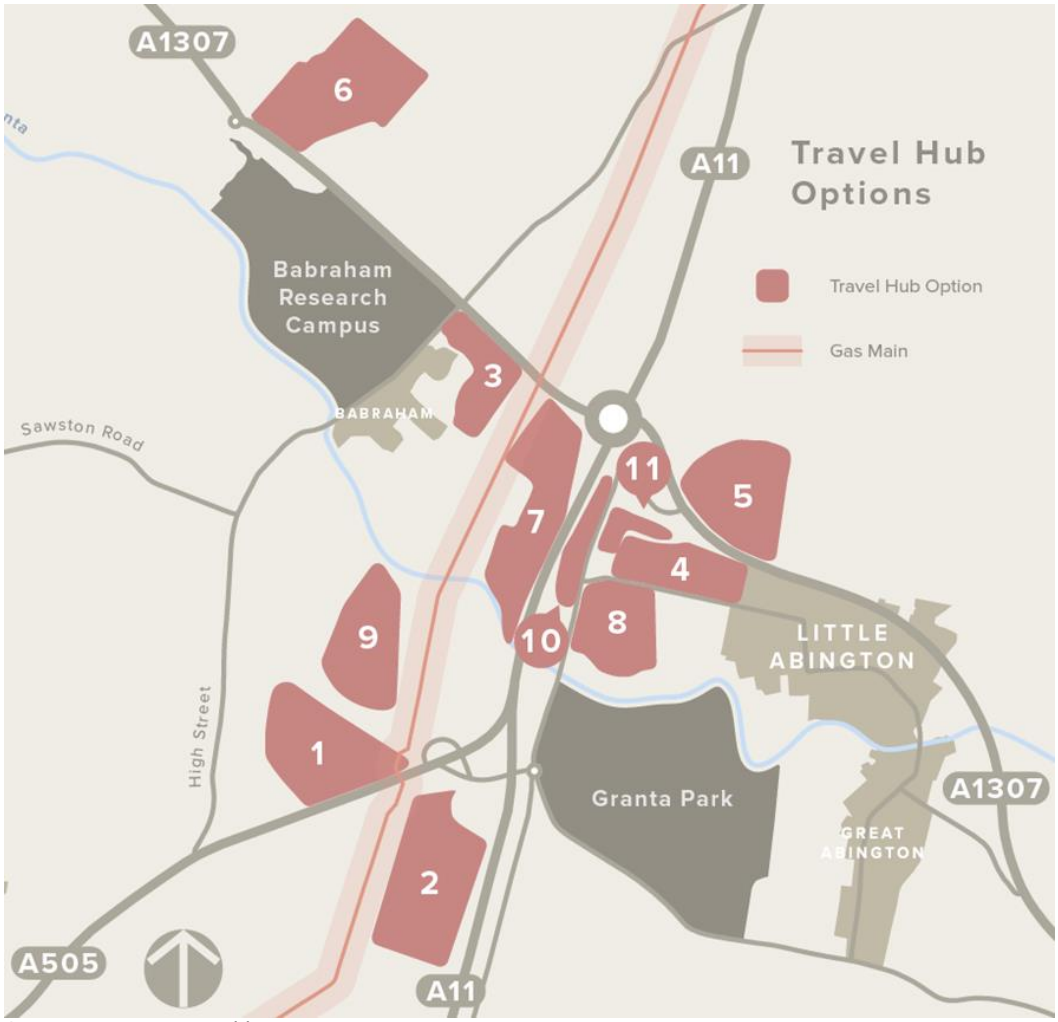
- Location – the new strategic Travel Hub facility should be located within close proximity to the intersection of the A11, A1307 and A505;
- Capacity – availability of sites of sufficient size to accommodate 2,000 to 3,000 spaces;[7]
- Accessibility, proximity and synergy to corridor route alignments;
- Compatibility with other emerging strategic transport infrastructure schemes; and
- Constraints to development.

The sites are summarised in Table 1.2 and shown in Figure 1.6.

Table 1.2: Travel Hub Site Locations

Site Name	Location
Travel Hub Site 1	located to the west of the A11/A505 junction
Travel Hub Site 2	located to the west of the A11
Travel Hub Site 3	located to the west of the A11
Travel Hub Site 4	located east of the A11
Travel Hub Site 5	located on the A1307 (east of the A11)
Travel Hub Site 6	located on the A1307, opposite the Babraham Research Campus roundabout
Travel Hub Site 7	located west of the A11
Travel Hub Site 8	located on Newmarket Road (east of the A11)
Travel Hub Site 9	located opposite Site 1, to the west of the A11/A505 junction
Travel Hub Site 10	located between the A11 and Newmarket Road
Travel Hub Site 11	located on Newmarket Road

Figure 1.6: Potential Travel Hub Sites



Source: Mott MacDonald

1.6.6 Route Alignment Development

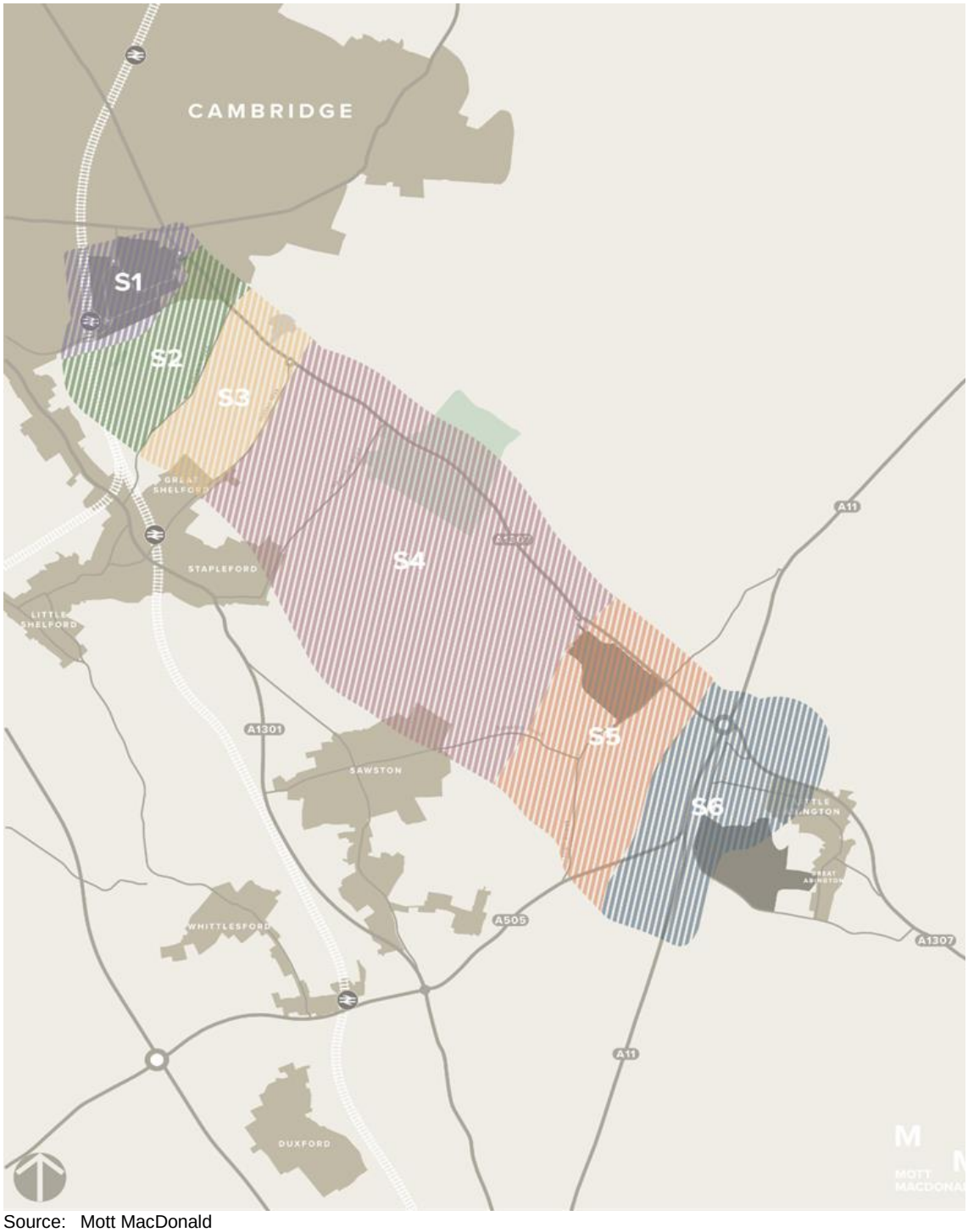
The length of the route within the study area between the Cambridge Biomedical Campus and the A11/A1307 Fourwentways junction was split into six segments and multiple route alignments were then developed in each of these segments.

The segments are summarised in Table 1.3 and shown in Figure 1.7.

Table 1.3: CSET Route Alignment Segments

Segment number	Description
1	CBC
2	CBC to Granham's Road
3	Granham's Road to Hinton Way
4	Hinton Way to Sawston Road
5	Sawston Road to High Street
6	Connection to the Travel Hub site

Figure 1.7: CSET Corridor Segments



Source: Mott MacDonald

A total of 38 route alignments were identified across all segments. A detailed description of each alignment is available in section 18 of the Strategic Case.

1.6.7 Shortlisting

A high-level sift at Stage 1B discounted route alignments from the initial group which were deemed not to be feasible based on political and environmental constraints. Following this sift 25 alignments progressed to the next stage of the assessment process.

The route alignments identified at the Stage 1B High Level Sift were combined with the 11 Travel Hub sites to generate 231 option packages at Stage 1C. A Gateway Assessment was then undertaken to discount option packages that did not meet key policy objectives or would cause hardship and distress such that it would render the scheme unacceptable by the local communities.

141 of the 231 options were sifted out as a result of this Gateway Assessment which left 90 options as a refined long list to progress to Stage 2 for formal appraisal.

The longlist of 90 option packages were subjected detailed qualitative sift and scored using a Multi-Criteria Assessment Framework according to how well they met criteria under the following themes:

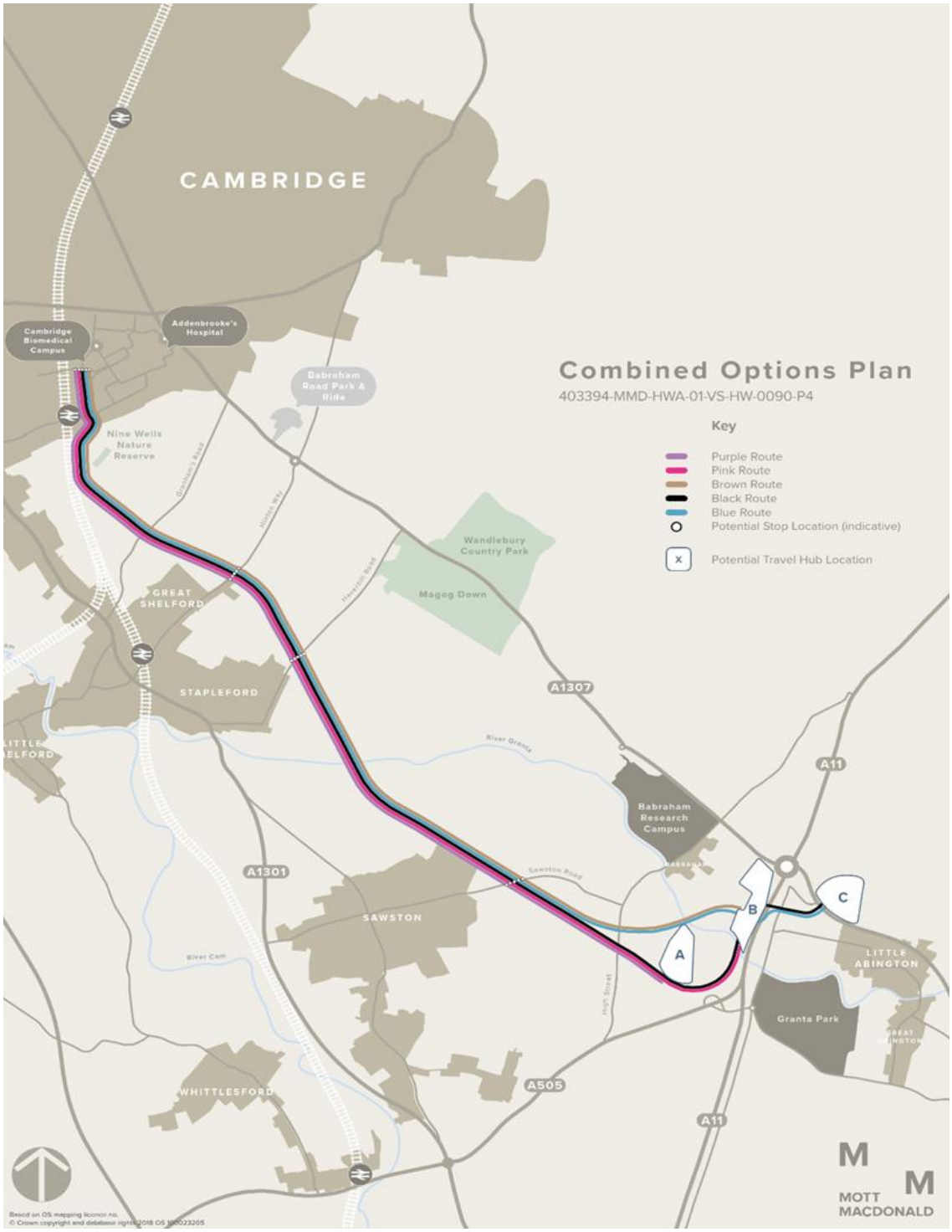
- Transport User Benefits
- Environment
- Deliverability
- Social Impact (Quality of Life)
- Wider Economic Benefits
- Alignment with Objectives; and
- Policy Alignment

A seven-point scoring system was adopted to assess how well options met the established thematic criteria, using a scale of -3 to +3, with -3 representing a very poor fit with criteria and +3 a very good fit. Following this assessment and further design refinement following consultation with stakeholders, five options were shortlisted for a robust quantitative appraisal; these were the options with the top five overall scores.

1.6.8 Option Shortlist

The five shortlisted options are shown in Figure 1.8, which details five full route alignments, denoted by colours; and three Travel Hub sites denoted by A, B and C. All five options follow the same route between CBC and Sawston, from which point they diverge into five alternative alignments, leading to one of three Travel Hub sites. All options would have the same public transport service frequencies and have similar levels of provision for pedestrians and cyclists.

Figure 1.8: Options Shortlist



Source: Mott MacDonald

1.6.9 The Preferred Option

The five shortlisted options identified through the process described in Section 1.6.4 to 1.6.8 were appraised from multiple perspectives utilising three mechanisms, namely:

- Mott MacDonald's in-house Multi-Criteria Assessment Framework INSET, (INvestment, Sifting and Evaluation Tool)[8]: A qualitative and quantitative assessment was undertaken of the shortlisted options against the themes listed in Section 1.6.7;
- Benefit Cost Ratio (BCR) calculation and Value for Money (VfM); and
- Consultation feedback.

Following an assessment against the above referenced elements, the preferred option was either the Brown option based on INSET Appraisal and Consultation or the Purple option based on the BCR. This narrowed the potential options down to either Travel Hub Site A (Purple) or B (Brown). The Black and Blue options which connected to Travel Hub Site C, were discounted from further consideration.

In order to assess the relative advantages and disadvantages between Site A and Site B, further analysis was undertaken using VISSIM microsimulation modelling software to consider the traffic impacts of the two sites and associated access junctions, it was found that there was no material difference between the two options.

Following consideration of all of the appraisal perspectives and mechanisms outlined above it was concluded that the Brown option was the best performing option in terms of both route alignment and Travel Hub site, performing best under the INSET appraisal process, which assessed options against a total 92 criteria covering a wide range of transport specific, strategic, economic, environmental and political factors, and being the preferred option in the public consultation, while ranking second for value for money.

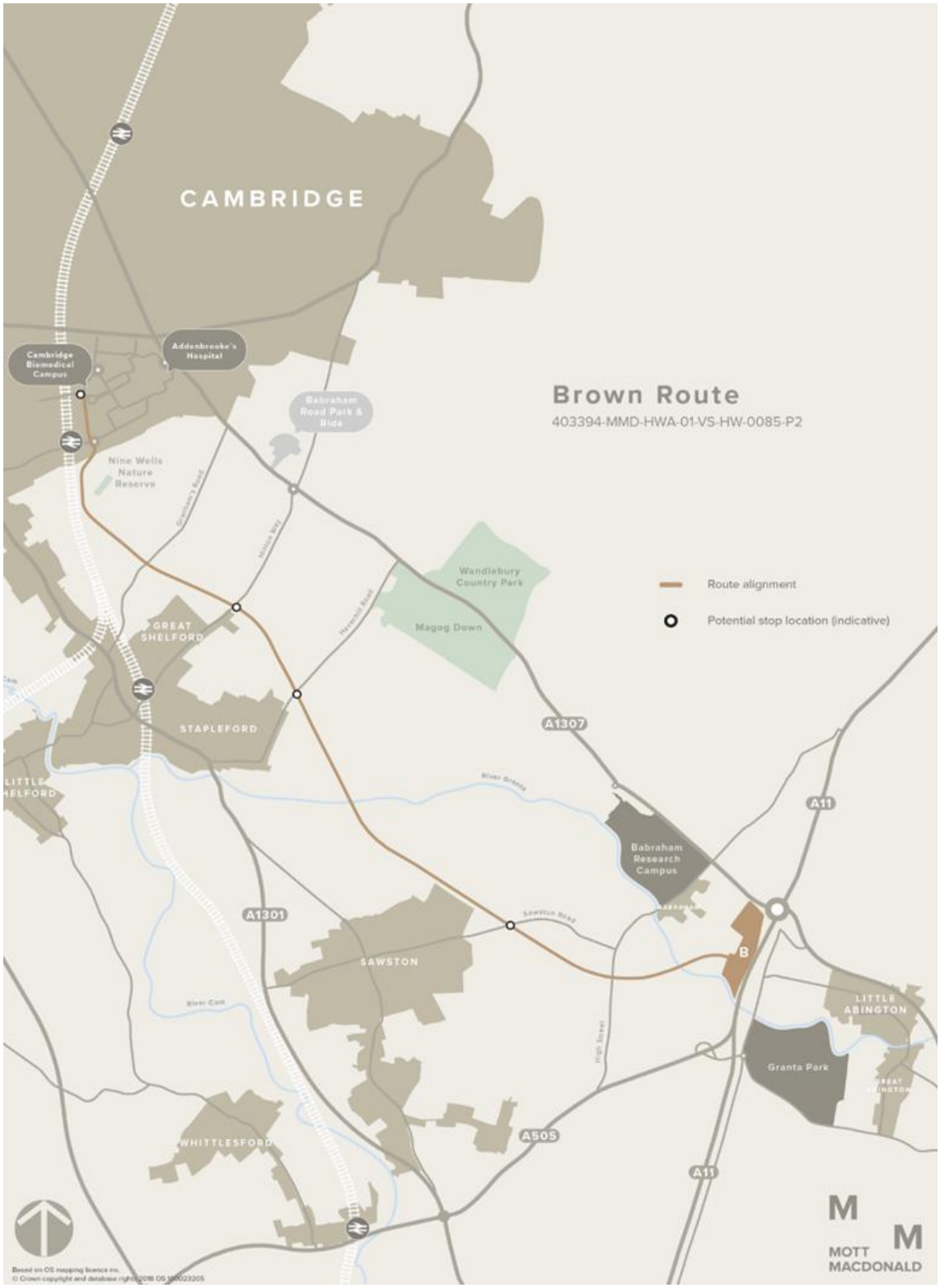
Although the BCR calculation showed that the Purple option provided the best value for money, this is only one element or rationale for implementing the scheme and it considers only a narrow set of economic criteria in the appraisal process. The main factor influencing the better performance of the Purple option in terms of VfM relative to the Brown option is the lower cost of the Purple option. This reflects the shorter route length required to connect to Site A and avoidance of the need for a second crossing of the River Granta.

Travel Hub Site B ultimately has greater potential to fulfil the role of a multi-modal Travel Hub and to facilitate enhancements to sustainable transport connectivity to both employment campuses than Site A. Site B is better located to intercept traffic on both the A1307 and A11, and to act as a public transport hub than Site A, to which access is compromised by the lack of a northbound exit from the A11 at the A505 junction. Site A is also more remote from Babraham Research Campus.

The Brown Route from Travel Hub Site B will therefore be taken forward for consideration by the GCP Executive Board as the recommended preferred option to be progressed for planning and further development to Full Business Case stage.

[8] An overview of INSET and how it is applied, together with the detailed results of the INSET appraisal can be found in the Options Appraisal Report Appended to the OBC as Appendix A, Document Reference 403394-MMD-BCA-00-RP-BC-0024 Rev C

Figure 1.9: The Preferred Option



Source: Mott MacDonald

The Brown option follows the same alignment as all other shortlisted options until just north of High Street, in that it:

- Runs along Francis Crick Avenue before exiting on the southern side of the CBC and running parallel with the railway;
- It then diverts to the east of Great Shelford and Stapleford before crossing the River Granta and running to the east of Sawston;
- Four passenger stops are proposed at the CBC, Hinton Way (Great Shelford), Haverhill Road (Stapleford) and Sawston Road (Sawston); and
- The route then crosses each of these roads and Granham's Road, via a new at-grade junction to be signalised with priority given to public transport vehicles.

Before reaching High Street the route then cuts across fields towards the A11 which includes a second crossing of the River Granta. The route ends at Travel Hub Site B, located to the south west of the junction between the A1307 and A11. General traffic would access it from the A1307 via a new roundabout junction whilst the site itself would have a linear arrangement in order to accommodate it between a high-pressure gas main, over which development is restricted, and the A11. The site could provide parking for up to 2,800 cars.

1.7 Economic Case

The Economic Case assesses options to identify their value for money, to fulfil the Treasury's requirements for appraisal and demonstrating value for money in the use of taxpayers' money. The economic, environmental, social and distribution impacts the scheme is expected to deliver are also examined.

1.7.1 Approach to Economic Appraisal

A shortlist of five options was identified through the INSET appraisal process, which is summarised in Section 1.6.7. The Economic Case details an additional process which compares the Benefit Cost Ratio (BCR) and Value for Money (VfM) of the five shortlisted options in line with DfT TAG guidance. The BCR is the ratio of the Present Value of Benefits (PVB) over the Present Value of Costs (PVC) and indicates how much benefit is obtained for each unit of cost.

The BCR and VfM were not included in the appraisal criteria established for INSET and as such the appraisal documented here is independent of the INSET process.

A Wider Economic Benefits Assessment and Social and Distributional Appraisals were also undertaken on the five shortlisted options, again adopting DfT TAG guidance and established appraisal criteria that were not included in the INSET appraisal.

1.7.2 Transport Modelling Framework

The Cambridge Sub Regional Model D Series (CSRM2) was used as the basis for the assessment of the shortlisted options. This has been enhanced with additional local refinements to its highway model and the creation of a new public transport model to provide a more accurate assessment of the public transport impacts of the options being considered.

1.7.2.1 Public Transport Journey Times

The base year CSRM2 SATURN highway model structure was initially reviewed along the A1307, A428/A1303 and A10/A1309 corridors. The modelled flows at various points along the A1307 corridor were compared to the observed data available to ensure the model was accurately reflecting current base year (2015) flows.

The public transport journey time benefit of the CSET Phase 2 proposal is presented in two comparison analysis (Inbound and Outbound), as follows for the Preferred option (Brown):

- Haverhill to Cambridge via Travel Hub Site B; and
- Travel Hub Site B to Cambridge Biomedical Campus (CBC).

The results from this modelling show inbound public transport journey times between Haverhill to Cambridge via Travel Hub Site B improving by up 12 minutes in the PM peak, 8 minutes in the Interpeak period and 6 minutes in the AM Peak compared to the Do Minimum scenario, as seen below in Table 1.4.

Table 1.4: 2026 Inbound Journey Times – Haverhill to Cambridge via Travel Hub Site B

Option	AM (07-10)		IP (10-16)		PM (16-19)	
Do Minimum (X13 AM, 13 IP, 13 PM)	48 mins		50 mins		54 mins	
Scheme Preferred Option	42 mins		42 mins		42 mins	
Saving & Percentage	6 mins	-13%	8 mins	-16%	12 mins	-22%

Source: Mott MacDonald

Outbound journey times from Cambridge to Haverhill via Travel Hub Site B improve by 8 minutes compared to the Do Minimum scenario in the AM, PM and Interpeak periods, as shown in Table 1.5.

Table 1.5: 2026 Outbound Journey Times – Cambridge to Haverhill via Travel Hub Site B

Option	AM (07-10)		IP (10-16)		PM (16-19)	
Do Minimum (13 AM & IP, X13 PM)	51 mins		51 mins		54 mins	
Scheme Preferred Option	43 mins		43 mins		46 mins	
Saving & Percentage	8 mins	-16%	8 mins	-16%	8 mins	-15%

Source: Mott MacDonald

Inbound journey times from Travel Hub Site B to the Biomedical Campus improve by 7 minutes compared to the Do Minimum scenario in the AM peak and 6 minutes in the PM Peak, as shown in Table 1.6.

Table 1.6: 2026 Inbound Journey Times – Travel Hub B to Biomedical Campus

Option	AM (07-10)		PM (16-19)	
Do Minimum (X13 AM, 13 PM)	16 mins		15 mins	
Scheme Preferred Option (Brown)	9 mins		9 mins	
Saving & Percentage	7 mins	-44%	6 mins	-40%

Source: Mott MacDonald

Outbound journey times from the Biomedical Campus to Travel Hub Site B improve by 8 minutes compared to the Do Minimum scenario in both the AM and PM peaks, as shown in Table 1.7.

Table 1.7: 2026 Outbound Journey Times – Biomedical Campus to Travel Hub B

Option	AM (07-10)		PM (16-19)	
Do Minimum (13 AM, X13 PM)	17 mins		17 mins	
Scheme Preferred Option (Brown)	9 mins		9 mins	
Saving & Percentage	8 mins	-47%	8 mins	-47%

Source: Mott MacDonald

1.7.2.2 Bus Passenger Demand

The following detailed passenger volumes are presented for the Travel Hub site and the on-route locations to provide context to the CSET Phase 2 service patronage. The extended services generate a relatively low level of patronage, as indicated in the economic appraisal, therefore the information is presented for those locations that influence the assessment.

Table 1.8 and Table 1.9 provide the total Travel Hub vehicles and passenger demand for 2026 and 2036. Overall the assessment indicates that on average 40% of the total P&R users are new users attracted by the provision of the Travel Hub and the CSET Phase 2 High Quality Public Transport (HQPT) service.

Table 1.8: AM Peak Hourly 2-way P&R Passengers

Option		P&R Total	New	% New
2026	Vehicles	447	180	40%
	Passengers	593	239	
2036	Vehicles	408	156	38%
	Passengers	563	215	

Source: Mott MacDonald

Table 1.9: PM Peak hourly 2-way P&R Passengers

Option		P&R Total	New	% New
2026	Vehicles	447	192	43%
	Passengers	593	255	
2036	Vehicles	394	174	44%
	Passengers	544	240	

Source: Mott MacDonald

The On-route locations of Sawston, Stapleford and Great Shelford represent key locations for the attraction of patronage to the CSET Phase 2 HQPT service. The service has been designed to accommodate and encourage patronage through dedicated stops. Table 1.10 presents the modelled patronage per stop location for the modelled periods and daily. Overall the service is popular with over 1,200 daily journeys.

Table 1.10: Period 2-way Passengers – On-route Demand

Forecast Year	Location	AM (07:00-10:00)	IP (10:00-16:00)	PM (16:00-19:00)	Weekday 12hr	%
2026	Sawston	121	241	127	**489**	40%
	Stapleford	19	30	15	**64**	5%
	Great Shelford	192	318	173	**683**	55%
	Total	**332**	**589**	**315**	**1,236**	**100%**

Source: Mott MacDonald

1.7.3 Transport Economic Appraisal

The Transport Economic Appraisal section details the assumptions, costs, and benefits which have been used to calculate the BCR in accordance with DfT TAG guidance. The following assumptions were made:

- Spend Profile – It has been assumed that all costs are expended over the period 2020 to 2025 inclusive;
- Risk contingency of 25% (P80) has been applied to costs;
- Costs have been uplifted by a Market Price Factor of 1.19;
- Costs have then been modified by GDP deflator from 2020 to 2010; and
- Finally, costs have been discounted to 2010 prices to arrive at a figure for the PVC.

Changes in costs for Noise, Air Quality and Greenhouse Gases are based on the standardised reduction in car based distance travelled. This is based on the Marginal External Cost (MEC) prices, as defined in TAG Table 5.4.2, which shows the pence per km saved for different road classifications. The A1307, which is the main impacted corridor, has been classified as a Rural A Road. Under this assumption:

- A saving of 0.2p per km is applied for Local Air Quality;
- A saving of 0.8p per km is applied for Greenhouse Gases; and
- Noise impacts are excluded based on the Rural 'A' Road classification within the MEC.

A 60-year appraisal period has been used, with a horizon year of 2083 and the opening year for the scheme was assumed to be 2024. Modelling was undertaken for 2026 and has been discounted to 2024.

The assessment excluded the contribution of additional revenue and operational costs (OPEX). It is likely that due to the volume of additional new users, the potential revenue generation would be a contributing factor, however, careful consideration is required as to who will benefit from this revenue before this can be considered in the assessment.

1.7.4 BCR and VfM Calculation

Benefits

The benefits assessment was divided into two classifications:

1. Journey time savings accounting for 80% of benefits and consisting of travel time savings for all users, including;
   - Travel Hub users (passengers);
   - Extended service users (passengers); and
   - On-route service users (passenger).

Travel time savings were monetised based on specified values of time (commute, work and other).

2. Non-user benefits classified as marginal external costs (MEC), amounting to the remaining 20% of benefits. These comprised of additional non-user benefits for distance saved by Travel Hub vehicles only, including:

- Congestion;
- Infrastructure;
- Accidents;

- Local Air Quality;
- Noise;
- Greenhouse Gases; and
- Indirect Tax (cost).

Table 1.11 below presents a summary of the monetised benefits calculated for the shortlisted options based on the identified approach.

- The Brown (Site B), Purple (Site A) and Blue (Site C) options generate reasonably consistent results in terms of journey time savings and MEC benefits, based on a different balance in benefits.
- The Purple option (Site A) generates the highest level of users at nearly 90 million over 60 years.
- The Pink (Site B) and Black (Site C) options generate noticeably lower levels of benefits, due to the extended route length relative to the Brown and Blue options and associated increased travel time.

Table 1.11: Summary of Option Assessment Monetised Benefits

Assessment Summary 60 Years	Site A PUR	Site B BRN	Site B PNK	Site C BLU	Site C BLK
Total Users (2-way)	**88.15**	**83.93**	**78.01**	**87.11**	**80.61**
Rank	**1**	**3**	**2**	**4**	**5**
Total Journey Time Savings (£m)	£45.03	£46.05	£41.18	£47.03	£42.03
Rank	**3**	**2**	**5**	**1**	**4**
MEC Non-User Benefits (£m)	£12.03	£11.06	£9.92	£11.73	£10.54
Rank	**1**	**3**	**5**	**2**	**4**
Total Benefits (£m)	**£57.05**	**£57.11**	**£51.10**	**£58.76**	**£52.57**
Rank	**3**	**2**	**5**	**1**	**4**

Source: Mott MacDonald Notes: (£m = millions)

Costs (CAPEX)

Table 1.12 presents for each of the shortlisted options:

- The raw capital cost (2019 prices); and
- The Present Value Cost (PVC), at 2010 prices with market prices adjustments and discounted.

The Purple option (Site A) has the lowest capital cost due to the avoidance of the cost of the infrastructure required on other routes to cross key obstacles i.e. the River Granta (Sites B and C) and crossing the A11 (Site C).

A cost comparison with the Purple option (Site A) indicates that approximately an additional £10m PVC is required to extend the route across the River Granta to reach Site B and a further £15m to cross the A11 to reach Site C.

This cost assessment identifies that the Site C options are unviable based on an additional cost of 38% to 45% relative to lowest cost option with limited additional benefit, as previously indicated.

Table 1.12: Capital Expenditure (CAPEX) Costs in £ millions

Costs CAPEX (£m)	Site A	Site B	Site B	Site C	Site C
	PUR	BRN	PNK	BLU	BLK
Rank	1	3	2	5	4
Cost CAPEX (£m)	£94.86	£109.24	£107.90	£137.29	£130.75
Present Value Cost (PVC) (2010 Prices, Discounted) (£m)	£70.24	£80.90	£79.91	£101.67	£96.82
% Difference Purple	0%	15%	14%	45%	38%
Difference Purple (£m)	£0.00	£10.66	£9.67	£31.43	£26.58

Source: Mott MacDonald Notes: (£m = millions)

Value for Money

The Value for Money (VfM) for the options assessment is based on the calculated Benefit to Cost Ratio (BCR), which is based on comparison of the Present Value of Benefits (PVB), shown in Table 1.11 and the Present Value of Costs (PVC), shown in Table 1.12Table 1.11. A positive number in excess of 1.0 is considered to represent an economic return on the initial investment.

The DfT has defined standard categories for the VfM based on the BCR, as follows:

- Very High - BCR greater than or equal to 4;
- High - BCR between 2 and 4;
- Medium - BCR between 1.5 and 2;
- Low - BCR between 1 and 1.5;
- Poor - BCR between 0 and 1;
- Very Poor - BCR less than or equal to 0

Table 1.13 below presents the BCR and VfM calculation for each of the shortlisted options.

Table 1.13: Option Assessment Value for Money Comparison

Economic Summary 60 Years (2010, discounted)	Site A PUR	Site B BRN	Site B PNK	Site C BLU	Site C BLK
(Present Value Benefits) PVB	£57.1	£57.2	£51.1	£58.8	£52.6
(Present Value Costs) PVC	£70.2	£80.9	£79.9	£101.7	£96.8
(Benefit Cost Ratio) BCR	0.81	0.71	0.64	0.58	0.54
BCR Rank	1	2	3	4	5
Difference PVB-PVC	(£13.17)	(£23.73)	(£28.84)	(£42.90)	(£44.25)
(Value for Money) VfM	Poor	Poor	Poor	Poor	Poor

Source: Mott MacDonald Notes: (£m = millions)

Based on the lowest cost in CAPEX, the **Purple Option** generates the highest BCR at **0.81** making it the **indicative preferred option under this appraisal mechanism**. However, this and indeed all options at present represent a Poor VfM case**,** based on the DfT appraisal criteria. For the option appraisal all options have performed similarly with the CAPEX being a key factor in the BCR.

The Brown Option is also considered as a viable option based on the direct access to Travel Hub Site B from the A1307, consistent performance in terms of PVB with the Purple option and a comparable BCR of **0.71**.

Based on this the two highest performing deliverable options from the appraisal have been identified as the Purple (Site A) and Brown (Site B) Options. These were then taken forward to operational assessment (microsimulation) modelling to assess the detailed operation of the access arrangements to each of the proposed Travel Hub sites.

Under microsimulation, the Purple option results in the best modelled operational performance. However, the differences relative to the Brown option are marginal.

1.7.5 Wider Economic Benefits

During the INSET appraisal process the five shortlisted options were qualitatively appraised against the following Wider Economic Benefits (WEBs) criteria:

- Supporting development and employment sites;
- Number of new homes supported;
- Number of new jobs created;
- GVA uplift;
- Land value uplift; and
- Increase in job catchments area.

Except for the “Increase in Job Catchment Area” criteria, none of the routes could reasonably be distinguished from one another in terms of Wider Economic Benefits. The result was that under the WEBs appraisal no one preferred option could be identified.

In summary it was found that the development of the three residential sites and single employment site in the area around the CSET scheme identified in the South Cambridgeshire Local Plan (2018) could produce:

- Approximately 404 gross jobs and £18m of gross GVA per annum; and
- A single uplift in land values of approximately £113m.

Although the sites identified in the area around the CSET scheme were assessed as not being dependent on the scheme, the scheme can still support the wider development of South Cambridgeshire. CSET will provide additional transport capacity that will enable people to access key sites at either end of the CSET route.

1.7.6 Environmental Impacts

A series of environmental issues were assessed as part of the INSET options assessment. Those environmental impacts that were able to be monetised as part of the economic appraisal for the preferred option include air quality, greenhouse gases and noise. The other environmental impacts that feed into the VfM statement have been assessed in a qualitative and non-monetised manner using TAG appraisal worksheets. The potential impacts of each issue can be seen in Table 1.14.

Table 1.14: Environmental Impact Appraisal

Discipline	Overall Potential Impact
Air quality	Neutral
Biodiversity	Moderate adverse
Impact on Green Belt	Moderate adverse
Greenhouse Gases	Neutral
Historic Environment	Major adverse
Landscape	Moderate adverse
Noise	Minor adverse
Water	Neutral

Source: Mott MacDonald

1.7.7 Social Impacts Appraisal

A Social Impact (SI) Appraisal was conducted for the five shortlisted options. A SI appraisal covers the human experience of a transport system and its impact on social factors not considered as part of economic or environmental appraisals. The results for the preferred option are shown in Table 1.15.

Table 1.15: Social Impact Appraisal Summary Scores for the Preferred Option

Social Impact	Brown Route
Accidents	Slight beneficial
Physical activity	Moderate beneficial
Security	Moderate beneficial
Severance	Moderate beneficial
Journey quality	Moderate beneficial
Option and non-use values	Large beneficial
Accessibility	Slight beneficial
Personal affordability	Neutral

Source: Mott MacDonald

1.7.8 Distributional Impacts Appraisal

The Distributional Impacts (DI) Appraisal looks at the impact of the schemes on vulnerable population groups, and whether any impacts are proportionate. The summary assessment scores for the DI appraisals can be seen in Table 1.16 below. Across all options, the DIs are broadly beneficial.

Table 1.16: Distributional Impact Appraisal Summary Score for the Preferred Option

Distributional Impact	Brown Route
User benefits	Moderate beneficial
Noise	Scoped out
Air Quality	Scoped out
Accidents	Moderate beneficial
Severance	Moderate beneficial
Security	Moderate beneficial
Accessibility	Moderate beneficial
Personal affordability	Neutral

Source: Mott MacDonald

1.7.9 Sensitivity Tests

A number of sensitivity tests were carried out around the preferred option. The purpose of the sensitivity tests was to understand if the intervention being proposed would still yield value for money given alternative cost assumptions and demand levels driven by higher growth scenarios.

Two sensitivity tests have been carried out to assess the sensitivity of the scheme to different assumptions surrounding scheme costs. These relate to:

- The level of optimism bias; and
- The treatment of risk.

Both these tests have been carried out under the core scenario and the high growth scenario and have relatively little impact on the BCR and no impact on Value for Money, which remains "Poor" under all scenarios.

1.8 Financial Case

The Financial Case outlines the affordability of the CSET Phase 2 preferred option, its funding arrangements and technical accounting issues. The case also presents the financial profile of the preferred scheme option and an overview of how the scheme will be funded.

1.8.1 Scheme Costs

Scheme costs for the preferred option have been developed based upon the designs for the preferred option. The scheme costs include base costs (construction, design, project management, environmental mitigation, statutory undertakings, land, and inflation), as well as risk adjusted costs based on the uncertainty in the scheme design and the assumptions on which the costs have been based at this stage.

The capital infrastructure cost of the scheme is £129,905,000 inclusive of risk (base cost: £103,924,000; risk cover: £25,981,000). The cost breakdown inclusive of risk at 25% (P80) is shown in Table 1.17, with a range of £123,671,000 (P50) to £134,062,000 (P90).

Table 1.17: Capital Costs – Infrastructure Adjusted for Risk

Cost Item	Cost (£)
Construction	68,676,000
Design	9,546,000
Project Management	12,547,000
Environmental Mitigation	2,936,000
Statutory undertakings	12,543,000
Land Costs	11,450,000
Inflation	12,207,000
TOTAL	**129,905,000**
Range	**123,670,000 to 134,062,000**

Other longer-term costs have been considered but at this stage due to commercial sensitivity have not been itemised, these include:

- Maintenance and renewal costs; and
- Operational costs.

1.8.2 Funding Arrangements

Funding for the CSET Phase 2 project is intended to be sourced primarily through the Greater Cambridge City Deal. The funding ask constitutes the £129,905,000 risk adjusted capital costs plus an amount of £2,400,000 expended between 2015 and 2019 on scheme design and development to date; this equates to a total of £132,305,000.

The first tranche of funding for the Greater Cambridge City Deal awarded to GCP is worth £100 million (£20 million per year). A further £200m will be approved subject to gateway review and released from April 2020 onwards, and a final £200m will be released from April 2025 onwards.

GCP will also seek future opportunities to recover an appropriate proportion of the scheme cost from local developer contributions, secured through the planning process. As it stands however, no immediate opportunities to secure developer contributions to the scheme have been identified.

1.8.3 Accounting Implications

The total cost of the CSET Phase 2 project is deemed affordable based on successfully securing funding from the Greater Cambridge City Deal and potentially through the GCP Future Investment Strategy. If costs increase or funding from the identified sources is not secured, then the GCP as scheme promoters will explore other options through the GCP Future Investment Strategy to underwrite these costs. The proposed scheme will also incur an increase in revenue costs in order to maintain the new assets. Options to fund any revenue cost shortfalls required to operate the new system will be explored and reported in the FBC. It is not anticipated that the CSET Phase 2 project has any State Aid implications. However, a full State Aid check will be carried out as part of the FBC.

1.9 Commercial Case

The Commercial Case sets out how CSET Phase 2 will achieve the aims and objectives of the scheme whilst also:

- **Achieving cost certainty** - within the funding constraints;
- **Minimising preparation costs** - regarding scheme design and construction delivery;
- **Delivering programme efficiency** - achieve an efficient delivery programme that enables start on site in 2022 and completion in 2025;
- **Ensuring continuity of project knowledge** - Maintain project knowledge to support scheme design and successful rebuttal of any project challenge;
- **Minimising risk** - Obtain contractor input to risk management and appraisals to reduce risk to a level that is as low as reasonably practicable;
- **Facilitating deliverability** - Engagement with contractors and stakeholders, throughout planning to scheme delivery, to support development of robust, buildable and deliverable proposals; and
- **Ensuring quality** - Ensure GCP receives a quality finished product including:

The above criteria were used to assess procurement strategies and sourcing methods were a and to identify a preferred procurement route.

1.9.1 Procurement Strategy

Procurement covers capital infrastructure (the Travel Hub and public transport route) and considers future potential purchase options for public transport vehicles and ongoing operating costs of those vehicles. Whilst maintenance and public transport vehicle operating costs are not

part of the funding ask, in accordance with DfT guidance they have been considered as part of the overall procurement strategy as they are an integral part of the scheme.

1.9.2 Tendering Procedure

As Cambridgeshire County Council are the Public Authority responsible for procuring the CSET Phase 2 scheme on behalf of the GCP the Tender Procedures available to them are detailed in Table 1.18.

Table 1.18: Tender Procedure Options

Tender Procedure	Description
Open Procedure	Bids are received from any applicant who fulfils certain minimum criteria. There are no restrictions on who may tender, meaning that some parties may not be suitable to carry out the work and has the potential to attract a large number of bidders.
Restricted Procedure	A two-stage process where applicants are required to submit a pre-qualification application, from which a short list of the most suitable applicants is drawn up. Bids are invited only from those applicants on the short list.
Competitive Dialogue Procedure	Applicants are short listed but the solution for the scheme is developed with the applicants, at which point a reduced number of applicants are asked to submit a final tender.
Competitive Procedure with Negotiation	Used where minimum requirements can be specified but negotiations with bidders may be needed to improve the initial tenders.

It is likely that the scheme will be procured using the Restricted Procedure option, although further consideration will be given to the preferred process at the FBC stage. The Restricted Procedure would enable a well-defined tender package, with defined timescales, to be published whilst still allowing variant tenders to be accepted.

1.9.3 Procurement Options – Infrastructure

The procurement options which have been considered in relation to infrastructure are detailed in Table 1.19.

Table 1.19: Infrastructure Procurement Options

Contract Type	Description
Traditional contract	A designer is appointed to complete a full detailed design and the tender would then be undertaken based on that detailed design; the appointed contractor would be responsible for construction only.
Design and Build	GCP would submit for tender the design developed during the statutory processes and pass it to the contractor to tender the detailed design and construction; a single stage design and build contract places the design and construction in one package.
Early Contractor Involvement (ECI)	A derivative of design and build but is used when engaging the contractor at an earlier time is seen to be advantageous, drawing in industry experience at the design and preparation stages.

Contract Type	Description
Design, Build, Operate and Maintain (DBOM)	The private sector party is responsible for designing, building, operating and maintaining the project.
Management Contracting	This method of procurement is suitable for fast track and/or complex projects that have a developing brief. It is less suitable where cost certainty before starting construction is required and where the client wishes to transfer risk to the contractor.

Table 1.20 presents a comparison between these five contract types.

Table 1.20: Procurement Options Comparison (Infrastructure)

Procurement Option	Level of Certainty		
	Cost	Time	Quality
Traditional Contract	Medium / High	Medium / High	High
Design and Build	High	High	Medium / High
Early Contractor Involvement	Medium	Medium	High
Design, Build, Operate and Maintain	High	High	Low / Medium
Management Contracting	Low	High	Medium / High

Source: Mott MacDonald

The Design and Build option has been selected as the preferred procurement option as it:

- Allows the scheme programme to progress without significant delay, enabling certainty of design in a shorter space of time;
- Achieves an appropriate balance between design progression and contractor input. Issues such as buildability and construction phasing can then be appropriately addressed; and
- It places the responsibility for design, including integration, with the contractor. It would be the responsibility of GCP to define its requirements. It will provide GCP with more opportunity to drive value for money and to transfer delay risk and interface risks to the contractor.

1.9.4 Procurement Options – Services

The current bus services along the CSET Phase 2 corridor operate mainly on a commercial basis. It is not the intention of the GCP to be directly involved with the procurement and control of the new HQPT services expected to operate on the CSET infrastructure as this is not within GCP's remit.

However, the Cambridgeshire and Peterborough Combined Authority (CPCA) have commissioned a study to assess different delivery model options for bus dervices and the CPCA Mayor is expected to make a decision on the future preferred option for delivering bus services in early 2021.

1.9.5 Procurement Options – Maintenance of Infrastructure

Procurement options were also considered for the maintenance of infrastructure but as this is closely tied to the the outcome of the preferred option for delivering bus services, no decision could be taken at this stage in the Business Case process.

1.9.6 Procurement Options – Consultant and Contractor Services

Several framework contracts available for the appointment of contractors and consultants have been considered for the CSET scheme and are detailed below in Table 1.21.

Table 1.21: Contractor and Consultancy Services Procurement Options

Contractor Framework	Consultant Framework
Eastern Highways Alliance (EHA)	ESPO Consultancy Service Framework
SCAPE Civil Engineering Construction Framework	Consultancy One Framework
Cambridgeshire County Councils Highways Service Contract	Homes England Framework
	Cambridgeshire County Council Professional Services Framework
	Crown Commercial Services (CCS) Project Management and Full Design Team Services (PMFDTS) Framework

Source: Mott MacDonald

At this stage in the Business Case process no preferred route for appointing either a contractor or a consultant(s) can be confirmed. The availability of suitable frameworks for the appointment of contractors will continue to be reviewed and the preferred method for appointing contractors confirmed at the FBC stage following further assessment. The preferred framework for appointment of a Consultant for technical support remains to be determined however it is likely to be either:

- ESPO Consultancy Services Framework; or
- Cambridgeshire County Council Professional Services Framework.

1.9.7 Form of Contract

There are three forms of contract that have been widely used in the UK for major civil and highway engineering schemes over the last 20 years. These are commonly known as:

- Infrastructure Conditions of Contract (ICC);
- Joint Contracts Tribunal (JCT); and
- New Engineering Contract (NEC) published by the Institution of Civil Engineers.

NEC has been selected as the preferred Form of Contract for delivery of CSET Phase 2 for the following reasons:

- It is recommended by the Office of Government and Commerce and written in plain English;
- It encourages co-operation between parties. (Other forms of contract are more liable to create confrontation);
- Early Warnings promote a proactive approach to risk resolution. (Other forms of contract do not include Early Warnings);
- There is more flexibility than ICC, which only provides for payment through re-measurement; and
- JCT contracts tend to be used for building contracts rather than civil engineering and highways contracts.

1.9.8 Contract Options and Payment Mechanism

The NEC is packaged into six main options (A-F) to suit the scope of works and appetite for risk between the employer and contractor. These are divided into two types, ‘Priced’ and ‘Cost

Reimbursable' type contracts with the payment mechanism based on activity schedule, Bill of Quantities (BoQ) or actual work undertaken.

Option C - Target Cost Contract with Activity Schedule has been selected as the most appropriate option as GCP has adequately defined the scope of works and wants to further develop it through design before construction. GCP would appoint the contractor on a Design and Build arrangement and manage the cost through pain/gain incentive on the target cost with open book accounting. This option would give GCP an element of control over design and the open book accounting on cost.

In terms of pricing, Option C relies on a pricing document, the activity schedule which is a list of activities with priced amounts against each activity. The contractor prices a lump sum for each activity in order to complete the works in accordance with the scope; it would not be necessary for GCP to provide quantities and so the contractor takes the quantity risk.

1.10 Management Case

As a relatively new consortium, the Greater Cambridge Partnership (GCP) have delivered a limited number of schemes within the current City Deal. However, the constituent members of the GCP have a long history of successfully delivering schemes both large and small in scale, to time and budget.

Cambridgeshire County Council (CCC), have delivered several large-scale transport projects across the County in recent years which are summarised below in Table 1.22. The successful delivery of these projects demonstrates CCC's ability and experience in relation to major infrastructure projects and ultimately GCP's capability to ensure successful scheme delivery.

Table 1.22: Previous CCC Projects

Project	Cost
The Cambridge Core Traffic Scheme	£6.9m[9]
Milton Park & Ride	£3.1m
The Addenbrooke's Access Road	£24m
The Cambridgeshire Guided Busway	£150m[10]
Longstanton and St Ives Park & Ride	Estimated at £9m for both sites[11]
The Ely Southern Bypass	£43m

1.10.1 Strategic Management

CSET Phase 2 is being promoted and managed by the GCP - the delivery body for the Cambridge City Deal with central Government. The GCP seek to deliver better, greener transport which will connect people to homes, jobs, study and opportunity.

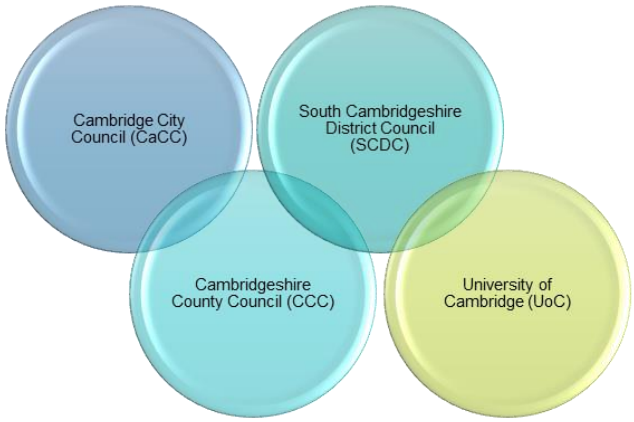
The GCP consists of representatives from several organisations detailed in Figure 1.10, plus a business representative. The partnership of Local Authorities, business and academia seeks to work together to grow and share prosperity and improve quality of life for the people of Greater Cambridge.

[9] This is an estimate as the scheme was implemented over a number of phases since 1996 and includes a range of supporting measures including streetscape works

[10] This is the total cost of the Cambridgeshire Guided Busway and include £109m contribution from CCC.

[11] This is an estimate as the costs were part of a wider package of Busway costs.

Figure 1.10: Organisations included in the GCP



Source: GCP/Mott MacDonald

The GCP operates as a Joint Assembly under powers delegated by its three local authority partners (CCC, CaCC and SCDC). It is led by a decision-making Executive Board which coordinates the overall strategic vision and drives forward the partnership's programme of work and is run in accordance with a clear governance structure, agreed by all partners.

1.10.2 GCP Executive Board

The Executive Board is made up of one representative from each of the five City Deal partners, the four organisations noted above plus the Business Representative.

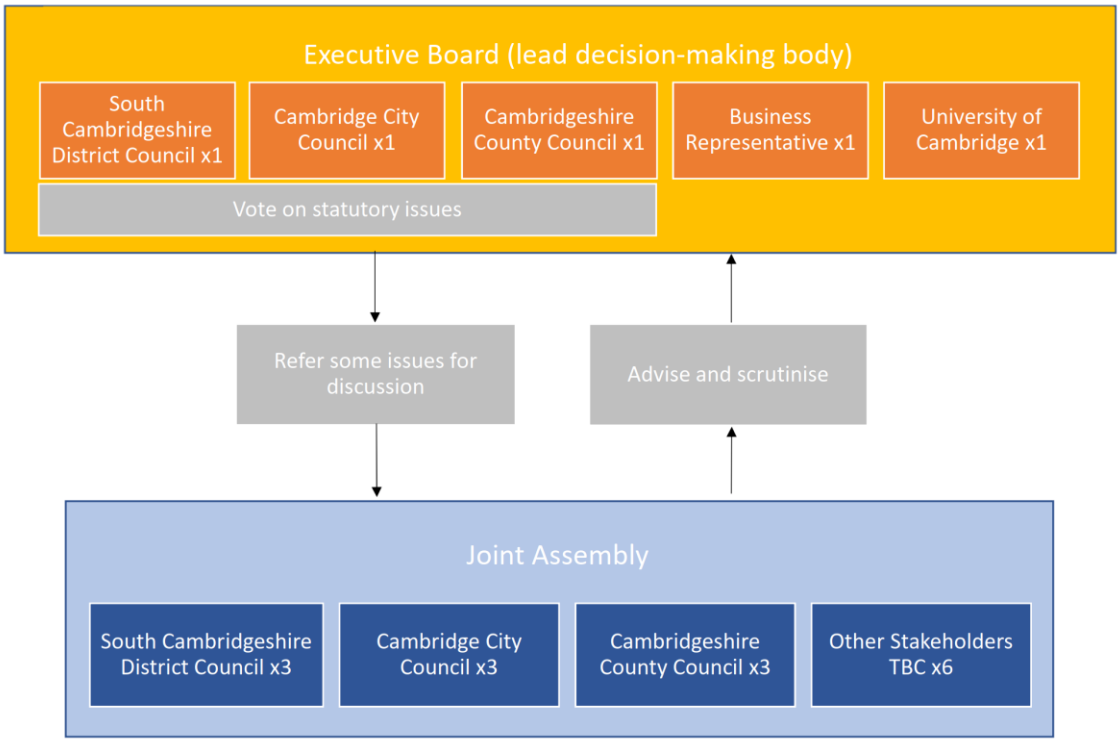
While the law governing Joint Committees only allows the three local authority representatives voting rights, they consider the advice of the Combined Authority's Business Board and University of Cambridge representatives, to make sure decisions take account of the views of the business and academic sectors.

1.10.3 GCP Joint Assembly

The Board is advised and informed by a Joint Assembly (which is an example of a Joint Committee of multiple Local Authorities). The Joint Assembly provides advice to the Executive Board, drawing on the broad expertise of its 15 members. The Assembly's membership is made up of three elected councillors from each of the three councils in the Greater Cambridge area, and reflects the political composition of their council.

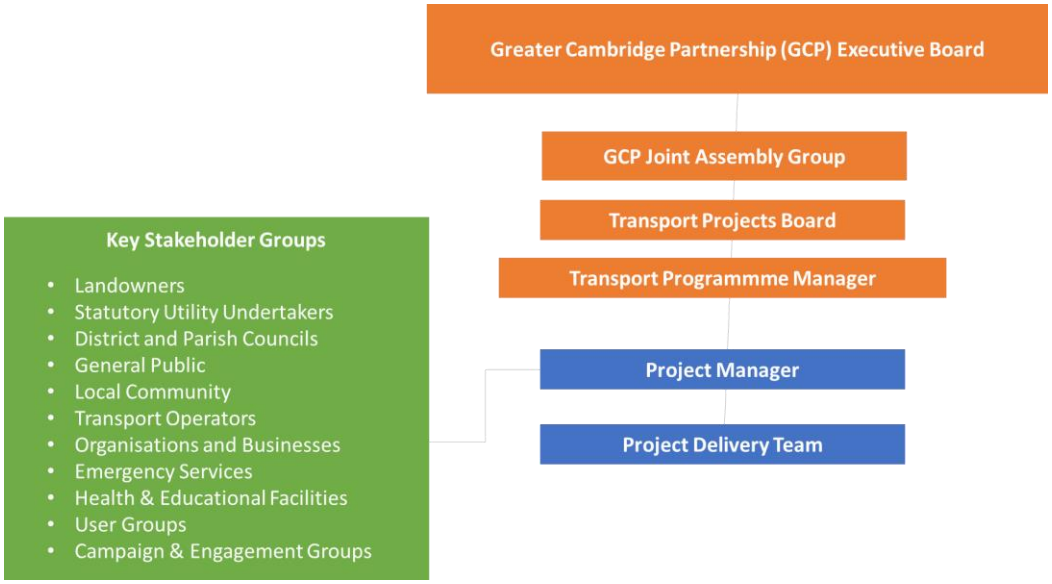
The structure of the Executive Board and Joint Assembly can be seen below in Figure 1.11 and the project Level Governance structure that feeds into these bodies in Figure 1.12.

Figure 1.11: GCP Strategic Governance Structure



Source: Mott MacDonald

Figure 1.12: Project Level Governance Structure



Source: GCP/Mott MacDonald

1.10.4 Project Management Team

The Project Management Team is accountable to the Project Board and ultimately the GCP Executive Board. It is the project management team who will manage the delivery of CSET

Phase 2. The Project Management Team will be responsible for the day to day delivery of the scheme and will ensure technical and financial control.

The Project Management Team coordinates inputs from technical advisors responsible for the delivery of the key workstreams in pursuit of the agreed programme, including:

- Design Development;
- Transport Modelling;
- Environment Assessment;
- Procurement;
- Business Case Development;
- Planning;
- Communications; and
- Land and Compulsory Purchase Orders.

1.10.5 Assurance and Project Plan

GCP have developed their own work and reporting stages which are based on key decision points aligned with the DfT Business case process.

Key Decisions are as defined in the GCP Assurance Framework and are the major ‘gateway’ decisions to allow the overall project progress. From Figure 1.13 it can be seen that development of the OBC aligns with the Feasibility Phase of the GCP Key Decision Framework and Stage 2 of the DfT WebTAG Business case process.

Figure 1.13: GCP Key Decision Framework

Major Infrastructure Project Development Key Phases	RESEARCH PHASE	GATEWAY	RESEARCH PHASE	GATEWAY	FEASIBILITY PHASE	GATEWAY
	Policy/ Local transport plan (LTP3), Strategic Studies/ Engagement	1	Initial Options	2	Consultation on Initial Options	3
	Strategy Stage	Key Decision	Delivery Stage	Key Decision	Delivery Stage	Key Decision
Delivery Stage/ Executive Key Decision	SS0	EKD1	DS1	EKD2	DS2	EKD3
	Policy & Strategy	Approval of Project Scope	Project Set Up / Initial Options	Approval to consult on initial options	Feasibility Study	Approval to design and consult on preferred option(s)
Definition	1. Development of a scope which sets out: the issues & problems the scheme will address, wit past lessons learnt, together with outline costs and potential funding sources. 2. Identify: the objectives/ approach Governance/ decision stream Exec key decision stages key stakeholders, key opportunities and key risks. 3. Hold a resources meeting using the agreed PID/ Agree QAA project team	***Document Checklist*** 1. Project Scope 2. Project Initiation Document (PID) 3. Project Management Plan 4. Initial Budget Estimate 5. Initial Risk Register 6. Communications Plan 7. Draft Business Case 8. Quality assurance audit (QAA) Resources plan	1. Transport modelling, 2. Conceptual design, 3. Initial engagement with stakeholders & initial options to take forward to first round public consultation. 4. Data collection and analysis, 5. environmental constraints mapping, 6. identify land requirements. 7. Route or other intitial options development, 8. high level transport and environmental assessment. 9. Public consultation planning. 10. QAA Options workshop	***Document Checklist*** 1. Scheme Definition Report: Consents strategy, Land strategy, Options strategy, Modelling strategy, Procurement strategy. 2. Initial Options Report Plan 3. Public Consultation 4. Budget Estimate 5. Communications Plan 6. Quality assurance audit	1. Public and stakeholder consultation on initial options 2. Analysis of feedback and identification of shortlist options, 3. Technical appraisal, 4. Environmental assessment, 5. Traffic assessment 6. Public consultation planning. 7. Strategic Outline Business Case (SOBC) 8. QAA Feasilbility workshop	***Document Checklist*** 1. Strategic Outline Business Case 2. Options Appraisal Report (OAR) 3. Public Consultation Plan 4. Communications Plan 5. Budget Estimate 6. Quality assurance audit

Major Infrastructure Project Development Key Phases	FEASIBILITY PHASE	GATEWAY	DECISION PHASE	GATEWAY	BUILD PHASE	END PHASE	MAINTENANCE
	Options Development & Consultation on Options	4	Develop Preferred Option	5	Delivery Programme		
	Delivery Stage	Key Decision	Delivery Stage	Key Decision	Delivery Stage	Post Project	
Delivery Stage/ Executive Key Decision	DS3	EKD4	DS4	EKD5	DS5		
	Preliminary Design	Approval of preferred option design	Detailed Design	Approval of project implementation	Construction (Mobilisation and Construction)	Key Documents	Maintenance
Definition	1. Public consultation on feasible options and analysis leading to preferred option selection. 2. Further stakeholder consultation. 3. Value Engineering. 4. Further preliminary design of preferred option, 5. Traffic assessment, 6. Environmental assessment leading to Outline Business Case for preferred option. 7. Road Safety Audit Stage 1 8. Build ability 9. Design sufficient for planning. 10. Prepare planning application & statutory consents. 11. Early Contractor Involvement. 12. QAA Prelim design workshop	***Document Checklist*** 1. Public Consultation Report 2. Preferred Options Report 3. Outline Business Case 4. Communications Plan 5. Procurement Plan 6. Budget Estimate 7. Land identification schedule 8. Approve land acquisition 9. Quality assurance audit	1. Development of preferred option for: environmental impact assessment, land referencing, land requirements, accommodation works, property cost estimates. 2. Negotiations with landowners and stakeholders. 3. Planning Application, Orders, 4. Compulsory Purchase, 5. Statutory Consents. 6. Public Inquiry 7. Detailed design, 8. Value Engineering, 9. Early Contractor Involvement. 10. Update risk register. 11. Full Business Case (FBC). 12. Prepare firm budget estimate based on contractor pricing and risk register. 13. Construction plan. 14. Maintenance and legacy arrangements. 15. Stage 2 Road Safety Audit. 16. QAA Detailed design workshop	***Document Checklist*** 1. Environmental Impact Assessment 2. Land schedule 3. Risk register 4. Construction Plan 5. Communications Plan 6. Budget 7. Full Business Case 8. Quality assurance audit	1. Mobilisation and Construction 2. Stage 3 Road Safety Audit 3. Public Liaison	1. Post project evaluation & Lessons learnt 2. Health & Safety file 3. As Built Records.	
Risk	1. Environment 2. Contractor 3. Procurement		1. Environment 2. Contractor 3. Procurement		1. Environment 2. Contractor		
Web-TAG (Web Based Transport Analysis Guidance)	**Stage 2 Further appraisal:** 10: Undertake Further Appraisal 11: Public Consultation on Appraised Options 12: Outputs from the Study	OBC	**Stage 3 Monitoring & Evaluation:** 13: Implementation Programme 14: Monitoring and Evaluation	FBC			

Source: Mott MacDonald

1.10.6 Scheme Delivery

Table 1.23 provides a draft outline programme of the key milestones and associated delivery dates for Phase 2 of CSET, following on from the scheme's progression to date.

Table 1.23: Delivery Programme - Key Milestones

Key Project Milestone	Date
Option Development and Appraisal	
Review initial optioneering undertaken by WSP	September-October 2018
Option development	January - March 2019
Option appraisal	March-September2019
Public Consultation on shortlisted options	September 2019
Options Appraisal Report	October 2019
Option Refinement	
Draft Outline Business Case (OBC)	February 2020
Final (preferred) option recommendation to Greater Cambridge Partnership Executive Board	May 2020
GCP confirmation of preferred option recommendation	June 2020
OBC completion	March 2020
FBC Development	
Detailed design completion	TBC
Statutory procedures completion	April 2022
Draft FBC	December 2021
Final FBC submission	TBC
Construction and Hand Over to Final Operator	
Appoint contractor	TBC
Construction start	April 2023
Construction completion and hand over	May 2025
Scheme opening	June 2025

Source: GCP/Mott MacDonald

1.10.7 Risk Management

The objectives of risk management for CEST Phase 2 are to:

- Increase knowledge about all aspects of the scheme and its delivery, to inform the production of plans, schedules and estimates that describe the work that will be conducted to deliver the scheme;
- Identify and provide for areas of uncertainty and ambiguity that may result in future change to scheme delivery, and identify ownership and responsibility for those changes;
- Develop and manage execution of plans that eliminate or minimise the effects of threats to the scheme, to minimise the occurrence of unanticipated issues that may delay progress, increase costs, or detract from the quality of the delivered scheme at all stages of delivery;
- Identify and develop plans that exploit opportunities for quicker, cheaper, or better delivery that arise from circumstances being more favourable than those assumed in the planning; and
- Develop fall-back or contingency plans to expedite the handling of risks that are realised, thereby minimising downside and maximising upside of risk impacts.

The scope of risk management addressed by this strategy extends to event and knowledge risks but excludes consideration of variability risks which are concerned with uncertainty in estimation of productivity, effort, duration, cost, or other variable parameters and the modelling of their effect on cost and timescales.

Risks were identified and grouped into one of 11 categories for the purposes of developing a risk register as shown Figure 1.14.

Figure 1.14: Risk Register Risk Categories

Source: Mott MacDonald

Risks within each category were scored by assessing both their likelihood and their impact on a scale of 1 to 5.

Based on the product of the likelihood of a risk occurring with its associated impact, the highest possible risk score is 25 (5, where the likelihood of occurrence is very high multiplied by 5, where the impact is catastrophic). The highest scoring inherent risks are noted in Table 1.24; only those with a score of over 15 are included, with 13 risks exceeding this value at the time of writing.

Table 1.24: Top Risks from the Risk Register

Risk	Impact	Inherent Risk Rating	Mitigation Measure	Post Mitigation Risk Rating
Ongoing funding subject to changes in priorities for allocation of finite resources. Competing schemes within City Deal programme.	Support may be withdrawn, or the continuation of the scheme may be conditional on a review, which would incur delay and additional cost preparing business justification for the review.	20	Escalate: Maintain good relationships with funding bodies and submit detailed and rigorous funding bids. Adequate resources will be devoted to maintaining funding bids.	15
COVID-19 situation and Government guidance do not permit programme-critical activities to be progressed	Delays and additional costs associated with prolongation.	20	Treat: Review current activities and those planned for the next 3 months. Identify those that can and can't be progressed. For those that can't be progressed, identify actions that can be taken to mitigate impact on overall programme.	15
A shortlist of route and travel hub site options has been produced. Political considerations that may influence the selection of a preferred option have not been available.	Extensive rework to identify further options and develop to a stage where they can be supported by CPCA.	20	Escalate: Work closely with CPCA (but it should be noted this is a strategic risk not a project level risk). At a project level, collaborate with CAM consultants to develop a preferred option that supports regional CAM extension to Haverhill.	12
The scheme schedule assumes that third party technical approvals are granted according to 'normal' timescales. It is known that where there are sensitive issues, or where the granting authority has resource constraints or competing demands, permissions and consents may take longer.	Delay pending processing of approvals. Additional costs, if further information is required	16	Treat: Early engagement with relevant contacts in Highways England, Environment Agency, Network Rail, etc. to agree programme for technical approvals. Develop alignment to minimise impact and interface with third party stakeholders.	4
Planning assumes that third party plans for other transport schemes do not introduce dependencies that affect scheme progress.	Delays are introduced into plans, delaying milestone achievement and increasing costs due to prolongation.	16	Treat: High level programme management is to undertake thorough liaison with all relevant transport authorities and scheme promoters. Collaborative planning between affected parties to align plans and share awareness of constraints.	6
The OBC is based on estimated values for land acquisition. Local land values may be volatile as the requirement for development land increases. Individual landholders may inflate demands for land critical to the scheme.	Increased costs for scheme delivery. Possible delay and cost impact if alternative designs/routes are considered to avoid contentious areas.	16	Treat: Ensure land cost estimates are robust and consider compensation payable. Negotiate with developers	8

Risk	Impact	Inherent Risk Rating	Mitigation Measure	Post Mitigation Risk Rating
The scheme is dependent on the development and production of the technological solution that is capable of running guided vehicles at the required speeds.	Delay and possible additional costs for the design and delivery of infrastructure associated with implementing a kerb-guided system.	16	Treat: Review state of art in technology areas and establish maturity at early stage. Avoid reliance on emerging technology unless risk can be managed. Development and implementation of testing programme to provide assurance of capability of the selected technology to support running guided vehicles at the required speeds, and associated design requirements.	12
Scheme design assumes that technological guidance will be approved in time for in-service dates to be achieved.	Design change to kerb-guided system.	16	Treat: Activities to promote change to GTMO. Engagement with CPCA, CCC, etc. Support to Mayoral engagement with DfT and Ministers. Need to understand parallelism in plan between legislation and scheme. Allow the possibility of a change to kerb-guided within the envelope and design.	12
GTMO does not currently provide for technological forms of guidance. Assumed that legislation will have amended the GTMO to accommodate technological guidance.	Delay pending alternative approach to consents, or to allow the presentation of a kerb-guided scheme.	16	Treat: Legal advice and promotion of a revision to the GTMO.	12
It is intended to use the TWAO process as a route to gain planning consent.	DfT TWA unit may require additional information and justification to accept the application. Delay and additional cost may be incurred if the challenge has to be addressed during the inquiry.	16	Treat: Continue dialogue with DfT. Use of legal advice. Ensure consistent approach and decision making across C2C and CSET Phase 2 schemes.	9
Planning constraints protect the Green Belt. Two shortlisted sites for the Travel Hub are within the Green Belt. The Green Belt may	Additional work (cost and delay) to justify the use of a Green Belt location. Additional mitigations required to landscape and/or hide the facility, incurring additional cost and	15	Treat: GCP to commission assessment of the impact of the project on the Green Belt, consistent with other GCP transport projects. Report to be completed by end of Q1 2020 and included in evidence base for scheme.	10

Risk	Impact	Inherent Risk Rating	Mitigation Measure	Post Mitigation Risk Rating
lead to a lower performing site being favoured, if that site is outside the Green Belt, leading to a sub-optimal solution or the loss of user benefits in order to maintain protection of the Green Belt.	time into the programme. Other option preferred, outside the Green Belt, delivering (potentially) lower user utility.		Early discussions with Planning Authority to understand key issues and evidence base required. Early discussions with key stakeholders. Development of a robust design and evidence base.	
Some elements of the design have not been costed in detail, but an allowance has been made based on estimates and previous works.	Re-evaluation, design changes, and value engineering will result in delays and additional costs.	15	Treat: During design development, cost estimates will be reviewed, and allowances replaced with detailed costings where possible. Client property consultants will develop detailed costs based on land acquisition plans. Regular liaison meetings to progress land costs.	6
Procedure for scheme submission has options around approach that affect submitted materials, consultation, form of application.	Responding to a legal challenge incurs additional time and cost, delaying the start of the scheme and its final delivery.	15	Capture every product required legally in the plan and programme for the next stage. Create plan and programme for next stage of the project to prepare and deliver the TWAO submission, following completion of the governance process to select a preferred option. Ensure that all statutory procedures are followed to ensure that there is no scope for a judicial review - use of GCP legal advisors. Identify potential vectors for challenge and review actions required to achieve compliance in these areas.	5

Source: Mott MacDonald

1.10.8 Engagement and Consultation at SOBC Stage

The consultation strategy at SOBC stage was designed by the GCP Communications Team with input from the County Council's Research Team.

Public consultation events took place between February and April 2018; the dates and locations of the events are set out in further detail in the Management Case.

1.10.9 Key Findings from Consultation at SOBC Stage

Consultation focused on three alignments, referred to at SOBC stage as Strategies 1, 2 and 3. Strategies 2 and 3 were on-line options, making use of or running alongside the existing A1307 highway corridor. Strategy 1 was a new offline route that would provide dedicated infrastructure for public transport vehicles and non-motorised users. Strategy 1 was found to have the most support with 64% of responses in favour of this proposal.

1.10.10 Engagement and Consultation at OBC Stage

Consultation at OBC stage ran for 8 weeks from 9 September to 4 November 2019 and sought the views of the general public on the proposed alignment for the new route (Strategy 1 at SOBC Stage) with alternative route options to the east of Sawston, linking to three potential Travel Hub locations near the A11/A1307/A505 interchange.

1.10.11 Key Findings from Consultation at OBC Stage

Quantitative data was recorded through the consultation questionnaire (online and hard copy) with 702 responses received in total, though not all respondents answered all questions. A detailed account of the feedback can be found in the Statement of Community Involvement that accompanies this OBC as Appendix E, document reference 403394-MMD-BCA-00RP-BC-0371, however the high-level responses to key questions that influenced the selection of the preferred option are included in the Management Case chapter.

It was found that 382 out of 693 responses indicated general support for the scheme proposals, compared to 274 who opposed the proposals to some degree; 37 of the respondents expressed no opinion.

1.10.12 Monitoring and Evaluation

The Department for Transport's (DfT) guidance 'Monitoring and Evaluation Framework for Local Authority Major Schemes'[12] forms the basis of the monitoring strategy alongside the GCP's Assurance Framework.

The DfT guidance has been produced to provide a consistent approach to reporting a scheme's value for money and conducting review in a proportionate and targeted approach. The document sets out the requirements for the monitoring of schemes and outlines three tiers of monitoring and evaluation, these are:

- Standard monitoring;
- Enhanced monitoring; and
- Fuller evaluation.

It is currently recommended for CSET Phase 2 to broadly follow the DfT's enhanced monitoring practice as the total scheme cost from inception in 2015 through to completion in 2025 of £132,305,000 exceeds the £50m mentioned in the DfT framework and the final scheme specifics have not yet been fully developed at OBC Stage.

Following the enhanced monitoring guidance, the scheme will be monitored against a set of standard measures. The various monitoring measures are considered in terms of the key stages of the scheme, these are:

- Inputs (i.e. what is being invested in terms of resources, equipment, skills and activities undertaken to deliver the scheme);
- Outputs (i.e. what has been delivered and how it is being used, such as infrastructure built, bus services delivered);
- Outcomes (i.e. intermediate effects, such as changes in traffic flows, modal shifts); and
- Impacts (i.e. longer-term effects on wider social and economic outcomes, such as supporting economic growth).

[12] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/9154/la-major-schemes-monitoring-evaluation.pdf

Upon the development of final scheme specifics at FBC stage, the monitoring and evaluation plan will be reviewed and re-confirmed.

1.10.13 Reporting

To evaluate the impact and understand the effectiveness of the scheme in meeting its objectives, GCP will arrange to collect and publish relevant data, comparing the conditions before and after scheme opening.

GCP will publish an initial report based on data collected at least one-year post scheme opening, and a final report based on further data collected approximately three years after scheme opening. The results of the evaluation will be independently reviewed and will be made available, including publication on the relevant website.

1.10.14 Evaluation

To evaluate the success of the scheme, and whether the objectives defined for CSET have been met, a structured outline monitoring and evaluation plan has been established which has been divided into two parts:

- Monitoring of project delivery, which focuses on scheme inputs and outputs; and
- Monitoring of the achievement of the scheme objectives, which focuses on impacts and outcomes.

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