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Slough Mass Rapid Transit Phase 2

Business Case Report

Hampshire County Council & Slough Borough Council

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1. Introduction

The aim of this document is to present the Business Case for the Slough Mass Rapid Transit (SMaRT) Phase 2 scheme to the Berkshire Local Transport Board (BLTB), as part of Step 3 within its scheme assessment and approval process[1]. The Business Case requests funding approval for £13.25 million from the BLTB.

1.1. Scheme Location and Vision

Slough Borough is characterised as a dense urban environment bounded by green belt, situated in the east of Berkshire and in the Thames Valley Berkshire sub-region. The A4 is a strategic east-west public transport corridor that links Maidenhead, Slough and Heathrow and plays an important role in providing surface access to the airport. It links to the Slough Trading Estate and key rail and highway routes (Burnham, Langley and Slough stations and the M25/M4 intersection). In the centre of the corridor, Slough railway station provides direct, frequent services east to London Paddington, and west to Oxford, Didcot Parkway and Reading and to Worcester, Great Malvern and Hereford on the Cotswold Line. Access to Heathrow, and to local rail stations, would be enhanced by highway improvements across the corridor.

Ensuring there is an accessible sustainable modes transport route to, from and around the town and to Heathrow for residents, employees and visitors will help facilitate development and economic growth through housing delivery and attraction of businesses. Without the investment required to both improve sustainable transport and to mitigate the existing and forecast levels of congestion in Slough, there is concern that the viability of the ambitious employment and residential development, required to fulfil the sustainable economic growth objectives of the Thames Valley Berkshire (TVB) sub-region, will be hampered. Section 2.2 overs the Business Strategy and Policy Context, where strategic objectives are considered in light of the scheme.

A number of schemes have been delivered in recent years in Slough, particularly on the A4 London Road corridor (SMaRT Phase 1, please see below). These schemes have a dual focus on enhancing overall highway capacity and reducing journey times and improving reliability for bus services.

Of the three recent projects delivered by SBC, two (Copthorne Roundabout and Windsor Road) focussed on highway capacity improvements. The third delivered bus priority on Slough Trading Estate and on the A4 London Road. Bus lanes provide extensive bus priority on the A4 London Road between the Langley High Street and Upton Court Road junctions, near continuous eastbound, and with a significant section westbound on the approach to Upton Court Road junction. These bus lanes complement bus priority already provided between the Uxbridge Road and Upton Court junctions, some of it provided under the Better Bus Area Fund initiative, and the other major improvement to circulation, the 'hamburger' roundabout at the Uxbridge Road junction.

The section of route between Brands Hill and Upton Court Road junction sees a bus service frequency of 8 – 9 buses per hour, indicating significant demand for these bus priority measures. However, this does not address all of the problems on the route and therefore Slough Borough Council is working with Heathrow Airport Ltd to deliver another tier of transit service – SMaRT – between the Trading Estate, Town Centre and Heathrow Airport.

The SMaRT scheme aims to improve this corridor by providing a bus service that is quicker, more frequent, and more reliable. In addition, by reducing congestion along this strategic route, the scheme also aims to improve the journeys of the 20,000 vehicles that use the A4 Bath Road every day. The role of SMaRT in modal shift, by taking people out of their cars and onto local bus services, and alleviating congestion is recognised in the TVB Strategic Economic Plan (SEP) Implementation Plan.

SMaRT Phase 1 has already been delivered by Slough Borough Council (SBC) and focused on the A4 corridor between Slough Trading Estate, the town centre and Langley. The Phase 1 scheme delivered a combination of highway infrastructure measures aimed at delivering journey time

[1] Scheme assessment and approval: Step 1 – Long list of schemes, Step 2 – programme entry stage, Step 3 – Full Business Case, Step 4 – Financial approval

reliability performance improvements of bus services while also improving the efficient operation of the highway network for general traffic, and complementary improvements to bus service provision.

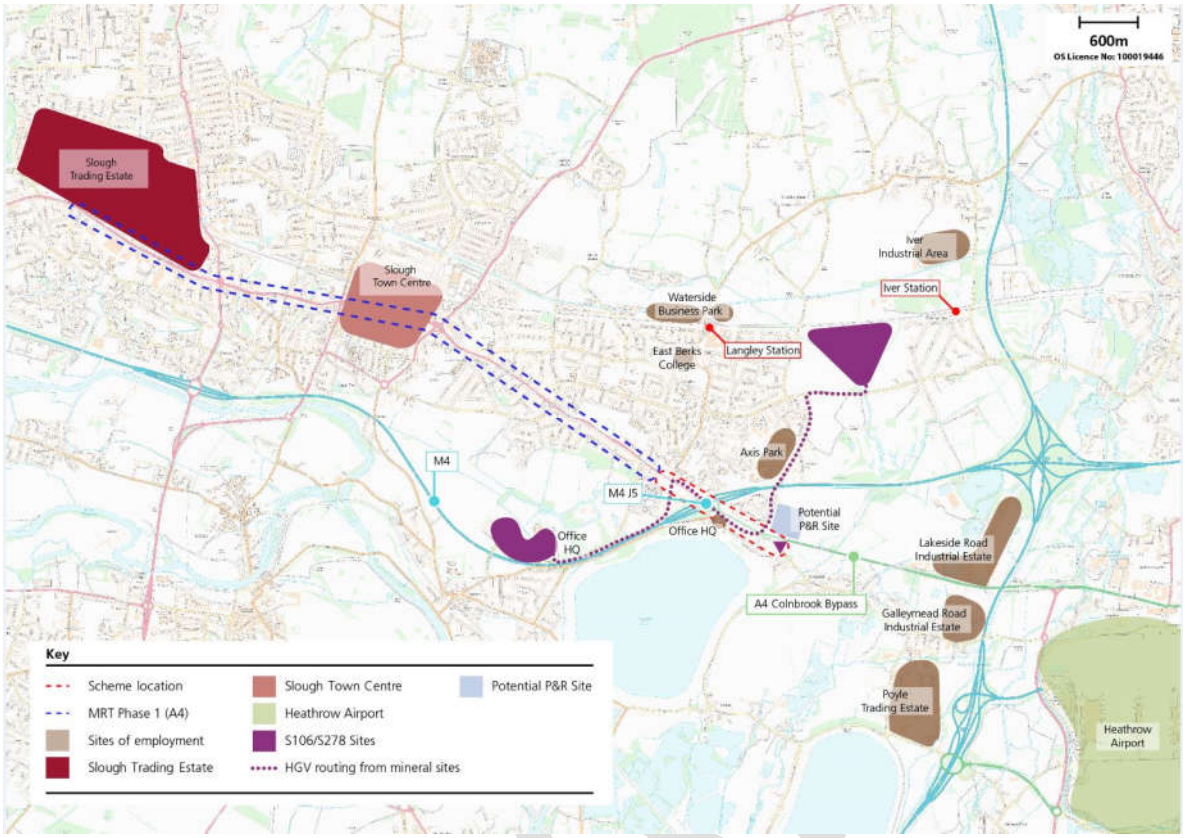
SMaRT Phase 2, the subject of this report, covers the eastern section of the A4 corridor between Langley and Heathrow, particularly between the High Street Langley and Sutton Lane gyratory at Brands Hill. The area largely comprises a mix of low density residential, small businesses and hotel use. The scheme is designed to relieve congestion on this eastern section of the A4 corridor, improve journey time reliability and enhance sustainable accessibility to the future housing and employment sites. As well as highway works that enable improved bus journey times and reliability, a Park & Ride (P&R) is included to further attract car trips to Slough and Heathrow off the roads. It also includes Urban Realm improvements to attract walking and cycling trips. SMaRT Phase 2 will help bring forward the delivery of housing and commercial development in the town centre over and above that previously support by SMaRT Phase 1.

The SMaRT Phase 2 elements are:

- Highway Improvements:
    - Revisions to the South East quadrant of the M4 Junction 5 roundabout with a modified slip road for eastbound traffic;
    - Modifications and signal provision at the Sutton Lane gyratory; and
    - London Road link widening to 2 lanes westbound between M4 Junction 5 roundabout and Sutton Lane;
- A Park & Ride facility located on land adjacent to M4 Junction 5 and Sutton Lane – including a bus station, stands, passenger facilities and parking areas with bus services connecting to Heathrow and Slough. It will contain a terminal building and staff presence and appropriate walkways and urban realm to provide a good interchange environment. It will also include a vending machine, cycle parking, Slough Cycle Docking Station and Electric Car Charging Points (outside of the station); and
- Urban realm enhancements including walking, cycling and bus shelter facilities to enhance the local area and attractiveness of sustainable modes on the northern frontage of the A4 between Langley High Street and the M4 J5 roundabout.

Section 2.13 explores in the scheme in more details shows the location of SMaRT Phase 2 components in the context of SMaRT Phase 1 and local key trip attractors and developments.

Figure 1-1 – Local Context of SMaRT Phase 2 Components[2]



1.2. Complementary Measures

SBC is planning to undertake improvement work on the footbridge over M4 Junction 5; this falls within the footprint of the SMaRT scheme.

SBC has recently delivered a number of schemes to reduce congestion and improve the provision of public transport: A355 Copthorne Roundabout re-modelling, Windsor Road widening, and bus priority infrastructure to deliver SMaRT between Slough Trading Estate (Bath Road frontages) and Slough rail station. The latter will lead to the delivery of a dedicated SMaRT service between Slough rail station and the Trading Estate from early 2019. SMaRT phase 2 will build on these by alleviating congestion on a further section of the Heathrow – Slough Town Centre – Trading Estate corridor.

Improvements delivered by SBC and by others include:

- Implementing sustainable travel measures and promoting the planned SMaRT scheme;
- Improvements by First in Berkshire to bus ticket retailing with the introduction of mobile phone-based ticketing;
- Introduction by Bus Operator First in Berkshire of new products aimed particularly at those travelling to a place of work on a part-time basis, such as carnets;
- Improvements delivered both by Thames Valley Buses and First in Berkshire to sub-regional bus services; and
- Improvements to M4 Junction 5 gateway urban realm environment by BBLUR Architecture

1.3. Structure of the Business Case

This Business Case is structured in accordance with the Department for Transport's guidance on Transport Business Case. The remainder of the document is structured as follows:

[2] The OS Grid Reference is between (500950,178200) and (501900,177600) and the Postcode is SL3

- Chapter 2 - The Strategic Case;
- Chapter 3 - The Economic Case;
- Chapter 4 – The Financial Case;
- Chapter 5 - The Commercial Case; and
- Chapter 6 - The Management Case.

2. The Strategic Case

2.1. Introduction

The Strategic Case provides the rationale for making this investment and its strategic fit to the national, regional and local policies.

2.2. Business Strategy and Policy Context

The business strategy and policy context has been analysed from wider (national) level moving towards more local (LEP, County, Council) levels in terms of transportation priorities. These priorities have also been reflected in setting out the scheme objectives in Section 2.7.

The national priorities guide the long-term objectives in relation to economic, environment and social growth. The Thames Valley Berkshire LEP sets the regional priorities related to housing and infrastructure, urban connectivity, encouraging vibrant town centres, foundations for future growth and access to Heathrow and London which are all relevant to the suggested scheme.

The priorities set by Slough Borough Council have also been covered in the LEP priorities in Section 2.2.2; therefore, only the high-level priorities are provided in these sections below.

2.2.1. National Transport Priorities

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

In its National Infrastructure Plan 2011, the Government presented its vision for the UK transport system:

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

These elements of the vision can be seen as being of direct relevance to the SMaRT Phase 2 scheme, which aims to reduce congestion and enable the economic growth of Slough.

2.2.2. Regional Transport Priorities

Thames Valley Berkshire LEP

In March 2014, the Thames Valley Berkshire LEP submitted their Strategic Economic Plan (SEP). Within the six-year period covered by the SEP (2015/16 to 2020/21) several considerable employment developments are planned on the Slough Trading Estate. The development amounts to 108,000m^2 of office space along with ancillary retail, food and accommodation. In addition, 2,920 residential units are programmed over the same period.

The SEP document outlines the case for the necessary investment to infrastructure, enterprise and employment that is required for the Thames Valley Berkshire region's economy to continue its successful upward trajectory.

Six packages for infrastructure investment have been identified within the SEP. The SMaRT scheme supports Labour Supply objectives addressing congestion and bringing forward housing; and infrastructure within and between towns and town centre investment. Infrastructure between towns will be improved by enhancing public transport connections and cycle links between Slough, the adjoining London Borough of Hillingdon, and Heathrow. With more efficient public transport links to Slough town centre from the east and the provision of a new park & ride site the scheme will support town centre investment.

The SMaRT Phase 2 contributes to the delivery of the 6 packages of the Thames Valley Berkshire's SEP in the following ways[10]:

- **Package 1 unlocking housing development** - By making public transport services along the A4 corridor more attractive, building on the work of SMaRT Phase 1, the scheme will help unlock this new housing development as explained in section 2.3.3;
- **Package 2 enhancing urban connectivity** -The measures in Phase 2, including the Brands Hill park & ride, will enhance connections between Slough, Heathrow, the London Borough of Hillingdon and communities in South Buckinghamshire;
- **Package 3 encouraging vibrant town centres** -The SEP Implementation Plan (2.16) sees the 'need to continue to give the private sector the confidence to invest' in town centres and refers to SMaRT Phase 1 as a transport scheme that will help achieve this. By extending the benefits of mass rapid transit east towards Heathrow, together with new park & ride facilities, SMaRT Phase 2 will help promote Slough town centre regeneration without adding to traffic problems on the A4;
- **Package 5 foundations for future growth** - The SEP Implementation Plan (2.20) says that 'we intend to develop more sustainable transport schemes that will both lead to modal shifts and alleviate congestion'. Phase 2 of SMaRT, Slough to Heathrow, is one of the two schemes specifically put forward as requiring development work; and
- **Package 6 access to Heathrow and London** - The SEP Implementation Plan emphasises the importance of the Western Rail Link to Heathrow and M4 Smart Motorway schemes as strategic projects which will help realise TVB's potential for accelerated growth. SMaRT Phase 2, combined with Phase 1, will support connectivity by improving public transport access to both the hub airport and the trading estate. SMaRT Phase 2 is in line with the aspirations to improve transport links to Heathrow expressed in the Sustainable Transport Plan 2014- 2019 of Heathrow Airport Ltd (HAL) and its specific aim of increasing the role of public transport in accessing the airport.

Slough Borough Council Local Transport Plan

Based on the Strategy Document of Slough's third Local Transport Plan (2011-2026), the scheme will support the five key priorities for SBC outlined in their vision, and would contribute to[3]:

- Achieving **community cohesion** by delivering better public transport services along the A4 corridor;
- Improving local **environment** conditions by supporting modal shift to sustainable modes;
- Enabling **safer communities** by reducing the collision rates between M4 Junction 5 and Sutton Lane;
- Improving **health and wellbeing** by creating opportunities for users to walk and cycle to their destinations; and
- Enhancing **economy and skills** in Slough by improving accessibility to employment sites.

2.3. Problems Identified

The Slough Local Development Framework (LDF) (2006 to 2026) identified a number of problems in Slough that the scheme aims to address:

- The need to address congestion and improve journey time reliability;
- The need to improve the image and environment of Slough; and
- The need to improve accessibility to housing and employment development.

These problems are discussed in more detail in the following sections.

[3] Slough's Third Local Transport Plan 2011-2026

2.3.1. The need to address congestion and improve journey time reliability

Residents rely heavily on cars for their daily travel, even for short journeys[4], and this adds to traffic congestion, worsens the journey time reliability and reduces the attraction of using bus services.

The A4 east of Langley is a major strategic route between Slough, the M4 and Heathrow that suffers from traffic congestion. The western end of the route carries an average of some 24,000 vehicles a day and the eastern end 22,000. Traffic levels have grown by about 1.5% per year since 2010[5].

Highways England forecasts indicate that in the opening year of the M4 Smart Motorway (planned for 2022) two-way traffic along the A4 east of Junction 5 in the morning peak will be almost 2,000 vehicles and some 1,740 in the evening peak[6]. The level of demand combined with limited highway capacity between Junction 5 and Colnbrook Bypass causes queues and delays which act as a barrier to growth, both for Heathrow bus services and traffic as a whole[10].

Growth in economic activity in the Borough, the TVB and in the Heathrow area will lead to further pressures on this corridor. Intervention is needed to ensure that accessibility can be maintained and enhanced between Slough and the airport without adding to existing traffic problems or increasing pressures on car parks in Slough town centre and at businesses. A number of major businesses on Slough Trading Estate report that their car parks are full, and that staff can often find nowhere to park.

There is investment by bus companies in vehicles, staff and marketing to improve public transport between Slough and Heathrow, but delays and congestion along the A4 act as barriers to achieving the reliable and efficient services that are vital for gaining access to jobs and training opportunities at the airport.

The SMaRT Phase 2 scheme will provide an opportunity to relieve localised congestion and minimise stop/start travel conditions on the A4. Enhancement of the current SMaRT network along the A4 corridor and the provision of a Park & Ride site at Brands Hill will provide improve connectivity for public transport services to the town centre and Heathrow and encourage modal shift.

2.3.2. The need to improve the image and environment of Slough

Slough ranks poorly in comparative studies for natural environment quality, with a recent study[7] ranking the Borough at 350 out of 354. The Borough suffers from congestion, noise and poor air quality which are worsened by its proximity to Heathrow and the motorways.

The scheme is located within two air quality management areas (AQMAs) – areas which are not meeting one or more national air quality objectives – one at the M4 at Junction 5, and one along the A4 between the M4 at Junction 5 and Sutton Lane. In addition, there are two AQMAs within Slough, one on the A4 in the town centre, and one on the A355 north of the M4 junction 6.

Slough's image as a place to do business has changed over time. The UK Competitiveness Index ranked Slough 29th in 2013 and 34th in 2016, having dropped 5 places. Whilst this is a high ranking nationally, there are many locations in the South East which rank above Slough as an economically competitive location. In more recent years Slough's reputation has improved, however there are now more competing locations for business within the South East.[8]

Crime levels are high in the Borough and there is a poor perception of personal security within the public realm. Thames Valley Police reports that the crime rate in Slough over the year to June 2015 (77 reported crimes per 1,000 population) is well above the force average (53 reported crimes per 1,000 population).

[4] Previous Slough Local Transport Plan

[5] Traffic data AADF, http://www.dft.gov.uk/traffic-counts/cp.php?la=Slough#6124

[6] Traffic data: Highways England's paper on effect of M4 Smart Motorway scheme on local road network in Slough (see p14) https://infrastructure.planninginspectorate.gov.uk/wpcontent/ipc/uploads/projects/TR010019/TR010019-002472-Highways%20England%20Response%20to%20Deadline%20VII%20Representation%20-%20Slough%20Borough%20Council_2.pdf

[7] Slough LDF (2006 to 2026) http://www.slough.gov.uk/documents/Adopted_Core_Strategy_16-12-08.pdf

[8] UK Competitiveness Index 2016

Transport related crimes are a concern for many residents. These concerns range from worry about items being stolen from cars, cars being stolen or being physically attacked, insulted or pestered while in a public place.

Slough has a higher than average employment rate (3.9% in 2017 compared to 4.2% in the UK[9]) and there is a requirement to provide a reliable level of accessibility to enable Slough residents to access some of these employment opportunities.

Some 14% of residents have a long-term disability that can hinder their access to services, including transport. Making transport more accessible for all residents can include measures such as removing obstacles on the pavements, ensuring paved surfaces are well maintained, providing pedestrian crossing facilities and improving information and signage.

The SMaRT Phase 2 scheme will improve connectivity by sustainable modes between Slough and Heathrow and contribute towards improving access to employment opportunities for all. Improvements to the quality of the NCN Route 61 will encourage further model shift and contribute towards improving air quality in the town centre AQMA.

The public realm enhancements along the A4 frontage along with the upgrade to the NCN Route 61 will also support local affordable transport, especially walking and cycling. The improved bus waiting areas and local environment along this key gateway will reduce fear of crime.

2.3.3. The need to improve accessibility to housing and employment development sites

The growing traffic congestion problems, particularly on strategic public transport corridors like the A4 has a detrimental effect on ambience, access to employment opportunities and air quality. These effects have the potential to ultimately damage the local economy. In addition, congestion on main routes can have a detrimental impact on industrial and employment sites like the Slough Trading Estate.

The continued investment in Slough Trading Estate, the town centre and Heathrow airport is vital to improve the vitality and viability of the town centre and to create new jobs and housing. Growth in economic activity in the Borough, the TVB generally and in the Heathrow, area will lead to further pressures on this corridor. Intervention is needed to ensure that accessibility can be maintained and enhanced between Slough and the airport without adding to existing traffic problems and, because of the lack of alternatives such as a park & ride, increasing pressures on town centre car parks.

Current problems will restrict employment opportunities, development, and socio-economic improvements. Transport improvements and increased economic activity in Slough could increase the working age and quality of life of residents and decrease deprivation in the area.

There are a number of strategic housing sites that have been identified in the Council's Emerging Preferred Spatial Strategy for the Local Plan 2013 – 2026 that heavily rely on the use of sustainable means of transportation instead of cars by the future residents. By building on the previous work conducted in SMaRT Phase 1a, the scheme will help make the public transport services more attractive for the A4 and enable new housing development of 2,160 new houses. Additionally, the scheme will give additional support towards delivery of another 5,120 new homes giving a grand total of 7,280 houses linked to the scheme[10].

There is a need to improve access to these key economic centres by more sustainable modes of transport, including for residents accessing employment and training opportunities and for visitors transferring from transport hubs, such as Slough Rail Station, to these key destinations.

Phase 1 of the SMaRT scheme was identified in the SEP (package 2) as a scheme which will enhance connectivity within and between urban areas. The measures in Phase 2, including the

[9] Office for National Statistics, Labour Market Profile 2017, available at: https://www.nomisweb.co.uk/reports/lmp/la/1946157286/printable.aspx

[10] 2018 TVB LEP Business Rates Retention Pilot

Brands Hill park & ride, will further enhance connections between Slough, Heathrow, the London Borough of Hillingdon and communities in South Buckinghamshire[10].

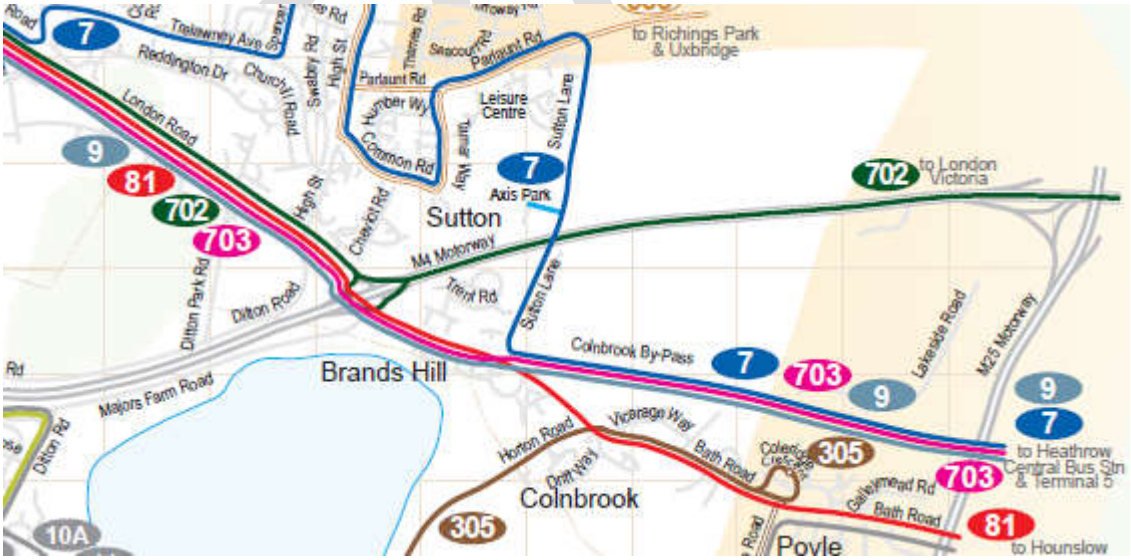
A scheme has the potential to increase clustering and agglomeration effects in the Slough and Heathrow area. Reduced congestion will allow businesses to work more closely, enabling the clustering of economic activity and productivity which is currently lacking in the corridor despite its advantageous geographic location. Slough has many business locations, such as Slough Trading Estate, Slough town centre, which would benefit collectively from an improved local transport network, especially from park & ride infrastructure which would enable quick access to these.

- ***The SMaRT Phase 2 scheme will improve access by bus services to key housing and employment areas in Slough and the wider TVB sub-region, including Heathrow which will be vital for the working population.***
- ***Maximising accessibility by all modes will encourage future development and investment in Slough. The Park & Ride site at Brands Hill will also help to relieve pressure on town centre car parks, by providing a reliable alternative to the car for travelling to the town centre. Improving accessibility to Heathrow by sustainable modes of travel will help residents of Slough access jobs and training opportunities at the airport.***
- **Alongside this, the public realm enhancements will transform the local environment along a key gateway, complement the promotion of the SMaRT route and encourage continued investment in Slough.**

2.4. Public Transport Provision

Figure 2-1 shows an extract from Slough's bus map in the vicinity of the area in scope.

Figure 2-1 - Bus Routes around Brands Hill



Routes 7, 9 and 703 operate along the corridor and past the proposed Park & Ride site, immediately to the east of Sutton Lane:

- Route 7 – Heathrow Central – Terminal 5 – Langley village – Slough town centre (daytime frequency of 4 buses / hour, provided by First in Berkshire);
- Route 9 – Windsor – Slough – Terminal 5 (daytime frequency of 2 buses / hour, provided by First in Berkshire); and

- Route 703 – Bracknell – Windsor – Slough – Terminal 5 (daytime frequency of 1 bus / hour, provided by Thames Valley Buses).

All of these operate via Colnbrook Bypass.

Other services in the vicinity of the proposed Park & Ride site, and using A4 London Road, are:

- Route 81 – Hounslow – Heathrow Airport North – Longford – Colnbrook village – Slough Bus Station (daytime frequency of 5 – 6 buses / hour, run under contract to Transport for London); and
- Route 702 – Windsor – Slough – London Victoria (daytime frequency of 1 bus per hour, provided by Thames Valley Buses).

Hence the bus service frequency along A4 London Road is currently 9 - 10 buses per hour in each direction, with around 14 – 15 buses running through the Brands Hill gyratory. Twenty thousand private vehicles currently use the A4 every day causing congestion for these bus services.

2.5. Impacts of No Change

Without the introduction of proposed measures, existing capacity constraints and problems of local traffic congestion and start/stop travel conditions on this strategic transport corridor will remain and be exacerbated by future traffic growth. Congestion on the highway network in this area and the poor first impressions of Slough will discourage new development and investment in the vicinity, including the nearby Slough Trading Estate. It will be challenging for the Heathrow expansion to meet its requirements in terms of sustainable mode share targets.

Rates of walking and cycling are also relatively low in Slough, especially considering the geographical compactness and urban density of the Borough where active travel might be more practical than in areas where towns and neighbourhoods are farther apart. The urban realm along the A4 corridor does not facilitate and encourage short local journey by active modes.

Specific outcomes of a 'Do Nothing' case include:

- The constraints of the existing transport conditions will act as an inhibitor to growth with private sector investment attracted to other areas with better accessibility;
- Poor accessibility by sustainable transport modes on this key corridor is likely to encourage people to avoid the use of the corridor to make their journeys to access Slough town centre, Slough Trading Estate and London Heathrow;
- The air quality within AQMAs is unlikely to improve as quickly as would be the case with the proposed scheme, and may even deteriorate if traffic congestion worsens; and
- Local traffic congestion along the A4 London Road will remain along with the need for intervention.

The SMaRT Phase 2 scheme will provide enhanced connectivity for public transport services along the A4 corridor between Slough and Heathrow. Enhancements to the frontage along the A4 and the NCN Route 61 will also support the local and regional objectives of encouraging sustainable travel especially for short local journeys and reduce carbon emissions. Alongside this, the public realm improvements will also transform the local environment and encourage continued investment in Slough.

2.6. Drivers for Change

Section 2.3 describes a number of the existing problems in Slough including but not limited to highway congestion, poor local air quality in Slough and lack of sustainable accessibility to key employment sites along the A4 corridor. Heathrow Airport, Crossrail and the Slough Trading Estate are all significant external developments that have brought and/or will bring change in Slough, which to varying degrees, will impact upon and/or be impacted by patronage on the A4 corridor. The public transport provision in the area is negatively impacted by the congestion on this corridor. This section examines the level of public transport provision along the A4 corridor and how these services would be affected due to the current and future congestion levels.

2.6.1. Slough Trading Estate

The Slough Trading Estate (STE) is the largest industrial estate under single ownership in Europe. It is home to over 450 businesses, which provide over 20,000 jobs – around a quarter of all jobs in Slough. The estate is and will continue to be a major employment centre in Slough.

Part of the estate is owned by SEGRO, and part by AEW. Plans for significant development and growth within the estate are consistent with Slough's LDF, which has identified the estate as the most significant regeneration opportunity outside of the town centre. The LDF's Site Specific Allocation (SSA41) of the estate also ensures and encourages business development on the estate.

Whilst the site owner SEGRO is promoting and implementing development plans, the site's special LDF designation reinforces the importance of the estate's role in contributing to the achievement of the Borough's wider objectives of encouraging enterprise and employment growth as a means of reducing unemployment in the Borough.

In terms of transport, the LDF has established that there will be no net increase in car parking on the estate. In promoting sustainable travel, SEGRO and the Borough work closely through a Sustainable Transport Partnership, supporting initiatives including match funding programmes to encourage businesses to install cycle facilities, memberships of the Slough Cycle Hire scheme and rail and bus fare discounts. SEGRO provides financial support for local bus services between Slough rail station and the Buckingham Avenue section of the estate. As part of SMaRT phase 1, Slough Borough Council has invested in bus priority measures on Bath Road Central, owned by AEW. Until recently, four businesses each ran their own shuttle bus services. SBC has worked with AEW and the four businesses to combine the four shuttle services into one, reducing the overall number of vehicle movements while improving the rail / bus proposition to employees of those businesses. From January 2019 the service will become publicly available, potentially benefiting all employees of Bath Road Central. Further improvements are under consideration including extending to Burnham Station.

2.6.2. Heathrow Airport

London Heathrow airport is one of the largest international airports in the world. In 2014, 73 million passengers and 1.5 million metric tonnes of cargo passed through the airport. Following the closure of Terminal 1 (less than 7 miles from Slough town centre) in 2015, annual passenger numbers have continued to increase to 78 million and cargo passing through the airport has increased to 1.7 million tonnes in 2017. About 7.5% of Heathrow current staff live in Slough and there are close links for training and apprenticeships through the Heathrow Academy and the Heathrow Jobs and Careers Fair.

In June 2018, Parliament voted in favour of the third runway at Heathrow Airport. The London Heathrow Economic Impact Study (2013) identified that by 2040, the expansion of the Heathrow could create up to an additional 35,000 full time equivalent (FTE) jobs. It also has the potential to open up new routes to emerging markets and/or new markets that could enhance trade and export.

Heathrow has two major impacts on the economy of Slough. Primarily this is seen through the airport generating significant employment directly, in the form of on-site workers, and secondly through indirect supply chain linkages. Slough's close proximity to the airport makes it a prime location for multinational industry.

In 2010, a survey was conducted to investigate Heathrow's labour market and found that Slough provided over 4,000 direct on-site employees. Additional economic analysis estimated that a further 1,500 off-site indirect jobs associated with the airport were taken by the residents of Slough.

As a key employment and business hub for the Slough economy, public transport connections with Heathrow are of key importance to improve connectivity. By offering an appealing alternative to the private car it is possible that mode shift to bus could occur.

Heathrow expansion is intended to accommodate a significant increase in throughput at the Airport, from 77 million passengers per annum to 134 million. Clearly, this will have a significant impact on the demand for surface access to the Airport, and the number of staff employed, but under the terms of the Airports National Planning Statement Heathrow Airport must set out how it will achieve a mode share of 50% access by sustainable modes by 2030 (55% by 2040). It must also show how it will achieve a 25% reduction of staff car trips by 2030 (50% by 2040) from a 2013 baseline. At

present 39% of passengers reach the Airport by sustainable modes, and 27% of staff reach the Airport by public transport.

Heathrow Airport Ltd is currently developing its proposals for how to achieve these targets, but clearly, it will have to achieve significant volume increases by public transport, and it is likely that these will be achieved by a combination of improved public transport services and car user restraint. It is considering developing parking sites at 'parkway' locations adjacent to the main roads into the Airport. The Park & Ride site at Brands Hill fits this narrative.

2.6.3. Crossrail

Crossrail is directly relevant to the scheme as it enhances the accessibility of all Slough stations, including Slough Station, and helps resolve local congestion and accessibility problems. The scheme improves bus access to these stations.

In the case of the highway network, it is vitally important that local infrastructure is put in place to enable the full benefits of Crossrail to be realised at a local and regional economic level.

Failing to address Slough's existing transport problems will deter people from taking public transport to access and interchange with Crossrail services. This could have a negative impact on economic activity in Slough, with firms and employers choosing to do business in other locations served by Crossrail and with more efficient, supportive transport infrastructure.

2.6.4. Heavy Goods Vehicle Parking

A long-standing issue in Slough is the lack of overnight heavy goods vehicle parking and associated lack of driver facilities. This leads to reported issues of anti-social behaviour. It is proposed to design and construct the Park & Ride in such a way that it can accommodate overnight heavy goods vehicle parking to address this issue.

2.7. Scheme Objectives

The scheme objectives have been defined to address directly the problems discussed earlier in this chapter. They align closely with the established policies and plans of the scheme promoters, the Local Enterprise Partnership and Central Government – most obviously in terms of the Government's broad goals for transport.

The desired outcomes from each objective have been considered and are shown in Table 2-1.

Table 2-1 - Objectives and Desired Outcomes

Scheme Objectives	Desired Outcomes
1. Minimise stop/start travel conditions along the A4 London Road and improve journey time reliability.	• Support anticipated job growth and employment development. • Improve local air quality by easing congestion, smoothing traffic flow and reducing queuing and delays.
2. Encourage mode shift by extending the current SMaRT service to Heathrow and providing P&R to improve connectivity and PT capacity to Slough and Heathrow.	• Improve surface access to Heathrow. • Encourage PT use to Slough Town Centre, Slough Trading Estate and Heathrow, supporting the expansion of Heathrow.
3. Improve capacity at, and functionality of, Sutton Lane Gyratory, which will mitigate congestion impacts of future development	• Support anticipated job growth and employment development. • Improve local air quality by easing congestion, smoothing traffic flow and reducing queuing and delays.
4. Improve the landscape and public realm to address poor quality visual impact in order to improve the image of Slough, to attract businesses, support	• Improve local residents' quality of life, increase safety, encourage walking and cycling and support housing development.

housing development and improve permeability.	• Create new local amenity and green space. • Improve the visual appearance of a prominent area on a key corridor into central Slough.

2.8. Measures for Success

Successful delivery against the scheme objectives will be monitored as part of the post construction scheme evaluation, details of which are discussed in Chapter 6 (the Management Case) of this Business Case.

A programme of Monitoring & Evaluation (M&E) will be put in place prior to construction to measure the success of the scheme at one-year and five-year post construction. A high-level M&E Plan has been envisaged in the Management Case in Section 6.11, proposing that monitoring will include Baseline and Target conditions in relation to:

- Traffic congestion and journey times;
- Public transport journey time and reliability;
- Public transport patronage and P&R usage;
- Road safety; and
- Air quality.

Objectives relating to economic growth through investment in business and housing will be difficult to measure in the short-term and cannot be directly attributable to this scheme in particular. However, longer term evaluation will seek to monitor economic, employment and housing growth.

2.9. Project Logic Map

The Project Logic Map involves systematically linking key components of an intervention to produce a causal pathway (see Figure 2-2) across the:

- Inputs (i.e. what is being invested in terms of resources and activities);
- Outputs (e.g. new lane markings, roadway design, products developed);
- Outcomes (i.e. short and medium-term results, such as changes in traffic flow levels); and
- Impacts (i.e. short-term results include benefits for public transport and car users, long-term results such as better quality of life, improved health and environmental benefits)

Figure 2-2 - Component of the Project Logic Map - Components on an Intervention Logic Map

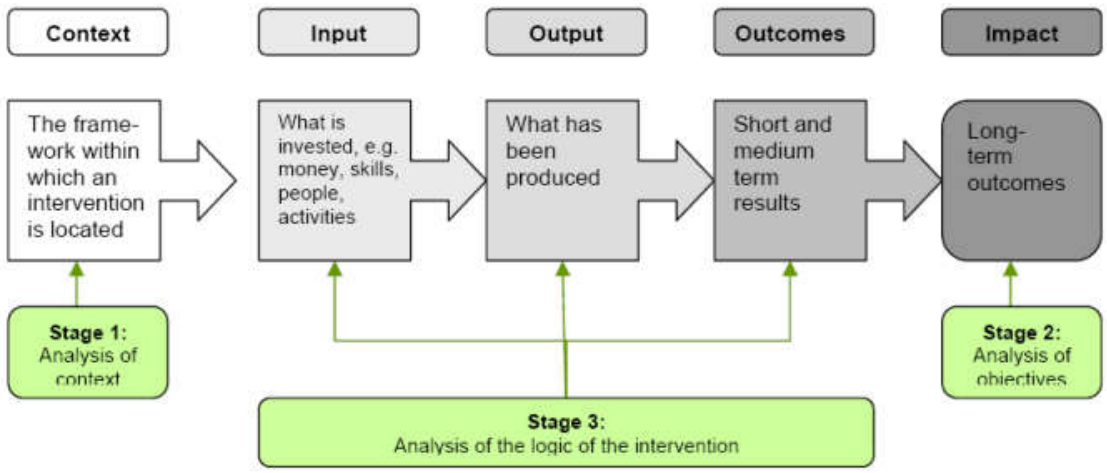
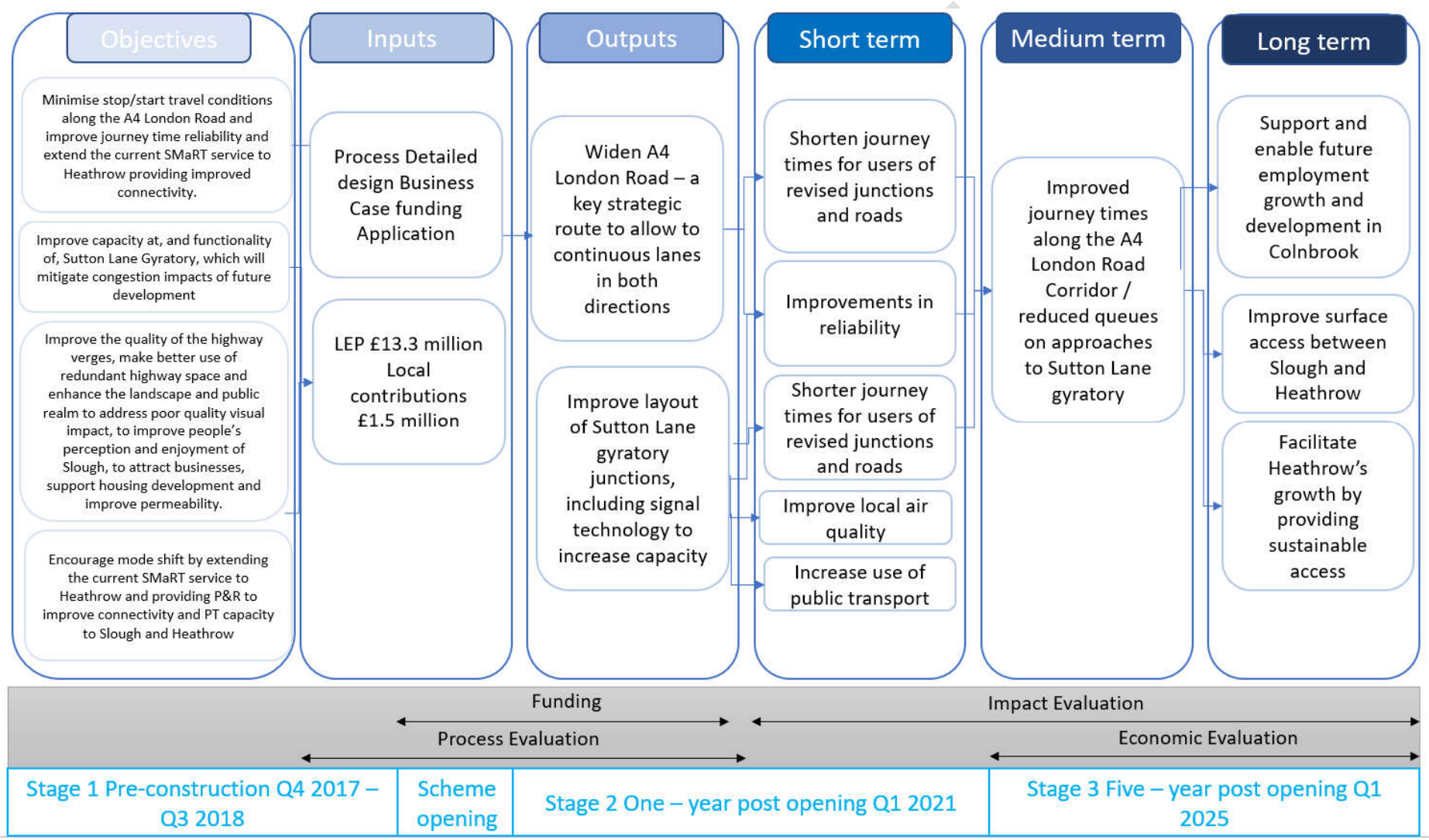


Figure 2-3 sets out the intervention logic map for the scheme and shows linkages between key components of the intervention and the scheme objectives. The map shows the process by which the scheme outputs will deliver the primary objectives for intervention and describes an outline evaluation approach for monitoring the extent to which these are achieved as part of a pre and post-opening monitoring report.

The Intervention Logic Map also shows wider and longer-term impacts, which depend on the delivery of the primary objectives.

Figure 2-3 - Intervention Logic Map for SMaRT Phase 2 Scheme



2.10. Constraints and Dependencies

A number of potential constraints and dependencies exist for the scheme and these have been dealt with or have planned mitigation throughout scheme development:

2.10.1. Constraints

Some general constraints are discussed below. The majority of the package is within the highway boundary and scheme consents will be obtained during preliminary design. A number of constraints which require land, statutory powers and consents, are outlined further below in more detail.

- A number of mature trees along A4 Bath Road could be affected by the scheme. This will form part of the planning application however the Council will be looking to limit the number of felled trees and will also undertake a landscaping scheme within the facility;
- The project team have taken every effort to ensure that there are no technical, technological or buildability issues with the scheme design. The design team has recent experience of successfully designing similar schemes in Slough; and
- Highways England are implementing their Smart motorways scheme. Highways will take control of the site early in 2019 but will through its contractor Balfour Beatty undertake a number of supporting groundworks which can be utilised to support the P&R. It is expected that Highways England will vacate the site in 2021. Slough Borough Council is in negotiation with Highways England regarding the extent of initial ground works that Highways England will undertake on Slough's behalf, in order for synergies to be realised and for the P&R site to be installed efficiently as soon as the site becomes available. The site is approximately 3.4 hectares in size.

2.10.2. Land Requirements

In addition to the P&R site which SBC is in the process of negotiation to purchase, other potential land take requirements have been identified and will be confirmed during preliminary design:

- Land at north side of A4 London Road, at SSE Electricity substation between Tweed Road and M4 J5;
- Land along north side of A4 London Road, Colnbrook Parish Council, between the electricity substation and 559 London Road; and
- 524-526 London Road land to be adopted as public highway.

The land is private ownership, as is the land for the proposed Park & Ride site. Hence the District Valuer is currently assessing the value of the site to support negotiations with the landowner.

2.10.3. Powers / consents already obtained

Planning Consent for all Highway Works is expected to be within the powers granted by the General Permitted Development Order 2015 Part 9 Class A.

2.10.4. Outstanding Statutory Powers / Consents

Adoption for highway widening on A4 London Road and A4 Colnbrook Bypass Highways Act 1980 s38):

- Conversion to shared cycle track - A4 London Road and A4 Colnbrook Bypass - (Highways Act 1980 s65);
- All Sites - Traffic Regulation Orders (Road Traffic Regulation Act 1984); and
- All Sites - Traffic Management Act.

Timescales vary, but all of the above will be in place before formal approval of schemes – expected to be in place by mid-2019.

The Park & Ride will require a Planning Application to be made. Slough Borough Council expects to submit this during 2019.

2.10.5. Dependencies

The Park & Ride could be delivered with the existing highway network in place, but it will be desirable to ensure that the highway changes proposed with this scheme are in place before it opens to ensure that it operates at its maximum effectiveness in terms of cars being able to access the site and buses being attractive as a result of the journey time improvements.

The construction of the SMaRT Phase 2 is scheduled to occur during the same period as other proposed work on the network which involves the redesign of the Sutton Lane Gyratory to reduce congestion and provide reserve capacity including access road from P&R to connect with the by-pass. A Construction Management Plan will be submitted in support of the planning application to identify the optimum programming and mitigate for the potential disruption caused by the combination of works.

2.11. Stakeholders

The Council will deliver the scheme in partnership with Slough Urban Renewal HAL and Highways England and in close liaison with the London Borough of Hillingdon and Transport for London.

All the stakeholders being consulted as part of the scheme development are summarised below:

- Heart of Slough Regeneration Project Partners;
- Bus operators: First in Berkshire; Thames Valley Buses (a subsidiary of Reading Transport Ltd); Transport for London; Major commercial landowners: SEGRO and AEW (Trading Estate);
- Heathrow Airport Limited;
- Neighbouring authorities: Royal Borough of Windsor and Maidenhead and Buckinghamshire County Council;
- Thames Valley Berkshire Local Enterprise Partnership.
- Local residents;
- Land agents / owners / tenants; and
- Local user groups e.g. cyclists, walking and disability groups.

Letters of support from various stakeholders are included in Appendix B11.

2.12. Options

2.12.1. Options Development and Alternative Options

This scheme is a component of the larger aspirational SMaRT package, which had been developed through public consultations, engagement with local resident and businesses, and incorporating feedback from LEP bids.

As detailed in the 2018 Business Rates Retention Pilot, the construction of the Western Rail Link to Heathrow scheme will not be open for train services until 2027. SMaRT Phase 2 will complement the public transport connections between Slough and the airport much earlier and could lead to modal shift for Heathrow employees. On the contrary, without SMaRT Phase 2, bus services to the airport experience further delays as a result of increased road congestion.

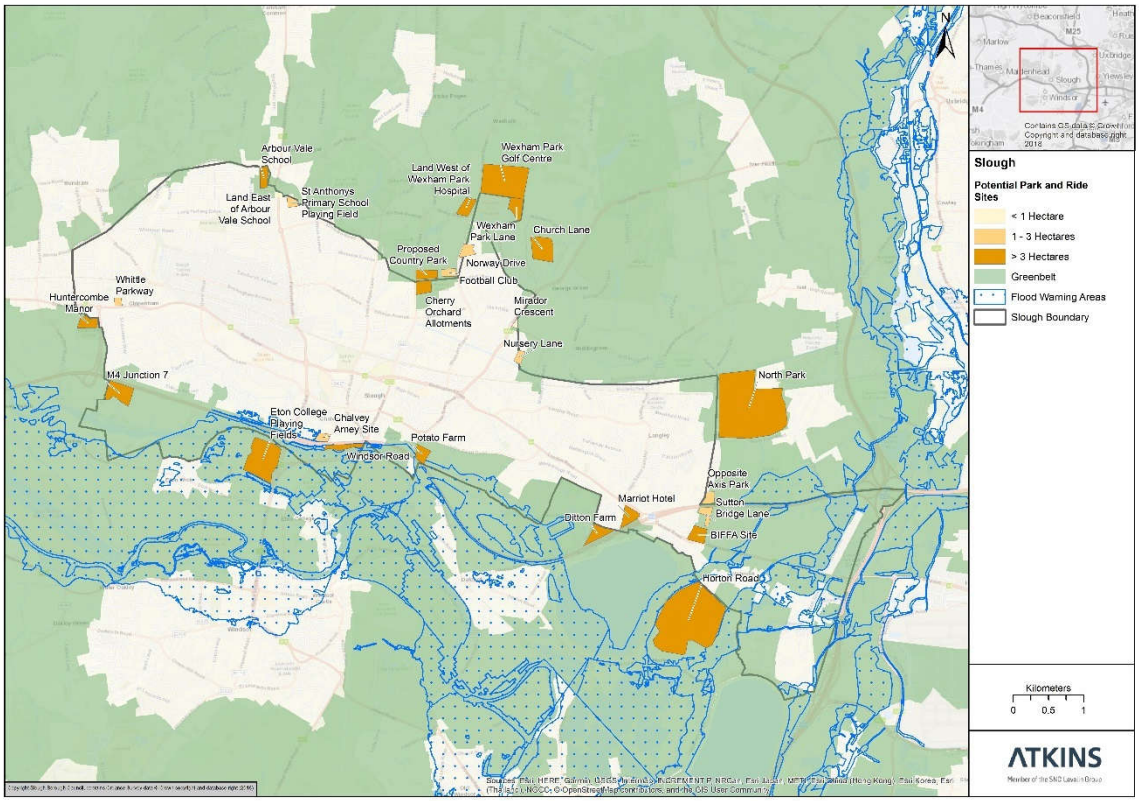
The exclusion of the Park & Ride development has also been considered but rejected based on the fact that it reduces traffic demands through the built-up area of Slough and along the A4 corridor eastwards to Heathrow. Also, without the associated Park & Ride it would be more difficult to reduce traffic pressures along the A4 corridor in Slough and eastwards and to maintain accessibility to the town centre and the airport.

More details about the options considered can be found in the Option Assessment Report (OAR) in Appendix C11. Some elements of the optioneering process outlined in the OAR have been superseded within the evolution of the project's design and appraisal process as part of this Business Case.

2.12.2. Park & Ride Choice of Locations

Figure 2-4 below shows potential Park & Ride site locations identified with Slough Borough Council planning officers.

Figure 2-4 - Long-list of potential Park & Ride sites



A number of sites are identified as having the potential to capture trips from the east of the town. These are:

- BIFFA Site;
- Ditton Farm;
- Horton Road;
- Marriot Hotel;
- North Park;
- Opposite Axis Park; and
- Sutton Bridge Lane.

Of these, BIFFA site has been identified as the optimum site to progress in relation to the eastern end of the A4 corridor serving both Slough and Heathrow. Others were not progressed for the following reasons:

- Ditton Farm and Marriott Hotel are currently occupied, so not available in the scheme timescales;
- Horton Road has poor highway links from the M4;
- Whilst better connected to the M4, North Park has low volumes of passing traffic and is some distance from the M4; and
- The sites opposite Axis Park and Sutton Bridge Lane are further from the M4 than the BIFFA site but, crucially, are smaller, offering less potential to provide an acceptable number of car parking spaces.

A further advantage of BIFFA site is that it is directly adjacent to the A4. This means that bus services offering a direct routeing to both Slough town centre and Heathrow Airport can serve the site without the need for a significant diversion, and hence journey time penalty. This is shown in the drawing for the proposed scheme in Chapter 3 – Economic Case.

2.13. Scheme Details

2.13.1. Summary

The SMaRT Phase 2 elements are:

- Highway Improvements:
  - Revisions to the South East quadrant of the M4 Junction 5 roundabout with a modified slip road for eastbound traffic;
  - Modifications and signal provision at the Sutton Lane gyratory; and
  - London Road link widening to 2 lanes westbound between M4 Junction 5 roundabout and Sutton Lane;
- A Park & Ride facility located on land adjacent to M4 Junction 5 and Sutton Lane – including a bus station, stands, passenger facilities and parking areas with bus services connecting to Heathrow and Slough. It will contain a terminal building and staff presence and appropriate walkways and urban realm to provide a good interchange environment. It will also include a vending machine, cycle parking, Slough Cycle Docking Station and Electric Car Charging Points (outside of the station); and
- Urban realm enhancements including walking, cycling and bus shelter facilities to enhance the local area and attractiveness of sustainable modes on the northern frontage of the A4 between Langley High Street and the M4 J5 roundabout.

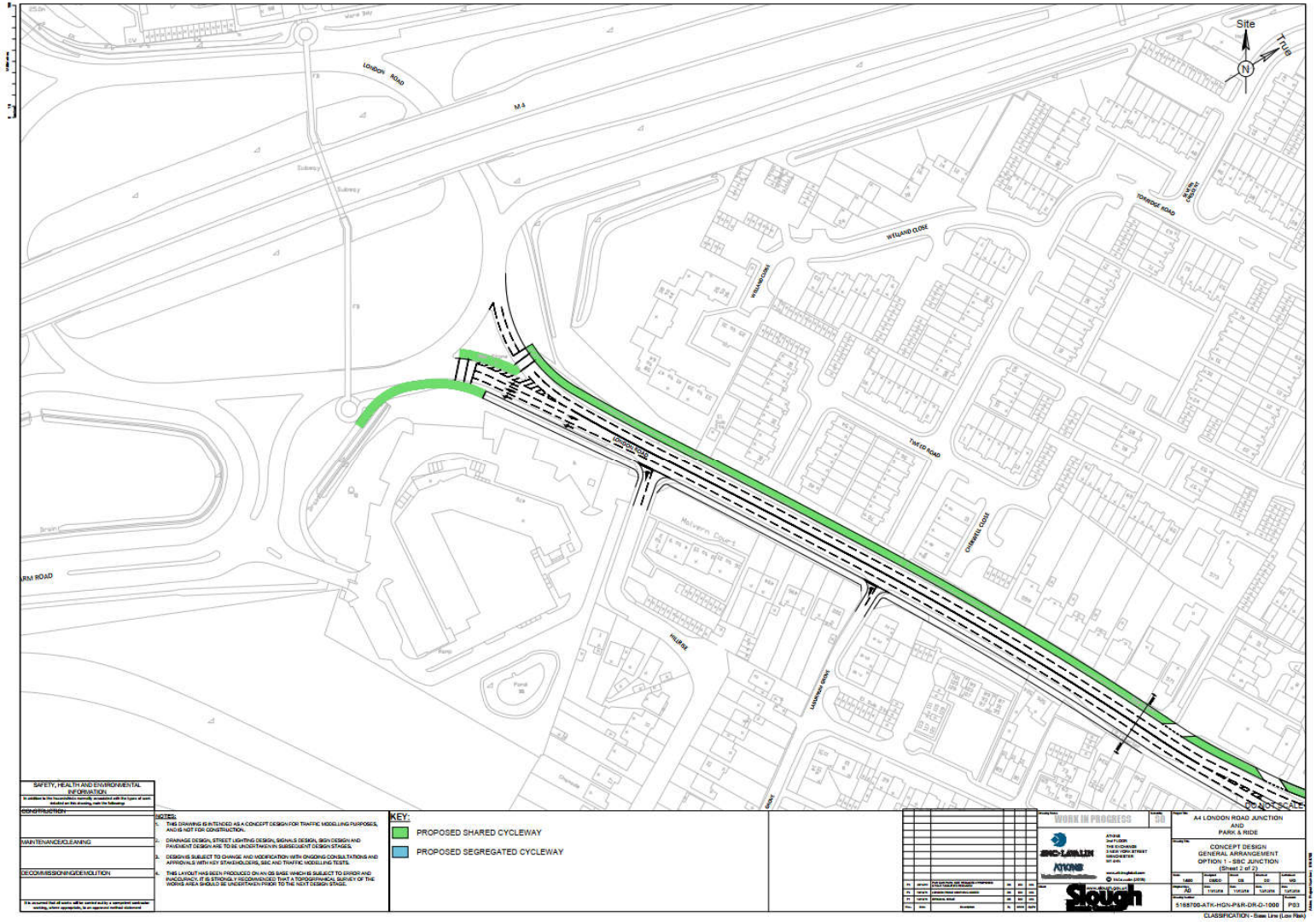
2.13.2. Highway Improvements

The scheme will improve lane usage and reduce congestion resulting from the merge on the westbound approach to the M4 J5 roundabout. At the junction between the A4 London Road and the M4 J5 roundabout, the changes will increase lane capacity and create a longer, more gradual diverge into the roundabout to encourage full use of all lanes. Just west of Sutton Lane and to the east of the diverge, the improvement will provide an additional lane westbound removing the existing merge from two lanes to one, which currently causes congestion and start/stop travel conditions because of traffic queues forming at the merge at peak times.

Changes to the highway at the M4 J5 roundabout and on the westbound approach to the M4 J5 roundabout will improve journey time reliability along the A4 corridor. This builds on a scheme previously delivered under Better Bus Area Fund to provide two lanes eastbound between Junction 5 and Brands Hill. Together with modifying the Sutton Lane gyratory, these highway improvements will tackle congestion and reduce delays on the motorway roundabout and at the gyratory. The modified configuration and signal optimisation will improve capacity at the gyratory and also enable it to accommodate traffic generated by the Brands Hill Park & Ride - benefitting not only existing bus services but also the new service that will serve the P&R.

A design for these scheme elements is shown below in Figure 2-5.

Figure 2-5 - Highway Improvements Scheme Design



2.13.3. Park & Ride

SMaRT Phase 2 includes a Park & Ride at Brands Hill to enable people to reach jobs and services in Slough town centre or at the airport by transferring to public transport for the last leg of their journey. This will reduce traffic pressures along the A4 and making optimum use of the SMaRT service between Slough and Heathrow. This has a potential catchment area extending to South Buckinghamshire via the B470 North and Sutton Lane; to Datchet and Windsor via the B470 South; and further afield via M4 Junction 5.

The P&R will accommodate around 600 spaces which is an adequate size for demand indicated by the modelling described in the Economic Case. It will contain a terminal building and staff presence and appropriate walkways and urban realm to provide a good interchange environment. It will also include a vending machine, cycle parking, Slough Cycle Docking Station and Electric Car Charging Points (outside the terminal).

The P&R will attract car passengers to the proposed new service to be provided by Heathrow as part of its mitigations for Development Consent Order for runway 3. The P&R is also in close proximity to a number of existing bus services along the corridor. The suggested route for the P&R service is:

Heathrow Central – T5 – Colnbrook Bypass - P&R – A4 London Road – Town Centre – Bath Road Trading Estate.

The potential stops of the services to serve the P&R are assumed to be following:

- All stops on line of route on the Heathrow Campus;
- Lakeside (Colnbrook Bypass);
- P&R site at Brands Hill;
- Uxbridge Rd Sainsburys;
- Queensmere (Westbound), Wellington St (Eastbound);
- Three Tuns; then
- All stops on Bath Road as far as Dover Road.

Existing bus services are not expected to stop at the P&R but there is flexibility for them to do so with very minimal impact on the existing passenger's journey times as a result of the configuration of the P&R entrance and exit arrangements. It is expected that bus services – and hence capacity provided - will evolve in response to demand associated with the Park and Ride and in response to changing demand for bus travel on the corridor. There is capacity on existing buses to stop in addition to complement the new service, if required. This is described further at Chapter 5.

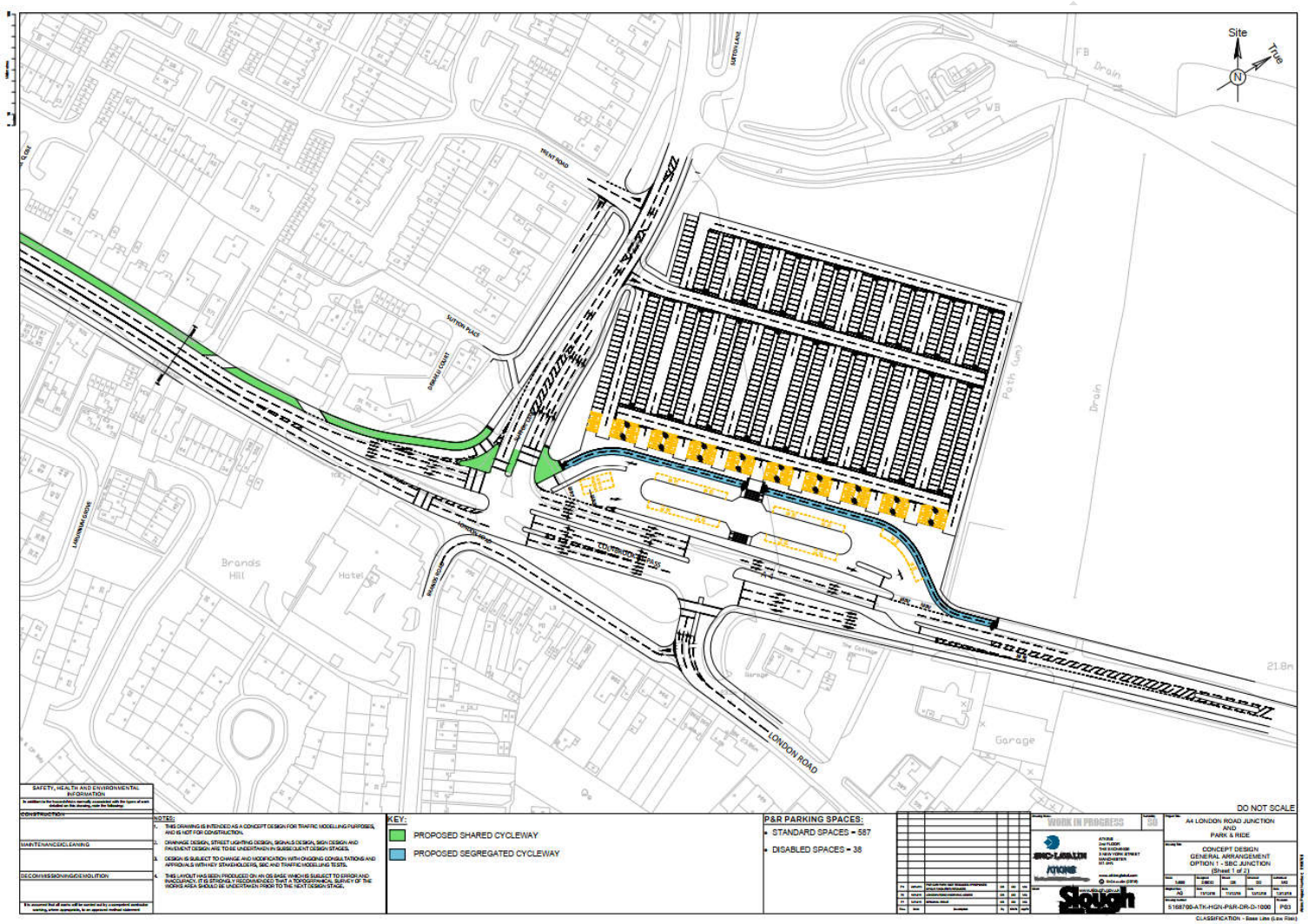
2.13.4. Urban realm, walking and cycling infrastructure

The urban realm enhancements will improve first impressions of a key 'gateway' to Slough and support continued investment and development in the local area. Pedestrian and cycle crossings on London Road will be improved and bus stop waiting areas will be upgraded for local needs at Brands Hill including residential, commercial and hotel properties. The quality of the National Cycle Network Route 61 will also be upgraded to make it a more attractive option for cycle commuting to and from Heathrow. NCN Route 61 is the established cycle link between Heathrow and these communities but quality will be improved as it is currently part shared path, part on-road and part bridleway[11]. The scheme upgrades the route to make it a more attractive option for cycle commuting to and from Heathrow. Langley and other residential areas in eastern Slough are within 10km reach of the Heathrow Cycle Hub and residents of Datchet, Colnbrook and Poyle are within 5km[12].

A design for the Park & Ride and urban realm, walking and cycling infrastructure elements is shown below in Figure 2-6.

[11] National Cycle Network Route 61:
https://www.sustrans.org.uk/sites/default/files/images/files/migratedpdfs/Sustrans_Jubilee_River_NCN4.pdf
[12] Heathrow Cycle Paths:
https://www.heathrow.com/file_source/Heathrow/Static/PDF/Transport_and_directions/cyclepaths.pdf

Figure 2-6 - Park & Ride scheme design



2.14. Strategic Case Summary

The SMaRT Phase 2 covers the A4 London Road corridor between High Street Langley to the northwest and Sutton Lane Gyratory to the southeast within Slough - a key strategic route connecting the town, the M4 and Heathrow Airport. The scheme will alleviate a number of problems, including the following:

- Congestion on Slough's roads, where residents rely heavily on car use and air quality is worsening;
- Unviability of the town centre and other key areas. Slough is currently losing out to competing employment and shopping centres;
- Negative image and town environment; and
- High levels of unemployment and deprivation.

In addressing the problems above, the SMaRT Phase 2 would support a number of national and regional transport strategies, including the Government's National Infrastructure Plan, the Thames Valley Berkshire LEP's Strategic Economic Plan, and Local Transport Plan policies. It will support the expansion of Heathrow airport by providing improved sustainable access.

Building upon the problems identified scheme objectives have been established to align closely with the strategic and policy context. The scheme's main objectives are:

- Minimise stop/start travel conditions along the A4 London Road and improve journey time reliability;
- Encourage mode shift by extending the current SMaRT service to Heathrow and providing P&R to improve connectivity and PT capacity to Slough and Heathrow;
- Improve capacity at, and functionality of, Sutton Lane Gyratory, which will mitigate congestion impacts of future development; and
- Improve the landscape and public realm to address poor quality visual impact in order to improve the image of Slough, to attract businesses, support housing development and improve permeability.

The successful delivery of the scheme will be measured against its impacts on traffic congestion, journey times and journey reliability, as well as on road safety, public transport accessibility, patronage and air quality improvements. The next chapter provides the estimates of these impacts where it is possible supported by qualitative analysis.

3. The Economic Case

3.1. Introduction

An economic assessment is undertaken to facilitate the quantification and monetisation of scheme costs and benefits where possible. Overall, schemes are assessed against relevant government objectives, which include:

- Providing good value for money (vfm) in relation to impacts on public accounts;
- Improving transport economic efficiency for business users and transport providers; and
- Improving transport economic efficiency for consumer users.

An economic assessment is undertaken over a 60-year period in accordance with the requirement of TAG Unit A1.1. Economic assessment results are presented in the form of Transport Economic Efficiency (TEE), Public Accounts (PA), and Analysis of Monetised Costs and Benefits (AMCB) tables. The results are also input to an Appraisal Summary Table (AST) and combined with qualitative assessments which demonstrate overall vfm.

The economic case of the scheme comprises the following:

i. Transport modelling - Atkins has recently developed an updated 2017 multi-mode model framework for SBC. The Slough Multi-Modal Transport Model (SMMTM) framework has a 2017 base year and contained the following elements:
   - A highway assignment model in SATURN;
   - A public transport assignment model in EMME.

ii. Benefits appraisal
   - A detailed assessment of monetised economic benefits using TUBA, in accordance with WebTAG.

iii. Derivation of scheme costs
   - Scheme costs calculated by SBC using benchmarked values for recent schemes;
   - Incorporation of scheme costs to TUBA, in accordance with WebTAG.

iv. Scheme assessment and supporting analysis
   - Assessment of monetised and non-monetised impacts in terms of the economy, environment, social and public accounts.

The following elements of the economic assessment have been considered at this stage:

- Road user journey time impacts – due to changes in travel time and vehicle operating costs;
- Indirect tax revenue – due to changes in the amount of fuel and other direct vehicle operating costs purchased and changes in expenditure on transport offsetting changes in expenditure elsewhere in the economy;
- Greenhouse gas;
- Road safety and reliability impacts; and
- Noise and air quality impacts – qualitative assessment.

3.2. Options Appraised

The evolution of the SMaRT Phase 2 scheme – and the range of options considered in arriving at the current scheme option – was presented in detail in the OAR. The option included in this business case is the result of identifying a solution that will deliver substantial benefits at the same time as being affordable and maximising value for money.

At the outset of the scheme design a number of options were considered. These included four broad scheme concepts in addition to a “Do Minimum” option in which the existing facilities remain. Assessments of the remaining four scheme concepts included numerous tests incorporating slight variations within each concept scheme (“Do Something – DS). A brief description of each option is presented in Table 3-1.

Table 3-1 Option Concepts

Concept	Option	Description
DM	Do Minimum	As existing with background growth, committed schemes and schemes under construction.
DS1	High Cost SMaRT Phase 2	SBC deliver highway infrastructure measures on the A4 between High Street Langley and Sutton Lane gyratory Brands Hill, introduce signalling and pedestrian facilities and public realm improvements. Junction enhancements and the provision of a segregated lane or 'track' along the A4 Colnbrook Bypass east to the Borough boundary, including real time information (SMaRT technology) measures.
DS2	High Cost SMaRT Phase 2 and park & ride	As DS1, with the provision of a Park & Ride site.
DS3	MRT Phase 2	As DS1, but without segregated bus lane and SMaRT technology along the A4 Colnbrook Bypass or facilitating SIFE, although compatible for future upgrades to include SMaRT technology and/or SIFE.
DS4	MRT Phase 2 and park & ride	As DS1, but without segregated bus lane and SMaRT technology along the A4 Colnbrook Bypass or facilitating SIFE, although compatible for future upgrades to include SMaRT technology and/or SIFE, with the provision of a park & ride site.

The final schemes included in this business case, therefore, are:

- The 'Do-Minimum', which includes committed transport schemes and development proposals across the study area; and
- The 'Do-Something' (Scheme Option), which appraises the impact of Option DS4, MRT Phase 2 and park & ride on top of the 'Do-Minimum'.

3.3. Scheme Concept Designs

The scheme concept designs can be found in Section 2.13 in the Strategic Case. The scheme descriptions are outlined below:

- Highway Improvements:
    - Revisions to the South East quadrant of the M4 Junction 5 roundabout with a modified slip road for eastbound traffic;
    - Modifications and signal provision at the Sutton Lane gyratory; and
    - London Road link widening to 2 lanes westbound between M4 Junction 5 roundabout and Sutton Lane;
- A Park & Ride facility located on land adjacent to M4 Junction 5 and Sutton Lane – including a bus station, stands, passenger facilities and parking areas with bus services connecting to Heathrow and Slough. It will contain a terminal building and staff presence and appropriate walkways and urban realm to provide a good interchange environment. It will also include a vending machine, cycle parking, Slough Cycle Docking Station and Electric Car Charging Points (outside of the station); and
- Urban realm enhancements including walking, cycling and bus shelter facilities to enhance the local area and attractiveness of sustainable modes on the northern frontage of the A4 between Langley High Street and the M4 J5 roundabout.

3.4. Approach

3.4.1. Transport Modelling

A robust approach to scheme assessment has been undertaken using the 2017 updated Slough Multi-Modal Transport Model (SMMTM17). The model is capable of comparing a With-Intervention and a Do Minimum scenarios and fixed demand assignments are used.

WebTAG guidance highlights key model design considerations. In summary, these are trade-offs between model complexity and sophistication of outputs versus constraints on resource, computer run-times and data requirements and availability. The considerations when reviewing an existing model or specifying the design of a new transport model are as follows:

- The nature of identified problems and their likely solutions;
- The definition and size of the study area;
- The availability of data and existing models;
- The need to update and (re)calibrate models (including data collection);
- The timescale for model development; and
- The required accuracy and robustness of results/recommendations

When forecasting the impacts of a new scheme and establishing its benefits it is important to consider future developments and transport interventions. Given the location of the scheme, the growth in demand in the Slough district and the adjacent authorities is expected to have an impact on the performance of the schemes appraised here.

3.4.1.1. Future Year demand

Given that the recently updated 2017 base year (BY) models have been used, the parameters are in line with the latest guidance:

- Demand growth – derived from TEMPRO v7.2; and
- Value of Time and Vehicle Operating Costs – based on the latest version of WebTAG Databook (May 2018)

In terms of matrix building, the additional growth for car in the forecast years was obtained by applying NTEM/TEMPRO growth factors to the 2017 Base Year matrices. The detailed growth factors can be found in Appendix A. No individual development sites are considered. LGV and HGV growth factors were taken from the Road Traffic Forecasts 2018.

3.4.1.2. Assumptions for the Do Minimum scenarios

Given that the demand will grow in the future years, some transport schemes are planned to mitigate the impact of this growth. Table 3-2 summarizes the list of transport schemes considered in the Do Minimum scenario for each modelled year. All these schemes are also included in the DS scenarios to ensure that the comparison only takes into account the impact of the schemes that are appraised.

Table 3-2 List of transport schemes included in Do Minimum

Developer	Development	Opening Year	Level of Uncertainty	Included in 2021	Included in 2036
Slough Borough Council	Burnham Station and access improvement scheme	2017	Near Certain	Yes	Yes
Slough Borough Council/Slough Mass Rapid Transit	Transit service	2017	Near Certain	Yes	Yes
Slough Borough Council/Slough Mass Rapid Transit	Highway elements (bus lanes, etc.)	2017	Near Certain	Yes	Yes
Slough Borough Council	Langley Station and access improvements scheme	2019	Near Certain	Yes	Yes
Slough Borough Council	Strategic P&R close to M4 J4,5 & 6	2021	More than Likely	Yes	Yes
Network Rail / Western Rail Link to Heathrow	Closure of Hollow Hill Lane	2024	Near Certain	No	Yes

Developer	Development	Opening Year	Level of Uncertainty	Included in 2021	Included in 2036
Highways England	M4 Smart Motorway Jct 3 - Jct 12	2023	Near Certain	No	Yes
Highways England	M25 Smart Motorway Junction 10-16	2020	Near Certain	Yes	Yes
Slough Borough Council	Chalvey one-way scheme	2012	Near Certain	Yes	Yes
Slough Borough Council	A332 (Windsor Road) Route Enhancement	2016	Near Certain	Yes	Yes
Slough Borough Council	A355 Tuns Lane	2017	Near Certain	Yes	Yes
Slough Borough Council	A332/A355 Jct south of M4	2021	Near Certain	Yes	Yes
Surrey County Council - Runnymede	Runnymede Roundabout	2018	Near Certain	Yes	Yes

3.4.1.3. Highway Model

The highway model for SMMTM17 was developed by using the SATURN (Simulation and Assignment of Traffic to Urban Road Networks) suite of programs. SATURN can operate as either a conventional traffic assignment model or as a combined simulation and assignment model in which junction interactions are represented in detail.

The SMMTM17 is able to forecast the likely transport impacts that the proposed SMaRT Phase 2 scheme would have on highway users on the surrounding road network. The 2017 base year model includes 3 vehicle types, i.e. car, light good vehicles (LGV) and heavy goods vehicles (HGV). The car matrix has been split into 3 trip purposes during matrix construction, as follows:

- Employer Business (Work);
- Commute; and
- Other.

The demand for user classes and road capacities are all presented in the model as passenger car unit (PCU) and the following PCU factors have been adopted per vehicle type.

Table 3-3 Passenger Car Unit Factors

Vehicle Type	Description	PCU Factor
Car	Private car	1
Light Goods Vehicle	Goods vehicle using car-based chassis	1
Heavy Goods Vehicle	OGV1 and OGV2 rigid	2
Bus	Scheduled coach and local bus service.	2.5

Based on the analysis of counts data within and around Slough, a single hour in each of the three peaks was specifically modelled:

- Morning peak (AM) assignment peak hour of 08:00 to 09:00;
- Inter-peak (IP) assignment covering an average hour between 10:00 to 16:00; and
- Evening peak (PM) assignment peak hour of 17:00 to18:00.

There are also one-hour pre-peak periods for both AM and PM peak operated by PASSQ function within SATURN. The SATURN highway assignment model was calibrated and validated following DMRB and WebTAG guidance and was documented in a Local Model Validation Report (LMVR)[13].

Forecasting for 2021 and 2036 was carried out for two-time periods, i.e. AM and PM. The DS network was developed using the DM networks described above but with the inclusion of the proposed scheme improvements. This comprised of the following:

[13] Highway and public transport local model validation report, 29th November 2017

- Widening the SE quadrant of the M4 J5 roundabout from 3 lanes to 4 lanes with modified slip road for eastbound traffic;
- London Road link widening to 2 lanes westbound between M4 J5 and Sutton Lane;
- Park & Ride site located on land adjacent to M4 J5 and Sutton Lane;
- Modifications and signalling optimisation at Sutton Lane gyratory.

The Slough Highway model operational parameters were derived from May 2018 v1.10 WebTAG release and are presented below for each modelled time period including the values of time in Pence Per Minute (PPM) and vehicle operating costs in Pence per Kilometre (PPK) which have been assigned to each modelled user class. Table 3-4 to Table 3-6 show the values for the AM Peak period, the Inter Peak period and PM peak period respectively. The value of time for HGVs has been doubled in line with guidance.

Table 3-4 PPM / PPK values - AM Peak

Morning Peak (0700:10:00)	PPM (veh)	PPK (veh)
1 Car Work	30.60	12.39
2 Car commute	20.52	5.92
3 Car other	14.16	5.92
4 LGV	21.63	13.56
5 HGV	21.96	42.79

Table 3-5 - PPM / PPK values - Inter Peak

Inter Peak (10:00:16:00)	PPM (veh)	PPK (veh)
1 Car Work	31.36	12.39
2 Car commute	20.86	5.92
3 Car other	15.08	5.92
4 LGV	21.63	13.56
5 HGV	21.96	42.79

Table 3-6 - PPM / PPK values - PM Peak

Evening Peak (16:00:19:00)	PPM (veh)	PPK (veh)
1 Car Work	31.04	12.39
2 Car commute	20.59	5.92
3 Car other	14.83	5.92
4 LGV	21.63	13.56
5 HGV	21.96	42.79

3.4.1.4. Public Transport Model

The public transport model has been built using EMME and uses the same zoning system, the same road network and the same time periods as the SMMTM17 highway model described above.

The bus network was created from the SATURN highway network model and bases its run times from it. This enables a linkage to be established between highway travel times and bus travel times such that, in forecasting mode, the impact of increasing highway congestion levels on bus travel times is represented.

This linkage also allows the impact on bus journey times of new bus lanes and bus priority measures at junctions to be modelled. At the same time, it models the effects of capacity reduction on general traffic, and the effect this has, in turn, on bus journey times.

The full list of public transport services (bus and rail) included in the Base Year can be found in Appendix B, along with service headway in each modelled time period. For public transport assignment model, a single user class is considered where buses are modelled as fixed flow

preloads, reflecting the existing scheduled bus timetable. The PT modes and vehicles type are shown in Table 3-7.

Table 3-7 PT Modes and Vehicle Types

Mode	Description	Mode Type	Vehicle Type	Default Speed (kph)	Description
c	Car	Auto			
f	First	Transit	1	30	First Berkshire & Thames Valley Buses
o	Redline	Transit	3	30	Redline Buses
a	Arriva	Transit	2	30	Arriva Buses
t	TfL	Transit	4	30	
x	Bus Dummy	Transit	5	30	Reserved for future use
b	Bearbuses	Transit	6	30	
z	Whitebuses	Transit	7	30	
y	Courtney	Transit	8	30	
r	Rail	Transit	10 for train and 30 for Tube	60	First Great Western, South West, Intercity rail and London Tube
w	Walk	Aux transit		5	
i	Interchange	Aux transit		5	
q	Quick walk	Aux transit		5	
d	Rail connectors	Transit		35	Access by car

The public transport assignment model uses the parameters based on those provided in TAG Unit M3.2, where further details may be found. The parameter values are provided in Table 3-8 and apply to both bus and rail. The wait time is calculated as half the service headway – this is controlled by the wait time factor of 0.5.

Table 3-8 - Assignment Parameters

Parameter	Value
Wait time factor	PDFH curve
Wait time weight	2.5
Walk time weight	2.0
Interchange penalty (minutes)*	0 to 25

** The interchange penalty varies at different locations. It was adjusted as part of the calibration process.*

The detailed procedure in developing Slough public transport demands can also be referred to in and was documented in the LMVR.

The possible effect of crowding has not been estimated, because as stated in the strategic case it is anticipated that new SMaRT-branded services will be introduced on the Slough – Heathrow corridor.

3.4.1.5. Park & Ride Assessment

The P&R demand was estimated in a spreadsheet-based model using an absolute logit choice formulation:

$$P_{ijn} = \frac{\exp(-\lambda_{sub-mode} * C_{ijn})}{\sum_{m\epsilon\{available\ sub-modes\}} \exp(-\lambda_{sub-mode} * C_{ijm})}$$

Where:

P_{ijn} is the probability of choosing sub-mode n for the trip between origin i and destination j;

$\lambda_{sub-mode}$ is the sub-mode choice sensitivity parameter, constant over all origin-destination (OD) pairs;

C_{ijn} is the cost of using sub-mode n for the trip between origin i and destination j. The cost is calculated as the total generalised time to include time and money components.

$$\sum_{m\epsilon\{available\ sub-modes\}} P_{ijm} = 1$$

For the purposes of the appraisal, the car and bus legs of the P&R trips are combined into a single OD trip in the DS scenario. This OD trip is then directly comparable with the same OD trip in the DM scenario.

This effectively segregates P&R into a separate mode, rather than having an element contained in the highway mode and another element in the PT mode. Aside from enabling correct calculation of benefits, this also allows benefits for P&R users to be clearly distinguished from benefits to other users.

The methodology and assumptions followed to achieve this generation of the P&R mode, while avoiding any double counting of benefits or costs within the existing modes is as follows:

- DM demand for bus remains unchanged since there's no P&R element in this scenario;
- To apply the binary logit, DM and DS (with P&R) time and distance skims are needed. The DM is skimmed in the usual way.from the highway model. For the DS, the car distance and time is skimmed to the P&R site for the car leg, and the bus distance and time is skimmed from the public transport model for the bus leg. As an example, in the AM that will be between the P&R site and the destination, be it Slough or LHR;
- Given these car and P&R costs, the binary logit will determine trips that shift mode from car to P&R. For example, if in the DM such car trips are from i to j, then in the DS they will be allocated to car trips i to k [being the P&R site] and bus trips from k to j;
- The logit works on person trips, and car trips that shift mode are factored to convert person trips to vehicle trips, so they can be assigned; and
- The P&R fare is a flat rate for all OD pairs based on a £ 1 parking charge per vehicle and £1.20 per passenger for using the P&R bus. This is only applicable to the DS P&R trips. DM P&R trips are made by car and so have zero fare

3.4.2. Economic Appraisal

The Economic Assessment was carried out using standard procedures and economic parameters as defined by TAG Unit A1 – Cost Benefit Analysis with efforts made to quantify and monetise costs and other impacts where appropriate. Overall, scheme was assessed against relevant government objectives which include:

- Provide good value for money in relation to impacts on public accounts;
- Improve transport economic efficiency for business users and transport providers;
- Improve transport economic efficiency for consumer users;
- Improve road safety;
- Improve reliability;
- Reduce emission of greenhouse gases; and
- Improve air quality.

Economic benefits of the scheme have been quantified using the DfT's Transport User Benefit Appraisal (TUBA v1.9.11) software.

Outputs from the transport models were used, giving details of demand, journey times, trip distances and charges or fares applicable to those trips. These were generated as matrices with average figures for each origin-destination pair and were provided for both modelled years, 2021 and 2036, and for two-time periods, AM and PM peaks in each year, where the models represent an average hour out of each 3-hour peak period.

Based on a review of base year flows, the AM peak model has also been used to reflect interpeak benefits, with the difference in flow levels built into the annualisation factor. Benefits accrued during

weekends and bank holidays have not been captured. The traffic counts indicated that average flow during the interpeak for cars was 34% that of the AM peak, while freight flows were up to 70% that of the AM peak.

Annualisation factors, calculated using traffic count data commissioned specifically for use in this study, were used to convert modelled benefits to daily benefits and then benefits are assumed to be evenly accrued over 253 working days a year.

As flows don't translate directly into benefits, with lower congestion levels generally resulting in low benefits generated per trip, conservative assumptions have been applied in this factoring process.

Therefore, the conversion has used the lower car only proportion and in addition the benefit per user has been reduced by 50%. The benefits generated per hour have then been factored up to cover the 6-hour interpeak.

With this representation of the interpeak in place, the AM peak contributes 70% of total benefits, interpeak contributes 6% and PM peak generates 24%.

Using the above methodology, time benefits for highway and public transport users were calculated. Benefits were disaggregated by user type, with separate figures for business and non-business users.

Benefits reported included time savings, reductions in vehicle operating costs, savings in charges, changes in revenue to private operators and local government and reductions in carbon emissions. The charges considered include park & ride fares, parking charges at the site and parking charges avoided elsewhere, for trips which change their journey to use park and ride.

These benefits were all monetised so that, based on values of time from WebTAG, the benefits of time savings could be added to the already monetised benefits of reduced operating costs and changes to fare revenue. This allowed all benefit types to be combined to give a Present Value of Benefit (PVB).

The benefits arising from the cycling interventions have not been monetised and have been assessed qualitatively.

3.5. Outputs

3.5.1. Transport Modelling

The potential impacts of the SMaRT Phase 2 are analysed using the newly validated 2017 SATURN and EMME highway and public transport assignment models respectively. Both models were validated against appropriate DfT's WebTAG guidance. The highway and public transport models for the 2017 Base Year has been used as starting point for the appraisal of the SMaRT Phase 2 scheme.

3.5.1.1. Future Year demand

Table 3-9 and Table 3-10 and summarise the demand per user class and mode for each future year obtained as a result of applying the respective NTEM growth factors. The number of car, LGV and HGV trips is expected to increase significantly, while bus trips are expected to decrease slightly, probably due to rising income and car ownership.

Table 3-9 Total demand per use class/mode for the morning peak hour

Mode/Purpose	2017	2021	2036	Growth 2017-2036
Car Work (veh)	8,853	9,204	9,962	13%
Car Commute (veh)	38,531	39,784	42,488	10%
Car Other (veh)	21,571	22,825	25,275	17%
LGV (veh)	6,120	6,493	7,734	26%
HGV (veh)	7,562	7,469	8,052	6%
Bus (persons)	1,527	1,428	1,415	-7%

Table 3-10 - Total demand per use class/mode for the afternoon peak hour

Mode/Purpose	2017	2021	2036	Growth 2017-2036
Car Work (veh)	8,741	9,076	9,978	14%
Car Commute (veh)	38,077	39,315	42,439	11%
Car Other (veh)	27,721	29,166	32,808	18%
LGV (veh)	6,737	7,264	8,654	28%
HGV (veh)	5,378	5,265	5,676	6%
Bus (persons)	1,349	1,298	1,315	-3%

3.5.1.2. Highway Model

The list of schemes considered in the Do Something scenario comprises the following:

- Widening the SE quadrant of the M4 J5 roundabout from 3 lanes to 4 lanes with modified slip road for eastbound traffic;
- London Road link widening to 2 lanes westbound between M4 J5 and Sutton Lane;
- Park & Ride site located on land adjacent to M4 J5 and Sutton Lane;
- Modifications and signalling optimisation at Sutton Lane gyratory.

All the schemes included in this package have some impact on the traffic conditions.

3.5.1.2.1. Flow difference

Figure 3-1 and Figure 3-2 show the impact of the schemes on the flows in 2021, for AM and PM respectively. The labels show flow differences with absolute values higher than 100 PCUs.

There are three main changes that can be observed from the model:

- The new right turn allowed at Sutton Ln junctions determines some re-routing away from Parlaunt Rd and down Sutton Ln;
- There is some re-routing on LondonRd/Colnbrook Bypass;
- The P&R generates additional traffic in the area of interest, mainly going into the P&R site in AM and leaving the site in PM.

The model shows very similar pattern for 2036 (see Figure 3-3 and Figure 3-4). It should be noted that, apart from the P&R demand, these changes are due to re-routing only as fixed demand assignments were done.

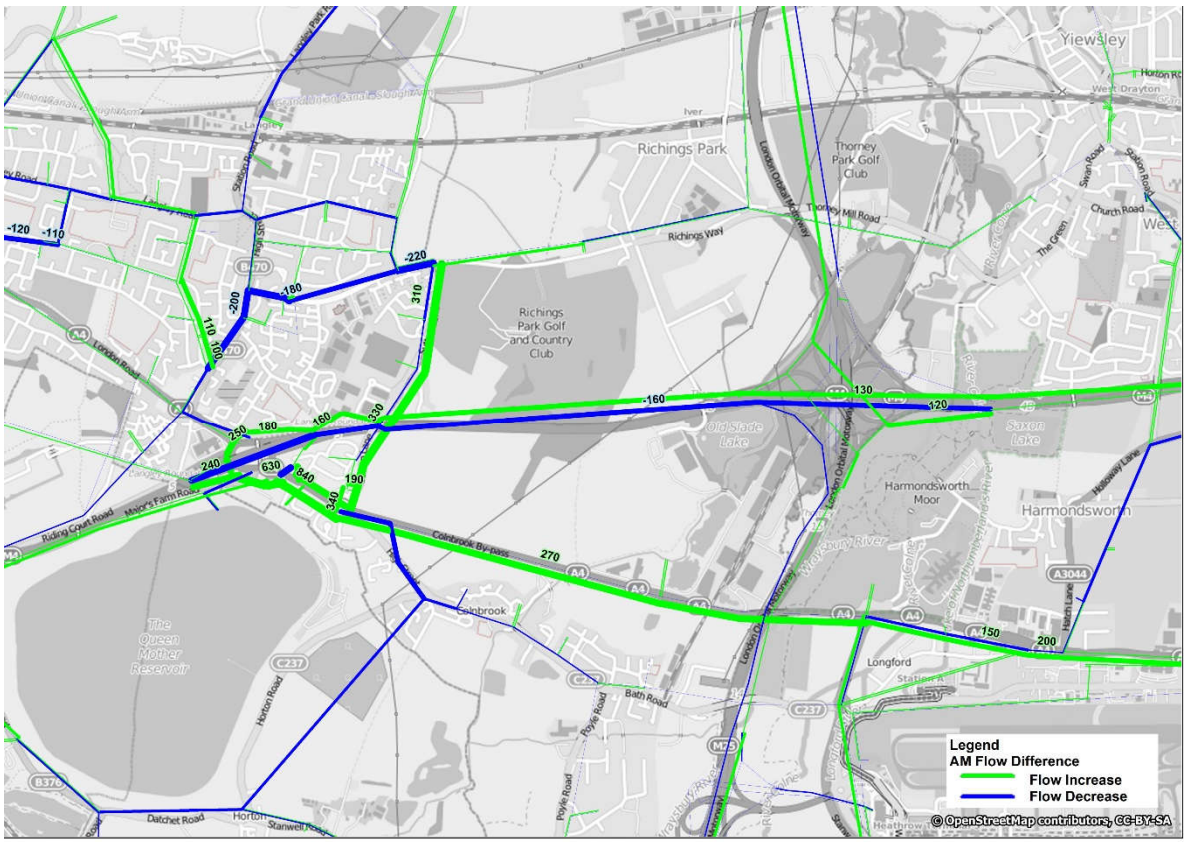


Figure 3-1 - Flow difference plots 2021 with Intervention vs. 2021 Without Intervention (AM)

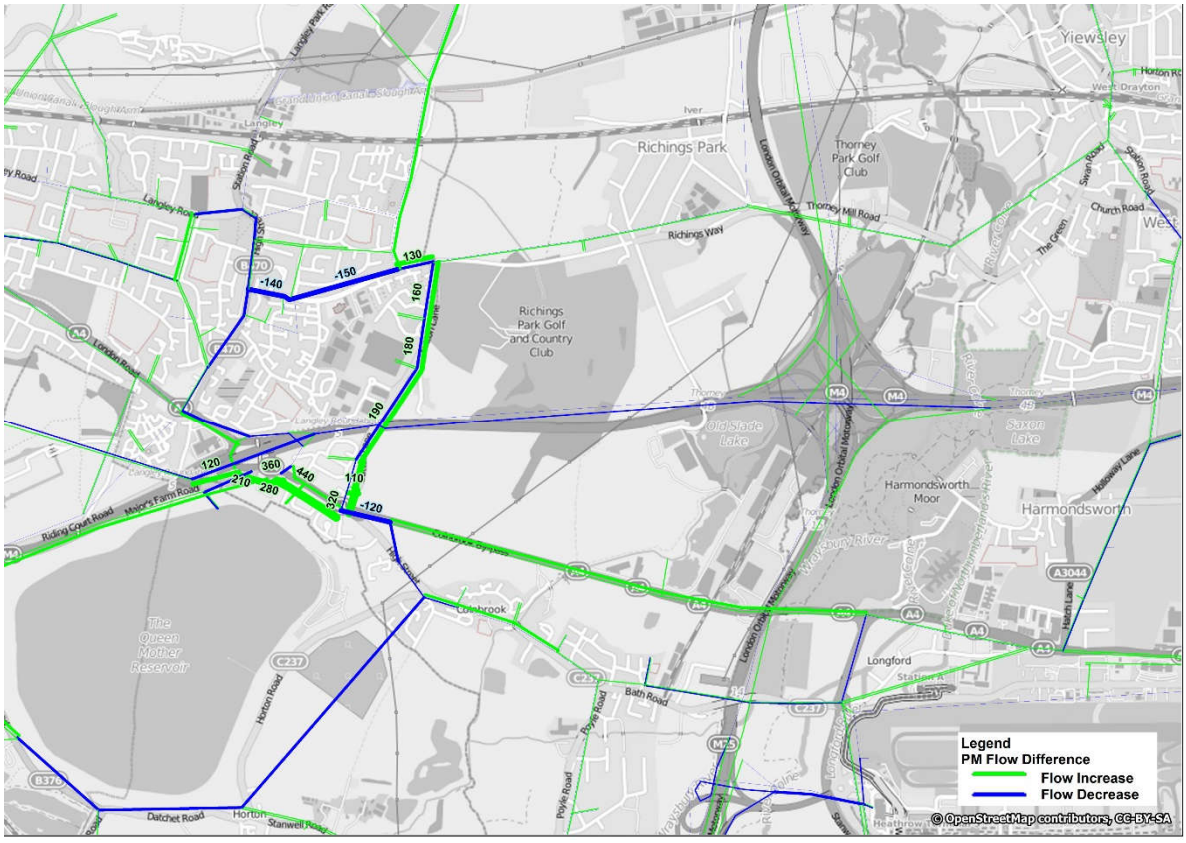


Figure 3-2 - Flow difference plots 2021 with Intervention vs. 2021 Without Intervention (PM)

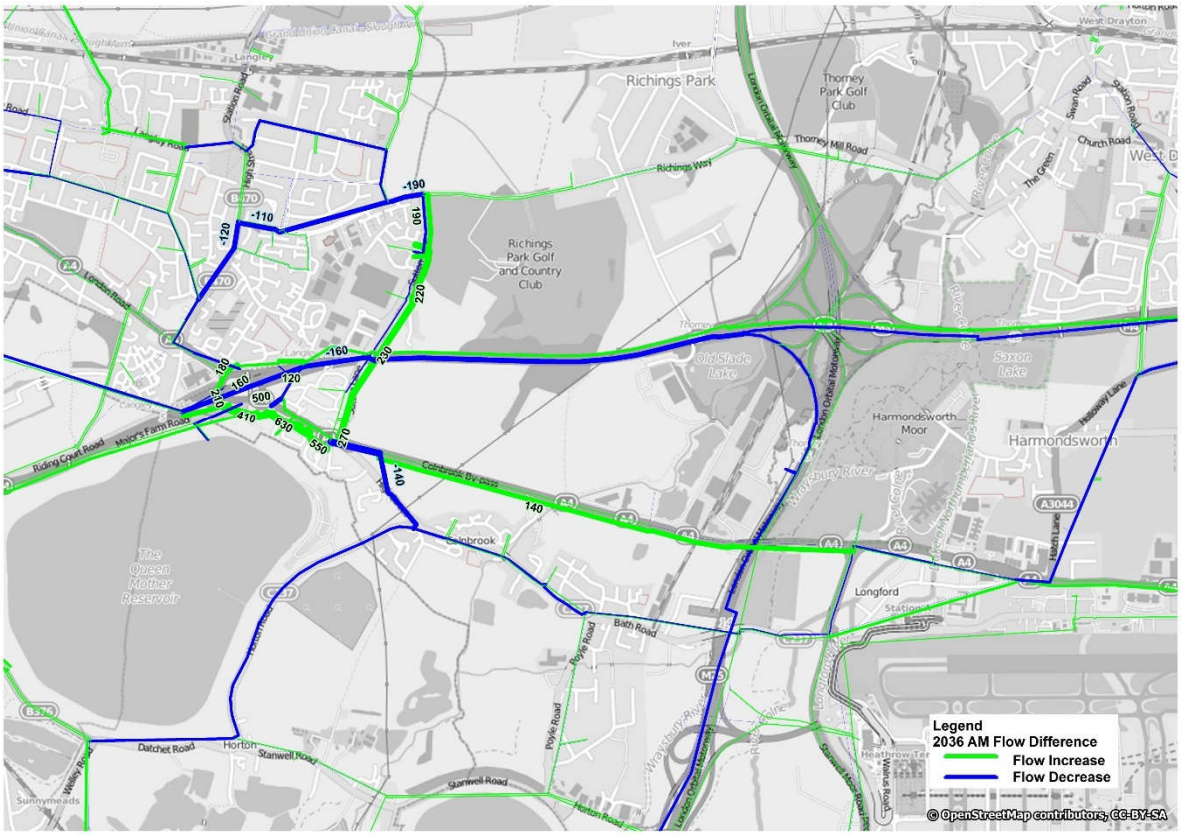


Figure 3-3 - Flow difference plots 2036 with Intervention vs. 2021 Without Intervention (AM)

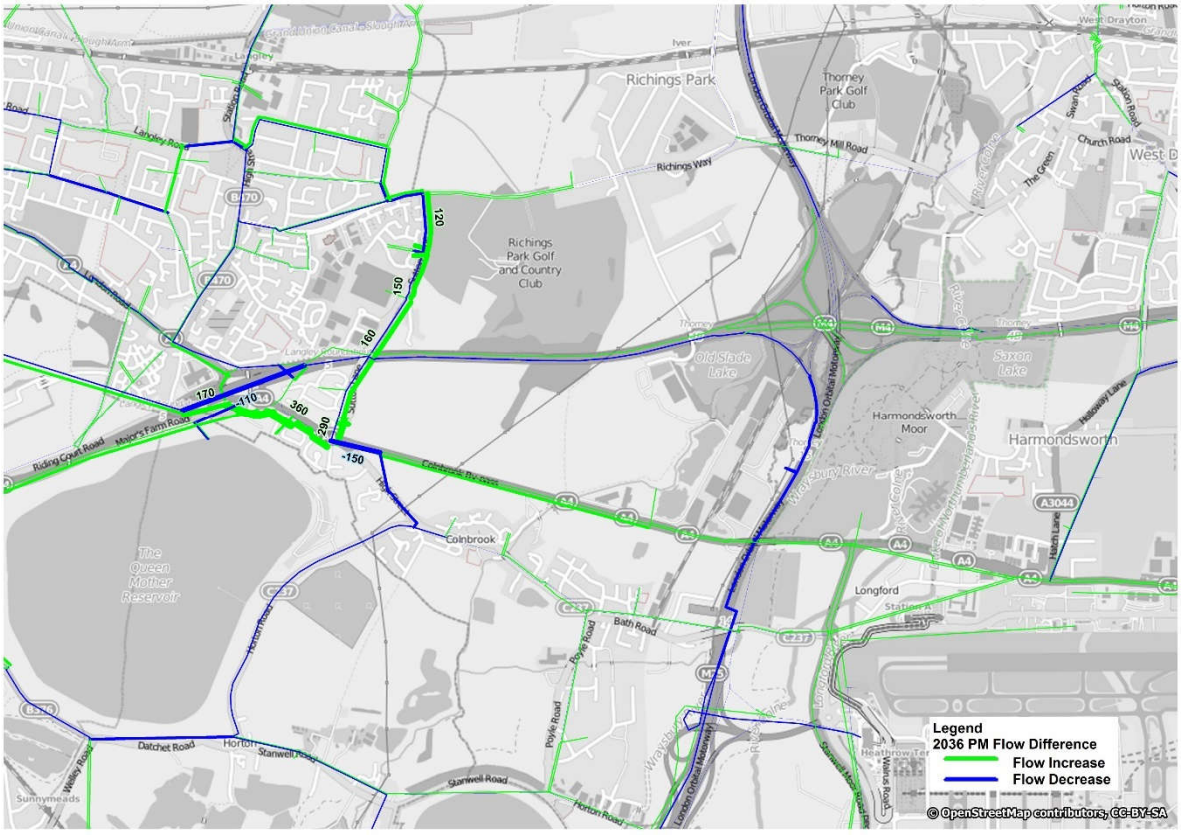


Figure 3-4 - Flow difference plots 2021 with Intervention vs. 2036 Without Intervention (PM)

3.5.1.2.2. Difference in car journey time and delay

Table 3-11 and Table 3-12 summarise the journey time differences between With and Without Intervention scenarios for each modelled year respectively. Figure 3-5 shows the points between which the journey times were measured.

The schemes impact mainly on the Westbound movements, which is where the highest journey time/delay reductions can be observed.

The results show smaller benefits in the afternoon peak. This is mainly due to the movements that occur at the Sutton Lane junction. In the afternoon peak, the additional flow coming down Sutton Lane is joined by the traffic leaving the P&R site, and this requires a higher green time for that arm. This means a reduction of the green time available for the Eastbound/Westbound movements. Nonetheless, the Westbound movements present benefits in both time periods and both future years.

Table 3-11 – Journey time and speed comparison for 2021 (DS vs. DM)

		Do Minimum		Do Something		Diff (DS-DM) (min.)	
		AM	PM	AM	PM	AM	PM
Eastbound	Total travel time (sec.)	233.52	152.09	241.19	173.97	0.13	0.36
	Total delay (sec.)	111.59	23.56	94.75	23.49	-0.28	0.00
	Average speed (kph)	38.73	59.46	37.49	51.98	-1.24	-7.48
Westbound	Total travel time (sec.)	308.93	191.92	166.13	168.69	-2.38	-0.39
	Total delay (sec.)	189.31	72.3	24.83	21.31	-2.74	-0.85
	Average speed (kph)	30.52	49.13	54.59	53.76	24.07	4.63

Table 3-12 – Journey time and speed comparison for 2036 (DS vs. DM)

		Do Minimum		Do Something		Diff (DS-DM) (min.)	
		AM	PM	AM	PM	AM	PM
Eastbound	Total travel time (sec.)	266.02	156.93	242.84	176.95	-0.39	0.33
	Total delay (sec.)	144.02	28.16	98.11	26.83	-0.77	-0.02
	Average speed (kph)	34	57.63	37.24	51.11	3.24	-6.52
Westbound	Total travel time (sec.)	284.96	174.76	164.22	167.04	-2.01	-0.13
	Total delay (sec.)	165.2	55.13	21.74	19.39	-2.39	-0.60
	Average speed (kph)	33.09	53.95	55.22	54.29	22.13	0.34

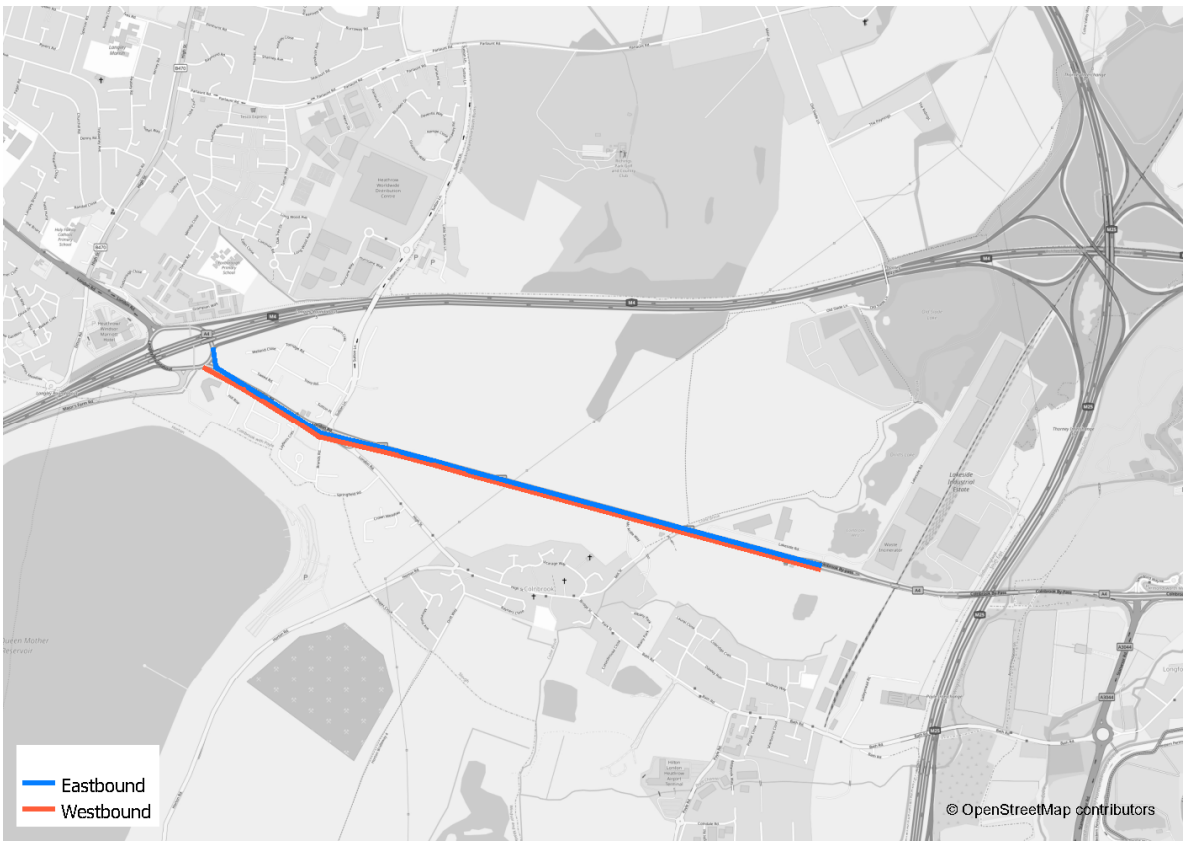


Figure 3-5 - Routes for measuring journey times

3.5.1.3. Public Transport Model

In terms of Public Transport supply, the only change between DM and DS is Slough Mass Rapid Transit service stopping at the P&R site.

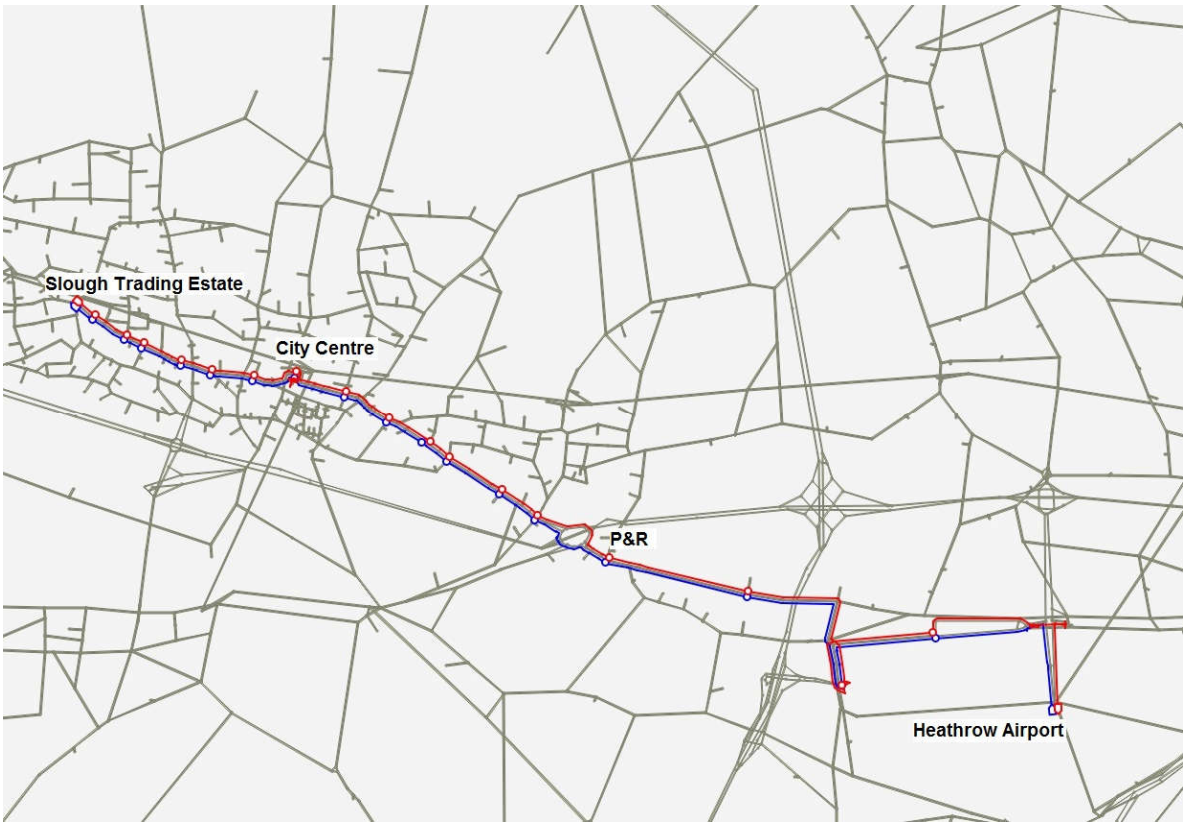


Figure 3-6 – Route of the SMART bus service coded in the model

Due to the layout of the scheme, the route of the bus service does not suffer any major changes. Although a stopping time of two minutes was coded at the P&R bus terminal in the DS scenario, this was compensated by the improvements to the highway network and the end-to-end journey time for the SMART service remained approximately the same, as shown by Table 3-13 for the one-way journey time between Slough and Heathrow.

Table 3-13 - Modelled Journey Times for the SMART service Slough to London Heathrow

Journey Time (mins.)	AM		PM	
Direction	**DM**	**DS**	**DM**	**DS**
Inbound	59.44	59.47	65.01	65.09
Outbound	61.90	61.86	61.10	60.93

As a result, there is no impact on the routing of existing users, as it can be seen in the example for 2021 shown in Figure 3-7 and Figure 3-8. In other words, there is no abstraction from current bus service use to the new P&R services. The figures show AM flows from the P&R site to Slough and to LHR, and the reverse in the PM period. Peak flows are 133 passengers per hour. Other bus volumes are not affected because the P&R patronage is derived only from the car trip matrix using the binary logit.

Figure 3-7 - Change in the number of passengers boarding bus services between DM and DS (2021, AM peak hour 08:00 - 09:00)

Figure 3-8 Change in the number of passengers boarding bus services between DM and DS (2021, PM peak hour 17:00 - 18:00)

3.5.1.4. Park & Ride Patronage

As the approach for estimating the P&R demand is a simplified one, the trips arriving by car to the P&R site in the morning period and the trips leaving by car in the afternoon period were modelled. Two different areas of interest were considered for the users of the P&R site:

- Slough City Centre; and
- Heathrow Airport.

Each of these areas of interest has a distinct catchment area. Table 3-14 and Figure 3-9 show the results for Slough City Centre in 2021. Table 3-15 and Figure 3-10 show the results for Heathrow Airport in 2021.

Table 3-14 Number of P&R users with Slough as destination in AM (persons) - 2021

Direction (by car)	AM peak hour	PM peak hour
IN	133	
OUT		64

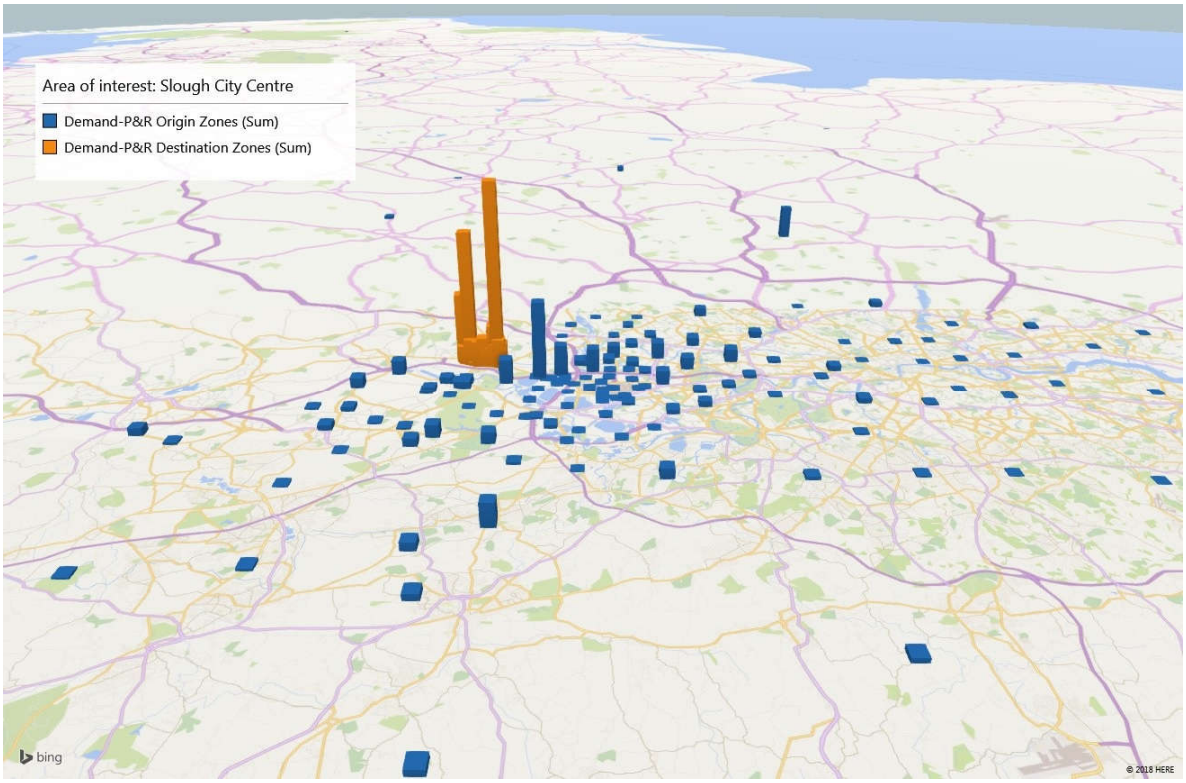


Figure 3-9 Catchment area for Slough City Centre – 2021

Table 3-15 Number of P&R users with Heathrow as destination in AM (persons) - 2021

Direction (by car)	AM peak hour	PM peak hour
IN	91	
OUT		72

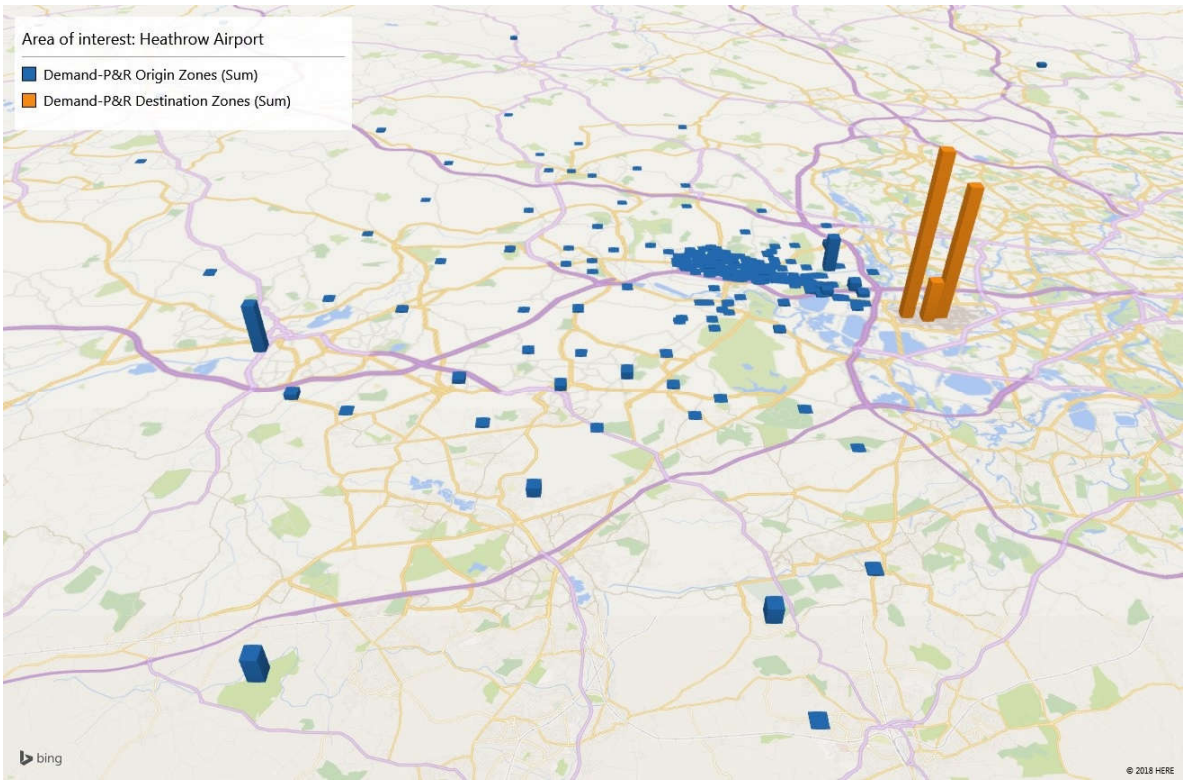


Figure 3-10 Catchment area for Heathrow Airport – 2021

Table 3-16 and Figure 3-11 show the results for Slough City Centre in 2021. Table 3-17 and Figure 3-12 show the results for Heathrow Airport in 2036.

Table 3-16 Number of P&R users with Slough as destination in AM (persons) - 2036

Direction (by car)	AM peak hour	PM peak hour
IN	144	
OUT		69

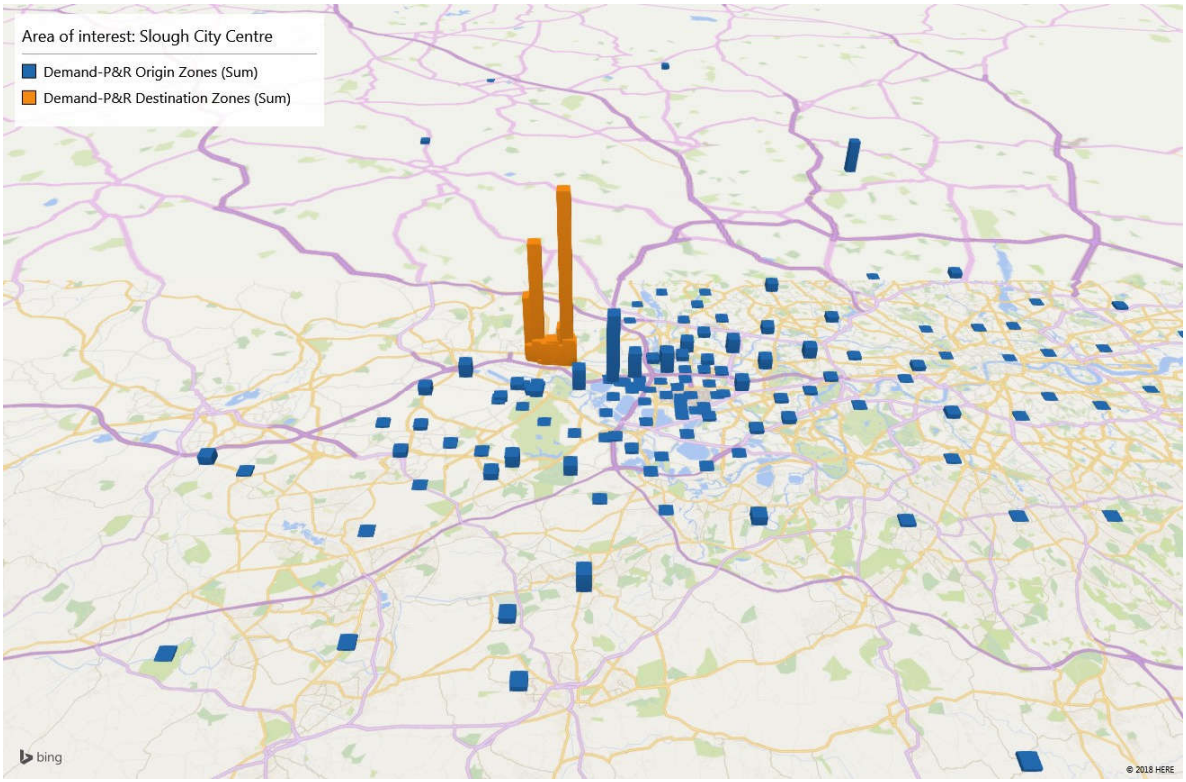


Figure 3-11 Catchment area for Slough City Centre - 2036

Table 3-17 Number of P&R users with Heathrow as destination in AM (persons) - 2036

Direction (by car)	AM peak hour	PM peak hour
IN	102	
OUT		87

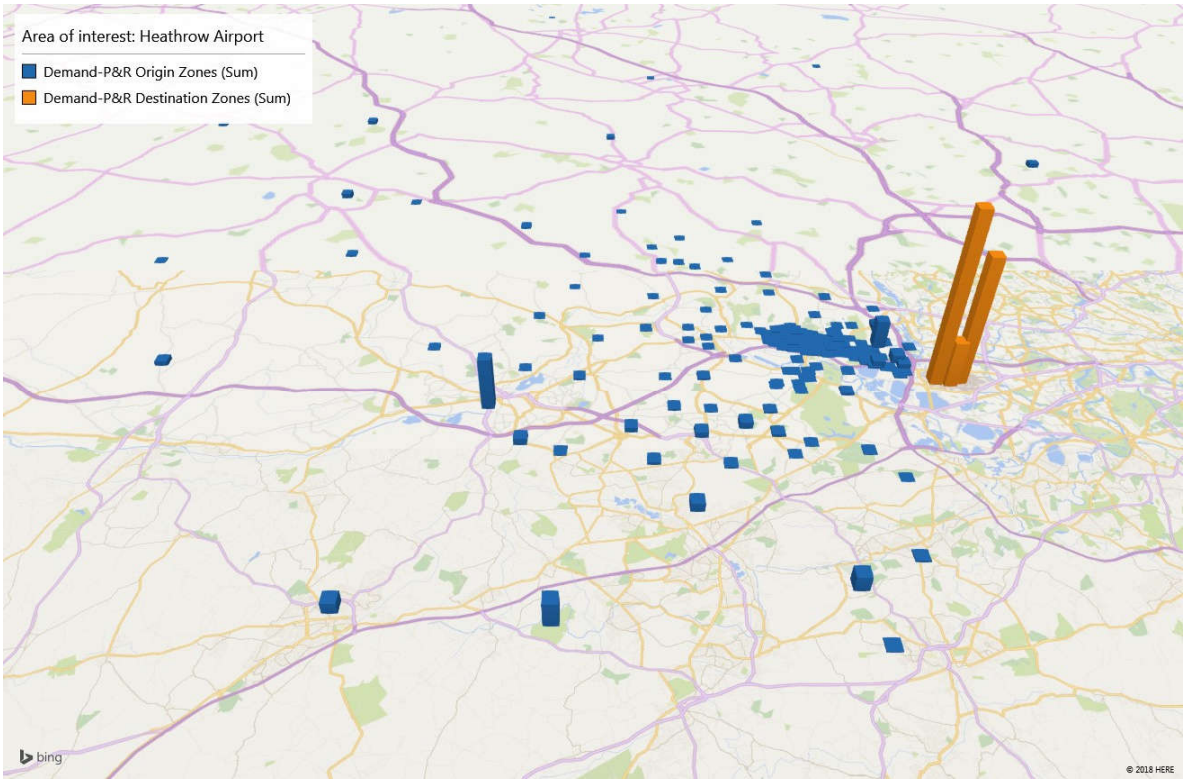


Figure 3-12 - Catchment area for Heathrow Airport - 2036

The results show a reasonable patronage at the P&R site increasing 8% between 2021 and 2036. The P&R catchment areas to both Slough and LHR look sensible. For estimating the capacity of the P&R facility, the results for 2036 are taken as the reference and the following assumptions are made:

- The peak hour (0800-0900) to the 3-hour peak period (0700-1000) factor for the morning peak is 2.69 (this value was taken from the Variable Demand Model which works on peak periods). The number of trips leaving the P&R site in the morning period is negligible and can be ignored; and
- The vehicle occupancy factor is 1.2.

Based on these assumptions, the capacity required for the P&R facility in the AM peak period is 320 parking spaces. Some allowance is needed for the 6-hour inter-peak period (which is usually 1000-1600), which might add another 100 spaces. The design capacity of the site at 600 parking spaces exceeds the potential demand of around 420 spaces, and should therefore suffice for an average working day.

Demand for the P&R could be influenced by parking and car access strategy to both Heathrow and the town centre which could encourage further shift to the P&R. There is adequate space to expand the P&R should there be an additional policy change and further spaces be needed. Further space could be utilised if either overnight parking is allowed, or if it becomes used as an overnight lorry park. The benefits of these potential demand attrators have not been forecast and included ijn the business case given the uncertainty around them, but there is potential to improve usage and the value for money of the scheme.

3.5.2. Economic Appraisal

This section describes the key elements of the economic appraisal, particularly focussing on costs and benefits included in the cost-benefit analysis.

3.5.2.1. Benefits

The key benefits from the economic assessment include:

- Road user journey time impacts – changes in travel time and vehicle operating costs;
- Public transport user benefits (including park & ride);

- Indirect tax revenue – changes in the amount of fuel and other direct vehicle operating costs purchased and changes in expenditure on transport offsetting changes in expenditure elsewhere in the economy;
- Greenhouse gas (CO2) emissions;
- Journey quality from improvements to public realm – qualitative assessment; and
- Noise and air quality impacts – qualitative assessment.

3.5.2.2. Costs

Costs associated with the scheme (construction, land, preparation and supervision costs) were derived following the principles set out in TAG Unit A1.2 – Scheme Costs. The following adjustments have been applied for appraisal purposes:

- Values converted into 2010 prices;
- Real inflation (i.e. Tender Price Index or Retail Price Index depending on the cost type less background inflation);
- Optimism Bias will be added (22%) on top of risk, for appraisal purposes only;
- Market price adjustment; and
- Values are discounted to 2010.

3.5.2.2.1. Highway Improvements Costs

Capital Costs

Construction cost estimates were developed based on preliminary design drawings, construction rates and bills of quantities. Estimates have been developed for preparatory costs (assumed to be approximately 15% of construction costs), site supervision (assumed to be approximately 10% of construction costs) and land. A risk allowance based on a quantified risk assessment has also been included which amounts to £2.2 million, and an optimism bias of 22% has been applied for appraisal purposes. This rate is based on WebTAG's recommended rate of 44% for a highways scheme at early design stage, with a reduction factor applied following a review of the elements which contribute to the 44% optimism bias rate. This ensured that costs which have already been captured in the QRA are not double counted. An appraisal period of 60 years has been applied. Capital costs for the highway improvements are as follows (2016 prices):

- Modifications and signal provision at the **Sutton Lane Gyratory** - £4.3 million;
- Revisions to the South East quadrant of the **M4 Junction 5** roundabout with a modified slip road for eastbound traffic - £1.0 million; and
- **London Road link widening** to 2 lanes westbound between M4 Junction 5 roundabout and Sutton Lane - £0.7 million;

Maintenance Costs

Maintenance costs have been estimated based on a global maintenance spend for the Borough, which have been applied on a per square metre basis to the increase in the highway area due to the scheme and will be accommodated within the boroughs overall maintenance spend.

Vehicle Operating Costs

The impacts of the scheme on travel times and vehicle operating costs have been assessed using the DfT's TUBA program (1.9.11).

TUBA estimates costs and benefits experienced by users and providers of the transport system by comparing transport conditions in a Do-something scenario against conditions in a Do-minimum scenario. It was used to:

- Calculate user benefits by vehicle type (including public transport) for each element of journey cost (i.e. travel time and vehicle operating costs – fuel and non-fuel); and
- Calculate the changes in the indirect tax income received by the government (for highway schemes this primarily reflects the levels of indirect taxation incurred on fuel costs).

Revenue

There are no revenue impacts for the highway improvements as part of this scheme.

3.5.2.2.2. Park & Ride Costs

Capital Costs

Construction cost estimates were developed based on preliminary design drawings, construction rates and bills of quantities. Estimates have been developed for preparatory costs (assumed to be approximately 15% of construction costs), site supervision (assumed to be approximately 10% of construction costs) and land. A risk allowance has also been included. An appraisal period of 60 years has been applied. Capital costs for the bus facility are £1.1 million and capital costs for the parking facilities are £1.2 million (2016 prices). Full details of the costs can be found in the Financial Case.

Operating and Maintenance Costs

To provide a full coverage of costs of the scheme, operating and maintenance costs have been calculated to supplement the capital costs which had been provided.

It is anticipated that the P&R site will be served by SMaRT which it is expected to be in operation in time for the Park and Ride opening. Hence no purchase of additional fleet to provide the P&R services will be required. Similarly, no additional vehicle operating cost relative to those incurred in the DM scenario have been assumed. Some small additional cost may be incurred through the need to serve the site, but as the service requires a very small diversion to serve the P&R site, it has not been considered proportionate to evaluate the small impact on cost which will result.

The operating and maintenance costs prepared for the P&R site itself assumes a terminal building with staffed presence. This provides a medium-cost assumption.

These costs have been incorporated into the scheme's PVC. Over the 60-year period, the Park & Ride site and facilities are expected to generate £2.7 million PV in operating costs by 2080, with annual operating costs of £137,000 in 2016 prices starting in 2021. A further £0.3m PV of maintenance costs for the site will be required over the appraisal period.

Revenue

While parking charges and bus fare for the P&R site have been included in the TUBA assessment, the modelling does not capture the range of parking charges incurred by car users travelling to Slough town centre or other locations.

As a result, the TUBA assessment only captures the disbenefit to users of paying the P&R charges, without putting a value on the parking charges in the town which they avoid paying by using the P&R service. This also results in P&R revenue being captured while missing out the value of town centre parking revenue which will be lost. To correct for this limitation within the modelling, an adjustment has been made to the TUBA outputs to better reflect overall economic impacts of user charge benefits and operator revenues.

It has not been possible to gather details at an OD level of what charges are being paid in the DM scenario by those drivers who will chose to use the P&R service once it is introduced, as the modelling applied does not extend to reflecting users' parking choices. Therefore, analysis has been undertaken of the sectors to which P&R trips are travelling during the AM peak. This identified the proportion of trips travelling to Slough Trading Estate, where no parking charges apply, the proportion travelling to other areas of Slough where charges would be payable in the do-minimum scenario and the proportion travelling to Heathrow when charges would be payable, but revenue losses would affect Heathrow Airport Ltd, rather than SBC. The impact of the parking charges has been captured based on the following assumptions:

- It is considered that those trips which mode shift to P&R in the DS scenario are likely to have otherwise been parking at sites where charges are applicable. Drivers who have free parking spaces available are less likely to choose to use the P&R service. Therefore, it has been conservatively assumed that, of the trips which will mode shift to P&R, other than those travelling to Slough Trading Estate, all will have been paying to park in the DM scenario.
- The individual charges have been sourced from the site http://www.slough.gov.uk/parking-travel-and-roads/buckingham-gardens-car-park.aspx. This gives a range of charges in the town centre based on the period of stay;
- It has been assumed that commuters using the parking facilities are likely to stay for most of the day and have therefore been assumed to require a ticket for greater than 5 hours. Business users and leisure users will tend to have shorter duration stays and have been

assumed to average a 3 hour stay. Across the various car parks these stays will incur a charge of £5 and £3 respectively per vehicle; and

- As P&R charges have been applied on a per-person basis, with the parking element of the charge factored up by vehicle occupancy, a reverse factoring has been applied to these town centre parking charges to convert from a charge per vehicle into a charge per person, using WebTAG average occupancies on a weekday by trip purpose.

Charges for P&R users include a £1 per vehicle parking charge and £1.20 per person bus fare.

These impacts are included in the Appraisal Summary Tables in Section 3.10.

3.5.2.2.3. Funding

Construction of the scheme is assumed to be publicly funded. £1.5m of developer funding may potentially become available from mineral extraction developments outside the Borough, but as this is yet to be confirmed this contribution has not been included in the assessment.

The buses serving the P&R site will be the SMaRT services operated by Heathrow Airport Ltd. These services are due to be already in operation prior to the opening of the P&R site so, being part of the do-minimum scenario, no additional operating costs are required.

SBC are anticipated to be responsible for the operating and maintenance costs of the P&R site and will collect the parking revenue at the site, while the extra bus fare revenue generated by the site will be retained by Heathrow. providing a moderate operating surplus, while maintenance costs for the site will be covered by SBC.

3.5.3. Safety Impacts

The scheme has the potential to increase safety in the corridor. Key routes and locations which are likely to benefit from the scheme's improved safety are the M4 between J5 and Sutton Lane, and the A4 between London Road and Ditton Road.

3.5.3.1. Existing Levels of Accidents

In the five years between 1st August 2013 and 31st July 2018 there have been 94 accidents in the scheme's corridor area. Most accidents have occurred on the A4 London Road, and have predominantly occurred on the following key routes and locations

- A4 London Road approaching Sutton Lane Slough;
- A4 London Road joining with B470 High Street Langley; and
- A4 London Road joining with Brands Road Colnbrook/Slough.

3.5.3.2. Potential Impacts and Effect on VfM

The scheme, located on the A4 London Road corridor between High Street Langley to the northwest and Sutton Lane Gyratory to the southeast, is likely to have a positive impact on safety. Large amounts of traffic use portion of road where the A4 London Road meets the Langley High Street/B470, close to the M4 J5. The safety impacts would be expected to have a positive effect on the scheme's BCR. This qualitative assessment indicates that these benefits would improve the VfM and support the scheme.

3.5.3.3. COBALT Assessment

DfT's COBALT software has been used to quantify the impacts of the scheme on road safety. Assessed over a broad area of the model, to capture changes in flow resulting from users' mode shifting to P&R as well as the more direct changes to network layout, a monetised value of £1.2m increase in cost of accidents has been calculated. This represents an additional 0.5 personal injury accidents (PIAs) per annum.

The COBALT assessment however reflects only changes to structure of links in the network and does not provide sufficient precision to capture improvements such as the upgraded Sutton Lane Gyratory. It also does not reflect improvements made for pedestrians and cyclists on key links, such as the addition of new crossing points and new cycle lanes on the A4.

The disbenefits forecast by COBALT are primarily related to increases in flow on the links providing access/egress to and from the P&R site. Mitigation for these impacts are built into the scheme design, such as the reconfiguration of the existing Sutton Lane Gyratory and improvements to the A4/M4 junction, but these safety improvements are captured only qualitatively, being at a level of detail outside the scope of COBALT.

A detailed analysis of the COBALT output showed that the overall disbenefit value calculated is fully captured within the scheme area, where more detailed analysis is required. Though the changes to the network mean that COBALT does not provide a representative assessment of this area, it does reflect that there are no significant impacts from variations in traffic flows across the remainder of the network, where infrastructure is not changed by the scheme.

3.5.4. Journey Time Reliability

An assessment of journey time reliability improvement for highway users has been undertaken using WebTAG's guidance for capturing reliability impacts on urban roads. This has shown that the junction improvements and decongestion caused by a mode shift from car to P&R results in a road user benefit of £1.48m PV.

Journey time benefits for public transport users have not been quantified, as this assessment would rely on data recording lateness of the existing service, prior to applying the scheme improvement. However, as the SMaRT services which will serve the P&R site are not yet in operation it is not possible to obtain such data.

The operation of services via the P&R site includes a 2-minute dwell time within timetabling, which has been built into the modelling resulting in reduced journey time savings. There will be opportunity to use some of this planned dwell time to recover from delays which may occur earlier in the journey. This will mean a small journey time reliability improvement for public transport users will also be generated. Negative effects on reliability during the construction period of the scheme have not been assessed.

3.6. Assessment of Non-Monetised Impacts

3.6.1. Air Quality Impacts

The scheme could potentially affect air quality because of changes in traffic. The key pollutants considered in this assessment include nitrogen dioxide (NO2), and particulate matter (PM10, PM2.5). These pollutants are most likely to be present in ambient air at concentrations close to or above national air quality objectives at sensitive receptors near to roads and are hence the focus of the assessment of vehicle emissions associated with the scheme.

3.6.1.1. Existing Air Quality

Air Quality Management Areas (AQMAs)

The scheme is located within the area administered by Slough Borough Council (SBC). SBC has declared four AQMAs due to exceedances of the annual mean AQS objective for NO2. The scheme is located within two of the AQMAs, AQMA Nos. 1 and 2 as summarised in Table 3-18. In addition, there are two AQMAs within Slough, one on the A4 in the town centre, and one on the A355 north of the M4 Junction 6.

Table 3-18 AQMAs designated by Slough Borough[14]

Name	Air Quality Objective Exceeded	Description
Slough AQMA No.1	Annual mean NO_2	An area encompassing land adjacent to the M4 motorway along the north carriageway between junctions 5 and 7, and along the south carriageway between junction 5 and Sutton Lane.
Slough AQMA No.2	Annual mean NO_2	An area encompassing the A4 London Road east of junction 5 of the M4 motorway as far as Sutton Lane.
Slough AQMA No. 3 Extension	Annual mean NO_2	The designated area incorporates stretch of road between Tuns Lane junction known as the "Three Tuns" and 30 Bath Road and Quadrivium Point.
Slough AQMA No. 4	Annual mean NO_2	The designated area incorporates the A4 Bath Road from the junction with Ledgers Road/ Stoke Poges Lane, in an easterly direction, along Wellington Street, up to Sussex Place junction.

[14] https://uk-air.defra.gov.uk/aqma/

3.6.1.2. Air Quality Monitoring

The nearest continuous monitoring station to the scheme is a kerbside site located on London Road in Brands Hill, which monitors NO2 and PM10 concentrations. Details of the monitoring are provided in Table 3-19. In 2017, both the annual mean NO2 and PM10 objectives were met at the kerbside site, indicating that the objectives would also be met at the houses bordering London Road which are set further back.

Table 3-19 - Annual mean monitoring results (µg/m3) at Brands Hill continuous monitoring station

Site ID	Site Name	Site Type	X	Y	Pollutant	2013	2014	2015	2016	2017
SL11	Brands Hill, London Road	Kerbside	501643	177753	NO_2	-	-	-	-	37.5
					PM_{10}	-	-	-	-	27.9

* Annual mean objective is 40 µg/m3 for both NO2 and PM10

Annual mean NO2 concentrations are also measured by SBC using passive diffusion tubes. The measured concentrations at the diffusion tube sites located within the vicinity of the scheme are presented below in Table 3-20. There have been exceedances of the objective at the majority of sites in one or more years, with the highest concentrations at the sites closest to a nearby main road (sites 10, 18 and 28), all of which are within 6 m of the A4. Concentrations at all sites show a general decrease in the last five years between 2013 and 2017, as is also noted within the most recent local air quality management (LAQM) report for Slough Borough Council15.

Table 3-20 NO2 Diffusion Tube monitoring results (µg/m3)

Site ID	Site Name	Site Type	X	Y	2013	2014	2015	2016	2017
SLO 8	Grampian Way	Other	501382	178101	**43.3**	**42.4**	**40.0**	**41.3**	**40.4**
SLO 9	Tweed Road	Other	501501	177879	**43.7**	39.0	35.6	37.4	35.3
SLO 10	London Road (A)	Roadside	501733	177725	**55.9**	**51.2**	**48.3**	**52.3**	**45.3**
SLO 11	Torridge Road	Suburban	501637	177999	**43.3**	36.3	36.9	37.3	32.7
SLO 18	Brands Hill (A)	Roadside	501798	177659	**65.8**	**53.1**	**61.1**	**63.7**	**55.2**
SLO 19	Ditton Road	Roadside	500851	177890	37.2	38.8	**41.1**	**40.0**	34.6
SLO 28	Rogans (Colnbrook bypass)	Roadside	501941	177633	**56.4**	**50.9**	**56.3**	**58.1**	**45.3**
SLO 32	Brands Hill (B)	Roadside	501853	177620	**44.9**	**42.1**	**40.1**	39.3	36.3
SLO 39	London Road (B)	Roadside	501734	177733	37.8	38.6	37.1	37.0	33.1
SLO 45	London Road (C)	Roadside	501658	177781	37.2	36.6	33.5	32.7	31.4

*Values in bold exceed the national objective of 40 µg/m3

3.6.1.3. Potential Impacts and Effect on VfM

Once operational, air quality could be affected (positively or negatively) by changes in vehicle activity (flows, speeds and composition), and/or by changes to the distance between sources of emissions and air quality sensitive receptors. Receptors include both human health receptors such as residential properties, schools, nurseries and hospitals, and ecological receptors, such as designated ecological sites. There are no designated ecological sites within 200 m of the scheme which would be affected.

The scheme comprises widening of the slip road from the M4 J5 eastbound and the A4 westbound, which would reduce the distance between the road and nearest residential properties to the south east of the roundabout and to the south of the A4 respectively, leading to a potential worsening of air quality at the properties.

Realignment of roads and changes to the junction arrangements at Sutton Lane gyratory could also result in changes in air quality at nearby receptors due to changes in distance between roads and receptors, and changes in emissions from queuing traffic. In particular the A4 Colnbrook Bypass would be realigned to the north, thus increasing the distance between the properties to the south and the road traffic on the A4 and leading to a potential improvement in air quality at this location. There is expected to be an increase in traffic along the A4 between the M4 J5 and the Sutton Lane gyratory at Brands Hill with the scheme, with the largest changes expected on the westbound carriageway.

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[15] Slough Borough Council, 2018 Air Quality Annual Status Report, June 2018, available at https://www.slough.gov.uk/downloads/ASR2018.pdf

The scheme will result in a slight increase in emissions on section of the A4 between junction 5 and the Sutton Lane gyratory, with 9,754 households within 200m expected to experience an increase of over 1,000 AADT and 6,616 households within 200m expected to experience a decrease of over 1,000 AADT. Use of the Park & Ride site will lead to an improvement in air quality in the wider area, including within the Slough town centre AQMA, as a result of fewer vehicles travelling into either Slough town centre, or to Heathrow Airport. As such, the overall impact of the scheme on air quality, due to congestion on the A4, will be slight adverse.

Further assessment would be required to quantify the changes in air quality at selected receptors.

The proposed scheme is in line with Slough Borough Council's Low Emission Strategy (LES)16 (currently in draft) which forms part of the Slough Air Quality Action Plan (AQAP), which is also due to be updated in 2019. The LES aims to reduce emissions from road transport, and to improve the borough's air quality, by amongst other measures, promoting modal shift away from cars, and promoting the use of electric vehicles including buses.

Measures to improve air quality within Slough's AQMAs are currently provided in Slough Borough Council's LAQM report1. One of the measures is to implement this Slough Mass Rapid Transit scheme, and another is to implement the bus park & ride scheme. The scheme is therefore in accord with the AQAP to help improve air quality within the borough.

The air quality benefits would be expected to have a positive effect on the scheme's BCR if quantified. The qualitative assessment indicates that these benefits would improve the VfM and support the scheme.

3.6.2. Walking and Cycling Impacts

Slough is undertaking a programme to upgrade the A4 corridor through Slough with shared use cycle facilities through to 2019 using DfT Growth Deal 3 funding, however these do not extend as far as M4 J5. Slough is also currently working on a future phase of the cycle route to extend to Colnbrook via M4 J5 to help address severance issues. The urban realm elements of the scheme extend the corridor through to the Park & Ride site, allowing park and cycle as an option. This would also complement investments they are making to access the nearby stations on the Elizabeth Line by foot and cycle, with the new services planned to begin by 2019.

3.6.2.1. Existing Walking and Cycling Conditions

A report by Sustrans has identified M4 J5 as a key barrier to cycle movements along the A4. According to DfT cycle counts reported in the SIFE Transport Assessment in 2010, cycle flows on the A4 are around 50 vehicles per hour. Traffic flows are high – around 6,000 vehicles per hour at peak times. The current route across the junction is a bridge passing over the roundabout and under the M4. Through site visit observations by Highways England with Connect Plus, and discussions with Slough and Sustrans, the following issues have been identified.

- The spiral ramps on either side of the bridge discourage cycling due to their steep gradient;
- The bridge connects the north-west side of the junction to the south-east side, however the desire line for movements to and from Heathrow would be from north-west to north-east to join up with existing routes on the north side of the A4;
- The environment does not feel safe, e.g. lack of lighting;
- The width of the route does not meet Highways England standards to accommodate both pedestrians and cyclists; and
- There is evidence of people crossing the roundabout at-grade, where there are no controlled crossings, putting them into conflict with high speed traffic exiting the roundabout towards the M4/M25

3.6.2.2. Potential impacts and effect on VfM

Slough is also planning to invest in cycling and walking improvements to and from areas adjacent to the M4 J5 in the next two years, and to design bus priority measures across the junction to support Phase 2 of the SMaRT bus scheme. Coordinating these will make the junction feel safer, and keep cyclists segregated from fast-moving traffic so that all levels of cycle ability are catered for.

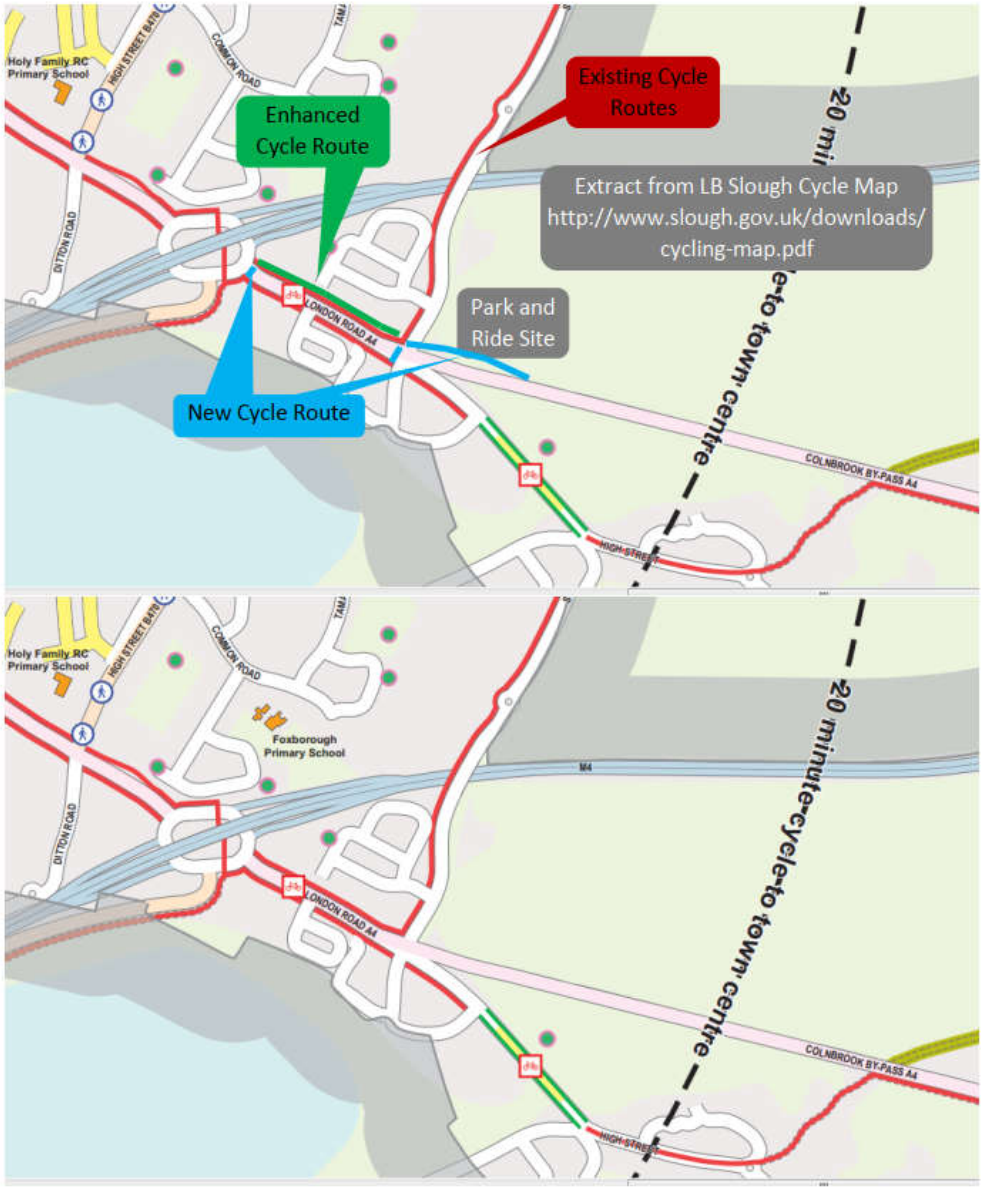
Specifically, users will benefit from a new cycle route just south of the Park & Ride site on the A4 London Road. This will provide opportunities for people to 'Cycle and Ride', allowing them to take advantage of cycle parking at the site, the Slough Cycle Docking Station, in addition to the Park &

16 Slough Borough Council, Slough Low Emission Strategy (LES) 2018 – 2025 Technical Report, August 2018

Ride services. This route will link up with existing cycle routes on Sutton Lane, and on either side of London Road. The scheme will enhance part of the northern side of London Road's existing cycle route and provide a new piece of the route to connect with this at the junction 5 roundabout, allowing cyclists to navigate the crossing of London Road more safely than at present.

The cycle route will be installed as a cycling and walking route enhancing pedestrian connectivity, especially at the Park and Ride Site and the M4 Junction 5.

Figure 3-13 - Scheme Cycle Route Additions and Enhancements



3.6.3. Landscaping Impacts

The scheme could affect existing landscaping, streetscaping, and the natural and urban environment.

Existing Landscaping

Most of the existing landscape is characterised by built up areas and a general urban environment. There are a number of local areas of biodiversity, but these are some distance from the scheme.

Potential impacts and effects on VfM

Analysis concluded that there would be a neutral impact on heritage or the water environment but a slightly adverse effect on biodiversity and landscape. The actual effect on the biodiversity areas, if any, will be investigated at detailed design stage but it is unlikely that any significant mitigation measures will be required. Most of the scheme will be within the existing built up area and the effect on landscape focuses on the Sutton Lane gyratory and the park & ride site. To reduce adverse impact screen planting will be provided around the park & ride site to supplement existing vegetation.

This assessment would not be expected to affect the BCR and the scheme's VfM.

3.7. Appraisal Tables

The quantitative and qualitative assessments of impacts made in the previous sections have been summarised in the following appraisal tables and VfM statement. The Appraisal Summary Table (AST) is provided in Appendix E1.

Table 3-21 - TEE Table

Consumer - Commuting user benefits	**All Modes**	**Road**	**Bus**		
Travel Time	17,244	16,197	1,047		
Vehicle operating costs	3,027	3,027	0		
User charges	1,787	0	1787		
During Construction & Maintenance	0	0	0		
NET CONSUMER - COMMUTING BENEFITS	22,058	19,224	2,834		
Consumer - Other user benefits	**All Modes**	**Road**	**Bus**		
Travel Time	8,375	6,803	1,572		
Vehicle operating costs	2,827	2,827	0		
User charges	-408	0	-408		
During Construction & Maintenance	0	0	0		
NET CONSUMER - OTHER BENEFITS	10,794	9,630	1,164		
Business	**All Modes**	**Road Personal**	**Road Freight**	**Bus Personal**	**Bus Freight**
Travel Time	9,712	4,460	3,997	1,255	0
Vehicle operating costs	2,539	744	1,795	0	0
User charges	-45	0	0	-45	0
During Construction & Maintenance	0	0	0	0	0
Subtotal	12,206	5,204	5,792	1,210	0
Private Sector Provider Impacts					
Revenue	-359	0	-359		
Operating costs	0	0	0		
Investment costs	0	0	0		
Grant/subsidy	0	0	0		
Subtotal	-359	0	-359		
Other business Impacts					
Developer contributions	0	0	0	0	
NET BUSINESS IMPACT	11,847				
TOTAL					
Present Value of Transport Economic					
Efficiency Benefits (TEE)	44,698				
Note: Benefits appear as positive numbers, while costs appear as negative numbers.					
Note: All entries are present values discounted to 2010, in 2010 prices					

Table 3-22 - PA Table

Local Government Funding	**ALL MODES**	**Road**	**Bus**
Revenue	1,236	0	1,236
Operating Costs	3,017	3,017	0
Investment Costs	13,760	13,760	0
Developer Contributions	0	0	0
Grant/Subsidy Payments	0	0	0
NET IMPACT	18,014	16,778	1,236
Central Government Funding: Transport	**ALL MODES**	**Road**	**Bus**
Revenue	0	0	0
Operating costs	0	0	0
Investment costs	0	0	0
Developer Contributions	0	0	0

Grant/Subsidy Payments	0	0	0
NET IMPACT	0	0	0
Central Government Funding: Non-Transport			
Indirect Tax Revenues	9,212	7,636	1,576
TOTALS			
Broad Transport Budget	18,014	16,778	1,236
Wider Public Finances	9,212	7,636	1,576
Note: All entries are present values discounted to 2010, in 2010 prices			

Table 3-23 - AMCB Table

Greenhouse Gases	3,317
Physical activity	237[17]
Safety benefits	-1,194
Economic Efficiency: Consumer Users (Commuting)	22,058
Economic Efficiency: Consumer Users (Other)	10,794
Economic Efficiency: Business Users and Providers	11,847
Wider Public Finances (Indirect Taxation Revenues)	-9,212
Present Value of Benefits (PVB)	39,040
Broad Transport Budget	18,014
Present Value of Costs (PVC)	18,014
OVERALL IMPACTS	
Net Present Value (NPV)	21,026
Benefit to Cost Ratio (BCR)	2.2

3.8. Value for Money Statement

The Value for Money (VfM) assessment is carried out as a staged process to ensure that a complete and robust analysis is undertaken. A Value for Money (VfM) statement will be produced using information within the Appraisal Summary Table (AST) to provide a summary of the conclusions from the VfM assessment. The DfT VfM categories and their relationship with benefit-cost ratios (BCRs) to be generated through the cost-benefit analysis is presented below:

Table 3-24 - DfT VfM Categories

BCR	Category
Less than 1.0	Poor
1.0 to 1.5	Low
1.5 to 2.0	Medium
2.0 to 4.0	High
Greater than 4.0	Very High

A number of benefits have been assessed qualitatively as part of this Business Case. These include air quality impacts, safety impacts, walking and cycling impacts, and landscaping impacts.

[17] Over 15 years appraisal period

Table 3-25 - Value for Money Statement

Scheme Name	Mass Rapid Transit Phase 2 and Park and Ride Scheme
Description of Scheme	The improvements comprise the following schemes: Highway Improvements: • Revisions to the South East quadrant of the M4 Junction 5 roundabout with a modified slip road for eastbound traffic; • Modifications and signal provision at the Sutton Lane gyratory; and • London Road link widening to 2 lanes westbound between M4 Junction 5 roundabout and Sutton Lane; A Park & Ride facility located on land adjacent to M4 Junction 5 and Sutton Lane – including a bus station, stands, passenger facilities and parking areas with bus services connecting to Heathrow and Slough. It will contain a terminal building and staff presence and appropriate walkways and urban realm to provide a good interchange environment. It will also include a vending machine, cycle parking, Slough Cycle Docking Station and Electric Car Charging Points (outside of the station); and Urban realm enhancements including walking, cycling and bus shelter facilities to enhance the local area and attractiveness of sustainable modes on the northern frontage of the A4 between Langley High Street and the M4 J5 roundabout.
Costs	
Capital investment costs	£13.76m
Operating and maintenance costs	£3.02m
Revenue (park and ride parking charges and reduced Slough parking charges)	£1.24m
PVC, 2010 prices/values	**£18.01m**
Benefits	
Transport User benefits	
Journey Time savings	£35.33m
VOC	£8.39m
User charge benefit	£1.33m
Operator income and costs	
Revenue (bus fares and reduced Heathrow parking charges)	-£0.36m
Operating costs	£0m
Indirect tax	-£9.21m
PVB, 2010 prices/values	**£35.49m**
Other quantified/non-quantified transport and non-transport user benefits	
User delay during construction & maintenance	qualitative comment
Journey Quality	qualitative comment

Physical activity	£0.24m[18]
Greenhouse Gases	£3.32m
Noise	qualitative comment
Air Quality	qualitative comment
Accidents/Safety	qualitative comment
Reliability	£1.48m (not included in BCR calculation)
PVB, 2010 prices/values	**£39.04**
Total Level 1 Benefits	**£18.01**
Benefit to Cost Ratio	**2.2**
Risks and Uncertainty	Revenue and user charge benefits contain an element of uncertainty due to DM charges for town centre parking requiring assumptions. Operating and maintenance costs have been calculated to exclude certain non-essential elements which would result in cost increases if required.
Value for Money category	High

3.9. Appraisal Summary Table

The Appraisal Summary Table (AST) is provided in Appendix B5.

3.10. Economic Case Summary

The economic assessment of the SMaRT Phase 2 scheme has been undertaken to establish the benefits, costs and value for money associated with the scheme proposals.

The potential impacts of the SMaRT Phase 2 scheme are analysed using the newly validated 2017 SATURN and EMME highway and public transport assignment models respectively. Modelling has been undertaken to assess the impacts for:

- Highway;
- Public Transport; and
- Park & Ride.

The economic assessment was based on changes in travel times, vehicle operating costs, indirect tax revenue and greenhouse gases impacts for road users using the TUBA. Safety impacts have been monetised using COBALT, with additional qualitative assessment to capture those elements of the scheme which are not reflected in COBALT. Journey time reliability has also been assessed, but not included in the central BCR. Impact on cycling and pedestrians, and landscaping has been assessed qualitatively.

From Table 3-7 above, it can be seen that the proposed scheme has PVB of around £39.1m with scheme cost of £18.0m and therefore BCR of 2.2. In terms of DfT's Value for Money assessment (VfM), the scheme represents 'high value for money'.

Inclusion of reliability benefits in the BCR would raise this to 2.3.

[18] Over 15 years appraisal period

4. The Financial Case

4.1. Introduction

This chapter presents the costs and affordability of the proposal and its funding arrangements. The total costs and expenditure profile are presented, along with an assessment of the impact of the proposed deal on the budgets. The cost of implementing the scheme and incremental costs of maintaining and operating have been estimated in accordance with WebTAG unit A1.2: Scheme Costs. The costs have been subject to early-stage value engineering, which is expected to develop at later design stages. The methodology for developing these scheme costs has been assessed and accepted on other projects.

4.2. Capital Cost

The total estimated cost of implementing the scheme is £13.25m (2016 prices). This includes appropriate risks generated as part of a Quantified Risk Assessment and contingency [NB OB added in economic case only in accordance with appraisal guidance]. The capital costs have been estimated based on a bill of quantities and assumptions for land cost, site supervision and preparatory costs. The cost estimates in Table 4-1 are considered reasonable based on recent SBC contract prices for other LEP schemes.

Table 4-1 - Capital Cost breakdown by scheme elements (£, 2016 prices)

Infrastructure Element	Cost (£, Q4 2016 prices)
Sutton Lane Gyratory (junction re-configuration)	4,279,000
M4 Junction 5 and London Road (junction configuration)	1,003,000
London Road Widening (widening and Non-Motorised User facilities)	747,000
Bus Facility (station, stands and passenger facilities)	1,124,000
Parking	1,203,000
Land Cost	500,000
Preparatory Costs	1,300,000
Site Supervision	850,000
Quantified Risk Assessment	2,243,000
Total	13,249,000

The following tables show the key elements built up from a bill of quantities [move to appendix in final version submission]

Table 4-2 - Sutton Lane Gyratory Cost (£, 2016 prices)

Item no	Description	Unit		Rate	Total
	Remove				
1	Kerb	m	1790.0	£10	£17,900
2	Footway	m2	3580.0	£25	£89,500
3	Carriageway	m2	1790.0	£45	£80,550
4	Surfacing	m2	8730.0	£25	£218,250
5	General Excavation	m3	1300.0	£20	£26,000
6	Street Furniture	No	500.0	£25	£12,500
	Provide				
1	Kerb	m	2220.0	£85	£188,700
2	Footway	m2	4440.0	£80	£355,200
2a	Verge	m2	500.0	£50	£25,000
3	Carriageway	m2	3152.0	£120	£378,240
4	Surfacing	m2	8730.0	£30	£261,900
5	Non Illuminated Signs	No	50.0	£400	£20,000
6	Illuminated Signs	No	20.0	£900	£18,000
7	Street Furniture	No	20.0	£0	£0
8	Road Markings	No	3000.0	£2	£6,000
9	Drainage (per gully)	No	60.0	£5,000	£300,000
	Earthworks				
1	Bulk Excavation	m3	2000.0	£20	£40,000
2	Bulk Fill	m3	0.0	£50	£0
3	Reinforcement (vertical face area)	m2	0.0	£500	£0
	Junctions				
1	Crossing	No	0.0	£25,000	£0
2	2/3 Arms	No	2.0	£50,000	£100,000
3	4+ Arms	No	1.0	£100,000	£100,000
4	UTC/Scoot/MoC	No	1.0	£25,000	£25,000
	Sub Total				£2,263,000
	Not Yet Identified and Quantified %age	25		25%	£566,000
	Preliminaries and Traffic Management %age	10		10%	£227,000
	Works Total				£3,056,000
	Statutory Undertakers Diversions	40		40%	£1,223,000
	Total Esimated Cost			Total	**£4,279,000**

Table 4-3 - M4 Junction 5 and London Road Cost (£, 2016 prices)

Item no	Description	Unit		Rate	Total
	Remove				
1	Kerb	m	500.0	£10.00	£5,000
2	Footway	m2	500.0	£25.00	£12,500
3	Carriageway	m2	250.0	£45.00	£11,250
4	Surfacing	m2	2000.0	£25.00	£50,000
5	General Excavation	m3	600.0	£20.00	£12,000
6	Street Furniture	No	5.0	£25.00	£125
	Provide				
1	Kerb	m	500.0	£85.00	£42,500
2	Footway	m2	1200.0	£80.00	£96,000
2a	Verge	m2	250.0	£50.00	£12,500
3	Carriageway	m2	1200.0	£120.00	£144,000
4	Surfacing	m2	2000.0	£30.00	£60,000
5	Non Illuminated Signs	No	8.0	£400.00	£3,200
6	Illuminated Signs	No	4.0	£900.00	£3,600
7	Street Furniture	No	10.0	£150.00	£1,500
8	Road Markings	No	200.0	£2.00	£400
9	Drainage (per gully)	No	10.0	£5,000.00	£50,000
	Junctions				
1	Crossing	No	0.0	£25,000.00	£0
2	2/3 Arms	No	0.5	£50,000.00	£25,000
3	4+ Arms	No	0.0	£100,000.00	£0
4	UTC/Scoot/MoC	No	0.0	£25,000.00	£0
	Sub Total				£530,000
	Not Yet Identified and Quantified %age	25		25%	£133,000
	Preliminaries and Traffic Management %age	10		10%	£53,000
	Works Total				£716,000
	Statutory Undertakers Diversions	40		40%	£287,000
	Total Esimated Cost			Total	**£1,003,000**

Table 4-4 - London Road Widening Cost (£, 2016 prices)

Item no	Description	Unit		Rate	Total
	Remove				
1	Kerb	m	400.0	£10.00	£4,000
2	Footway	m2	800.0	£25.00	£20,000
3	Carriageway	m2	200.0	£45.00	£9,000
4	Surfacing	m2	1400.0	£25.00	£35,000
5	General Excavation	m3	250.0	£20.00	£5,000
6	Street Furniture	No	10.0	£25.00	£250
	Provide				
1	Kerb	m	400.0	£85.00	£34,000
2	Footway	m2	1400.0	£80.00	£112,000
2a	Verge	m2	0.0	£50.00	£0
3	Carriageway	m2	550.0	£120.00	£66,000
4	Surfacing	m2	1400.0	£30.00	£42,000
5	Non Illuminated Signs	No	8.0	£400.00	£3,200
6	Illuminated Signs	No	8.0	£900.00	£7,200
7	15	No	0.0	£150.00	£0
8	Road Markings	No	400.0	£2.00	£800
9	Drainage (per gully)	No	6.0	£5,000.00	£30,000
	Junctions				
1	Crossing	No	1.0	£25,000.00	£25,000
2	2/3 Arms	No	0.0	£50,000.00	£0
3	4+ Arms	No	0.0	£100,000.00	£0
4	UTC/Scoot/MoC	No	0.0	£25,000.00	£0
	Sub Total				£394,000
	Not Yet Identified and Quantified %age	25		25%	£99,000
	Preliminaries and Traffic Management %age	10		10%	£40,000
	Works Total				£533,000
	Statutory Undertakers Diversions	40		40%	£214,000
	Total Esimated Cost			Total	**£747,000**

Table 4-5 - Bus Facility Cost (£, 2016 prices)

Item no	Description	Unit		Rate	Total
	Remove				
1	Kerb	m	0.0	£10.00	£0
2	Footway	m2	0.0	£25.00	£0
3	Carriageway	m2	0.0	£45.00	£0
4	Surfacing	m2	0.0	£25.00	£0
5	General Excavation	m3	1000.0	£20.00	£20,000
6	Street Furniture	No	0.0	£25.00	£0
	Provide				
1	Kerb	m	600.0	£85.00	£51,000
2	Footway	m2	1700.0	£80.00	£136,000
2a	Verge	m2	500.0	£50.00	£25,000
3	Carriageway	m2	3000.0	£120.00	£360,000
4	Surfacing	m2	0.0	£30.00	£0
5	Non Illuminated Signs	No	10.0	£400.00	£4,000
6	Illuminated Signs	No	4.0	£900.00	£3,600
7	Buildings and Shelters	No	1.0	£50,000.00	£50,000
8	Trees	No	30.0	£200.00	£6,000
9	Drainage (per gully)	No	20.0	£5,000.00	£100,000
	Sub Total				£756,000
	Not Yet Identified and Quantified %age	25		25%	£189,000
	Preliminaries and Traffic Management %age	10		10%	£76,000
	Works Total				£1,021,000
	Statutory Undertakers Diversions	10		10%	£103,000
	Total Esimated Cost			Total	**£1,124,000**

Table 4-6 - Parking Cost (£, 2016 prices)

Item no	Description	Unit		Rate	Total
	Remove				
1	Kerb	m	0.0	£10.00	£0
2	Footway	m2	0.0	£25.00	£0
3	Carriageway	m2	0.0	£45.00	£0
4	Surfacing	m2	0.0	£25.00	£0
5	General Excavation	m3	2680.0	£20.00	£53,600
6	Street Furniture	No	0.0	£25.00	£0
	Provide				
1	Kerb	m	335.0	£85.00	£28,475
2	Footway	m2	1340.0	£80.00	£107,200
2a	Verge	m2	1340.0	£50.00	£67,000
3	Carriageway	m2	1100.0	£100.00	£110,000
4	Parking Spaces	m2	6700.0	£60.00	£402,000
5	Non Illuminated Signs	No	13.4	£400.00	£5,360
6	Illuminated Signs	No	0.0	£900.00	£0
7	Street Furniture	No	0.0	£150.00	£0
8	Road Markings	No	3350.0	£2.00	£6,700
9	Drainage (per gully)	No	13.4	£5,000.00	£67,000
	Sub Total				£848,000
	Not Yet Identified and Quantified %age	25		25%	£212,000
	Preliminaries and Traffic Management %age	10		10%	£85,000
	Works Total				£1,145,000
	Statutory Undertakers Diversions	5		5%	£58,000
	Total Esimated Cost			Total	**£1,203,000**

4.3. Park & Ride Operational and Maintenance Cost Estimates

Annual operational expenditure for the Park & Ride Bus Interchange is set out below in Table 4-7. The total annual cost is £136,785 in addition to staffing.

Table 4-7 - P&R Annual Operational Costs (£, 2016 prices)

Cost Item	Costs (£)
Water	20,000
Electricity	30,000
Business Rates (NNDR)	26,987
Car Park Cleaning (Road Sweeper)	5,397
CCTV Monitoring Costs inc Data Link	12,500
CCTV Management Costs	1,250
Walkway/Shelter Cleaning	16,192
Public Liability Insurance	1,200
Central Administrations Costs	16,640
Rising Bollard System Testing	5,000
Landscaping	1,619
Total	136,785

Annual maintenance expenditure for the Park & Ride Bus Interchange is set out below in Table 4-8. The total annual cost is £9,886.

Table 4-8 - P&R Annual Maintenance Costs (£, 2016 prices)

Cost Item	Costs (£)
General Maintenance	2,249
Lighting Maintenance	1,000
Bus Shelter Vandalism	2,000
Shelter Seating Repair/Replacement	1,500
Drainage Clearance	1,349
CCTV Maintenance	1,563
Landscaping Repair	225
Total	9,886

4.4. Revenue

Heathrow Airport, who will be procuring the P&R bus service, will incur the operating costs of the additional P&R bus service and receive the revenue income from it. These have been excluded from the Financial Case and treated as private sector revenue costs in the Economic Case, as they are not public-sector revenue costs. An assessment of potential revenue lost from town centre parking charges has also been included in the economic assessment within the Economic Case.

4.5. Budgets / Funding

4.5.1. Funding Requirement

This project comprises elements of SMaRT Phase 2, which was submitted for the LEP's Growth Deal 3, in December 2015. The scheme was put on the LEP's priority list (no.18), but wasn't added to the programme, because:

- SMaRT Phase 2 didn't deliver as much housing as Phase 1; and
- Risks around Slough International Freight Exchange (SIFE) planning applications (now rejected at appeal).

Based on feedback about the scheme, this lower cost alternative scheme focuses on immediate local congestion relief and improved access to Heathrow to support employment development and economic growth while still being compatible with potential future upgrades to incorporate SMaRT and/or SIFE.

This scheme requires funding of £13.25m. £1.5m of S106 funding may become available to the Council arising from mineral extraction developments outside the Borough aimed at addressing the likely impact of HGV traffic on the A4 corridor. If this funding becomes available, then the funding requirement for this scheme will be reduced to £11.75m.

4.5.2. Funding and Spending Profiles

The Berkshire Treasurers' Group have calculated a planning figure of £25m for allocation in 2018-19. The terms of the Business Rate Retention Pilot allow for the money to be allocated to major infrastructure projects which support housing development or major regeneration projects[19]. This scheme uses part of this funding.

SMaRT Phase 2 was specifically identified as a Priority 1 scheme in the 2018 Business Rates Retention Pilot and has a value of £13.25m. £10.1m will be allocated from the Pilot in 2018/19 and £3.15m will be allocated in 2019/20. The money will be spent in the period from 2019/20 to 2021/22 which fits with fund requirements.

Table 4-9 outlines the funding profile for the scheme. The funding will be received from the TVB LEP Business Rates Retention Pilot. Although all funding will have been received by the end of year 2019/20, spending will commence in the year 2019/2020 and carry on through 2020/21 and 2021/22. Any cost overruns, which would impact on the alignment of the funding and spending profiles, will be dealt with by SBC.

[19] Berkshire Local Transport Body Report - Item 7 (Business Rates Retention Pilot – Prioritisation of Bids) BLTB (2018), Available here

Table 4-9 - Scheme Funding Profile (£, 2016 prices)

Source	Year	2018/19	2019/20	Later years
TVB LEP Business Rates Retention Pilot	-	£10,100,000	£3,150,000	0

Table 4-10 outlines the spending profile for the scheme's costs for the years 2019/20 to 2021/22.

Table 4-10 - Scheme Cost Spending Profile (£, 2016 prices)

Cost Item	2019/2020	2020/21	2021/22	Total
Preparatory	1,040,000	260,000	0	1,300,000
Construction (including Preliminaries but Ex OB))	£835,600	3,342,400	4,178,000	8,356,000
Site Supervision	85,000	340,000	425,000	850,000
Land	250,000	250,000	0	500,000
Quantified Risk Assessment	224,300	897,200	1,121,500	2,243,000
Total	**2,434,900**	**5,089,600**	**5,724,500**	**13,249,000**

4.6. Accounting Implications

Any tax and VAT implications of the scheme will be in line with standard SBC accounting practice.

4.7. Financial Case Summary

Funding of £13.25m is requested from the Business Rate Retention Pilot (this scheme is identified as priority 1 for the pilot). However, £1.5m of S106 funding may become available to SBC aimed at addressing the likely impact of HGV traffic on the A4 corridor. If this funding becomes available, then the ask for this Business Case will be reduced to £11.75m.

5. The Commercial Case

5.1. Introduction

This section contains considerations of the commercial procurement and operation of the scheme, and the output-based specification that will be used through the procurement process.

5.2. Procurement Strategy

The procurement process will be run in strict accordance with the legislative framework set out within the SBC Procurement Strategy, 2012[20].

In addition, the process will be governed by the Council's own constitutional Contract Procedure Rules (2012) and will be subject to the Council's Procurement Gateway Process.

Under the Procurement Gateway Process the strategy will be subject to review by the Council's Head of Procurement, senior legal officer and senior officers from across the Council who are highly experienced in strategic procurement and contract management. Express approval must be gained from the Procurement Gateway Board in two stages, firstly to enable the tender documentation to be released and secondly to enable the procurement to move to the award procedure stage following review of the award recommendation.

5.2.1. Output-Based Specification

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

- Achieve cost certainty, or certainty that the scheme can be delivered within the available funding constraints;
- Minimise further preparation costs with respect to scheme design by ensuring best value, and appropriate quality through **Bills of Quantities** similar to those outlined in Section 4.3;
- Obtain contractor experience and input to the construction programme to ensure the implementation programme is robust and achievable; and
- Obtain contractor input to risk management and appraisals, including mitigation measures, to capitalise at an early stage on opportunities to reduce construction risk and improve out-turn certainty, thereby reducing risks to a level that is as low as reasonably practicable.

Specific outputs for the preferred procurement option are as follows, and as described in the **Bills of Quantities**:

- Signalling and pedestrian facilities;
- Urban realm improvements including enhanced provisions for cyclists;
- Park & Ride site and supporting infrastructure;
- Junction enhancements and A4 widening; and
- Provision of infrastructure compatible with potential future SMaRT technology systems.

The specification of the outputs and outcomes that the contractor will be expected to deliver will be progressed during the scheme development process.

5.2.2. Procurement Options

The following procurement routes have been considered:

- Traditional procurement - construction, separate maintenance;
- Design and Build (D&B) construction, separate maintenance;
- Early Contractor Involvement (ECI), separate maintenance; and
- Private Finance Initiative (PFI) Funding, Design Build Operate and Maintain (DBOM).

Table 5-1 summarises the options, presenting the pros and cons of each procurement route.

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[20] http://www.slough.gov.uk/Moderngov/documents/s23125/Corporate%20Procurement%20Strategy%20March%202012%20v1.pdf

Table 5-1 – Procurement Options

Procurement Type	Description	Risk Transfer	Pros	Cons
Traditional	Client completes a full detailed design followed by tendering for a Contractor, who is passed the design to construct. The form of Contract is usually the ICE or similar.	Risk resulting from design is carried by the Client.	• Allows for competitive tender. • Comparable in programme terms with D&B. • High client control over specification and quality.	• Poor record on cost certainty – generally accepted that outturn cost will be 30% higher than tendered price. • Majority of the risk is carried by the client.
Design & Build with Consultant Contractor commission for advice throughout the design development phase	Client submits for tender the design developed during the statutory processes and passes it to the Contractor to tender the detailed design and construction. By employing a contractor through the design stage, the scheme benefits from continuous appraisal of buildability and value engineering options.	Risk from detailed design is carried by the Contractor. The client develops a detailed knowledge of risk, enabling a more informed negotiation of risk transfer at tender stage.	• Allows for competitive tender. Comparable in programme terms with traditional. • Target cost contract allows for high degree of cost certainty and potential cost savings. • Design solutions are likely to be directed towards specific Contractor methods aiding buildability and potential for value engineering.	• Requires well developed works information to ensure client control over specification and quality otherwise there is a significant risk of not meeting required objectives.
Early Contractor Involvement	Contractor appointed prior to preliminary design stage, helping to ensure that the design taken into the statutory processes is as efficient and buildable as possible. Allows for early supplier engagement on a partnering basis. This form allows for the incorporation of the supplier skills and knowledge within the early stages of design.	All design risk carried by the Contractor. Risk register developed in partnership with supplier. Opportunity to share risk to most appropriate party.	• Contractor is better placed to manage risk, having been involved from an early stage in the design process. • ECI benefits projects with complex engineering challenges like this scheme which includes multiple interfaces with Network Rail crossings and Metrolink allowing the Contractor to address key risks earlier. • Contractor involvement pre-planning inquiry would permit robust evidence to be presented. regarding concerns of construction impact on the local environment and communities.	• Although rates would be market tested, the target cost for the main construction works is negotiated rather than competitively tendered. • Requires some certainty of scheme funding prior to the commencement of preliminary design and statutory processes.
PFI DBOM	A Concession contract is awarded with the Concessionaire paid a service fee for delivery of operational and maintenance services for a duration of typically less than 22 years (procurement Regulations). In this instance the fee or unitary charge reflects the cost of the provision of the infrastructure through private finance (or largely private finance) plus the operating, maintenance costs and profit.	All risk is carried by the PFI Operator	• Total cost of the scheme including maintenance and operation is effectively spread over the whole lifecycle of the project. • Long term interest in maintenance helps ensure quality driven approach to the design and construction of the scheme.	• Increased time of procurement process will lead to significantly later start date of construction and therefore potential for increased cost to completion.

5.2.3. Preferred Procurement Route

The preferred route, which balances risk transfer with efficiency, particularly driven by time constraints, has led to the scheme being divided into the following elements for the purposes of procurement:

- Infrastructure design (for the highway improvements, P&R site, urban realm, walking and cycling) – competitively tendered through a mini-tender using the existing ESPO framework;
- Infrastructure build (for the highway improvements, P&R site, urban realm, walking and cycling) – using the Council's contractor Direct Services Organisation (DSO) in order to avoid the time required for a full tender to secure a contractor;
- Infrastructure maintenance and renewal (for the highway improvements, P&R site, urban, realm, walking and cycling) – to be undertaken by SBC through the DSO as an extension to existing highway and parking maintenance regimes;
- Operation of the P&R – to be undertaken by SBC as part of its parking operation; and
- Operation of additional bus services – to be secured by Heathrow Airport Ltd as part of its mitigation for Heathrow expansion under its Development Consent Order.

Slough Borough Council's DSO is expected to undertake highway and public realm works. Signals upgrades will proceed to tender as there is currently no framework. As already described, it is expected that many of the preparatory works for the Park and Ride site will be undertaken by Highways England's contractor. Any changes to UTMC will be undertaken by SBC's current UTMC contractor.

SBC intends to secure the operation of a frequent, direct limited-stop MRT service between Slough and Heathrow via the A4 and the Park and Ride. It intends to do so at no cost to itself by including its provision in the package of mitigation measures that Heathrow Airport Ltd will need to provide to secure its Development Consent Order (DCO) for its third runway.

As shown at Chapter 2, in addition a number of current, commercially-operated bus services operate past the Park and Ride site and would be capable of the minor diversion to serve the Park and Ride site. These include routes 9 and 703 towards Slough and Heathrow, and route 7 towards Slough (via Langley) and Heathrow.

It is anticipated that the Park and Ride site will be managed as part of the Council's in-house parking management service.

5.2.4. Contract Management

The project will be managed internally by SBC officers adopting PRINCE2 methods for programme management and NEC 4 principles. During contract negotiations, risk will be allocated to the party best able to manage it the most cost-effective way. Contract management will be undertaken by the Council's delivery team in conjunction with the transport engineers. SBC will review all submissions prepared by the transport engineers and contractors, abiding by the following:

- An audit trail will exist between data reported on submissions and the primary source of data;
- All change control and risk data is up to date;
- All submissions are consistent with one another and free from errors; and
- Amounts reported on submissions are consistent with other financial reporting both on the project and internally at SBC

When the project processes to the construction workstream, a dedicated SBC construction representative will closely monitor the progress and quality of the works on site.

Contract Length for the P&R services would be expected to be 8 years. However, if the service is provided commercially then this would not apply.

5.3. Commercial Case Summary

The Commercial Case outlines the specific outputs required from the scheme. These include achieving cost certainty, minimising preparation costs, obtaining contractor experience and input to the construction programme and risk management and appraisal strategies.

The Procurement Strategy will follow the legislative framework set out within the SBC Council Procurement Strategy (2012). In addition, the process will be governed by the Council's own constitutional Contract Procedure Rules (2012) and will be subject to the Council's Procurement Gateway Process.

Four procurement routes have been considered: Traditional, Design & Build, ECI, and PFI DBOM. The Council will be using the existing ESPO framework to procure services for preliminary designs and detailed drawings fit for construction. Construction works will be undertaken by the Council's in-house contractor (DSO) and therefore no procurement exercise will be undertaken for this element. Maintenance of the scheme will also be undertaken by the DSO. New bus services will be procured by Heathrow and P&R operation will be undertaken by expanding SBCs current parking management service.

Some commercial risks, and how they would be allocated between SBC and the contractor, have been outlined in Section 6.9.2. Specific risks have been detailed in the Risk Register in Appendix B10.

6. The Management Case

6.1. Introduction

The DfT's guidance document, 'The Transport Business Case: Management Case', outlines the areas that should be covered as part of the Transport Business Case documentation. The management approach has been developed following the outline set out below:

- Set the appropriate governance structure to ensure outcomes and objectives are met;
- Identify and plan for the key approval milestones ensuring information is provided in good time to not delay the programme; and
- Assess how the delivery process will be managed to achieve the optimum financial and impact performance.

6.2. Implementation of Similar Projects

SBC has proved that it can manage and successfully delivered multimillion pound schemes that prove their ability to:

- Deliver very detailed programme on time with clear dependencies and milestones;
- Manage multiple and high-profile stakeholders; and
- Deal with unexpected occurrences and risks

SBC has not delivered a Park & Ride scheme to date. Contracts will be developed to include specific requirements for, and experience of, Park & Ride infrastructure delivery. More details on the two similar highway improvement projects can be found below:

6.2.1. Heart of Slough Infrastructure Improvements scheme

SBC delivered the major multi-disciplinary transport scheme at the Heart of Slough which rejuvenated the town centre highway network, reducing severance through providing better pedestrian and cycle routes and improving access to Slough Rail Station railway station. With a final outturn cost of c£12.5m, the scheme was delivered to its original budget based on a Lump Sum NEC3 contract. The scheme was also delivered to time which was essential due to the need for works to be complete in time for effective access to Eton Dorney which was used as a venue for the 2012 Olympics.

6.2.2. Highways Improvement Scheme at A355 Tuns Lane/Copthorne roundabout

SBC delivered a major highways improvement scheme at A355 Tuns Lane/Copthorne roundabout, including road widening, converting to a hamburger roundabout with intelligent traffic light system. Tendered costs were c£5,916,000 and final costs are £6,058,000 – where the cost increase was attributed to contaminated soil found at the site and higher material disposal costs. Works commenced Feb 2016 and substantially completed in Dec 2016, as originally programmed.

6.3. Programme / Project Dependencies

This scheme is not dependent on any other schemes being delivered. The new P&R bus service is dependent on Heathrow agreeing to procure and subsidise it to meet the requirements of their DCO submission. This section addresses these dependencies which are project and programme components reliant on other components and schemes. These are different from risks, and a comprehensive list of risks has been prepared as part of the Risk Register (Appendix B10).

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The scheme programme is dependent on the following risks in Table 6-1. SBC will engage early with local stakeholders, land owners, local authorities and contractors to mitigate effects of these dependencies on the successful delivery of the scheme:

Table 6-1 - Programme Dependencies

Dependency	Likelihood	Importance
Planning Permission granted on behalf of all three local authorities	High	High
Successful CPO process complete to acquire land required for the scheme	Medium	High
Timely procurement of a capable supplier	High	High
Political backing and funding from each of the identified funding streams and public transport operators	High	High
Successful liaison with the local communities ensuring they are included in regular updates throughout the schemes development.	Medium	Medium

6.4. Governance, Organisational Structures & Roles

6.4.1. People responsible for delivering the project

SBC will deliver the scheme design, construction and monitoring using a governance structure as shown in the organogram below in Figure 6-1 which follows PRINCE2 and NEC 4 principles.

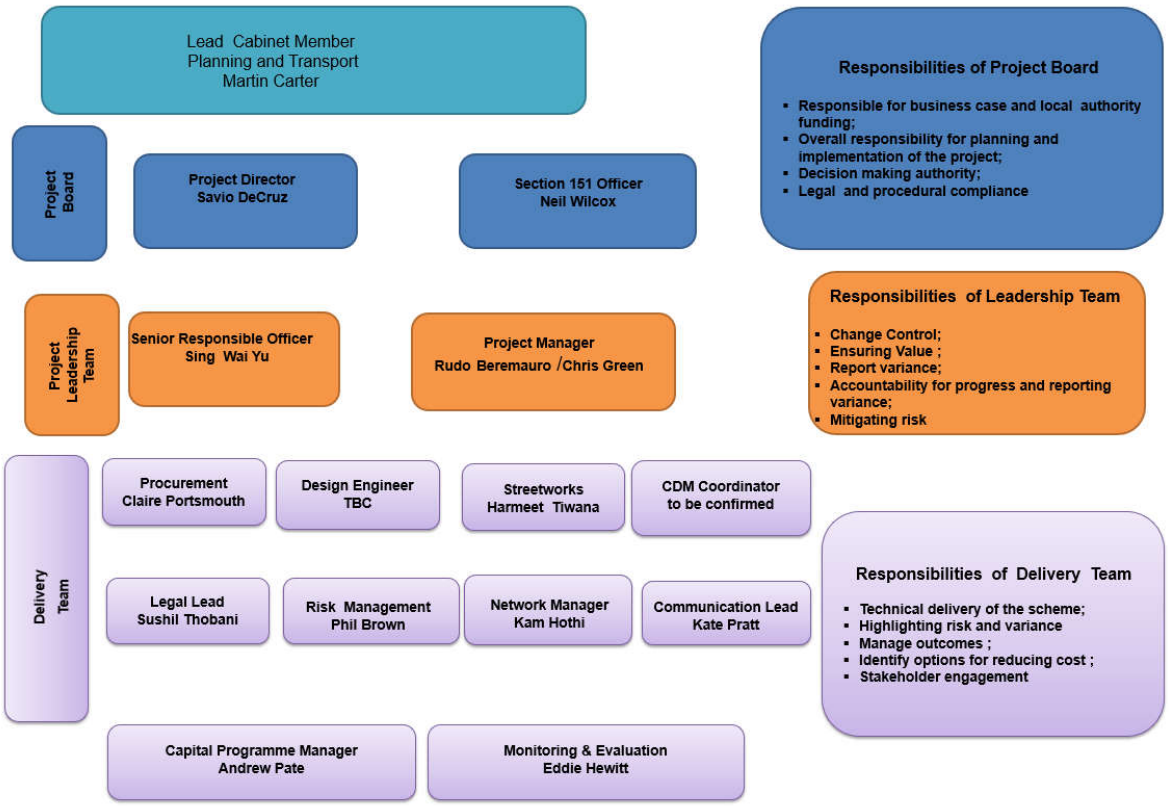
The Cabinet Member for Transport and Highways has the ultimate authority over the implementation of transport schemes with the assistance of the Project Board.

The Project Board and management teams have been selected based on their experience in managing similar projects. The programme management will be undertaken by experienced SBC staff members who have delivered major infrastructure schemes that include the Slough Ice Arena and Slough Community Stadium.

The leadership team will be responsible for ensuring the scheme follows the identified programme and will maintain the operation of the project delivery team. Cost overrun will be managed in-house by SBC.

This method of governance, as shown below in Figure 6-1 has been effective in delivering the £12.5m Heart of Slough Scheme.

Figure 6-1 - SMaRT Phase 2 Governance Structure.



A Project Management system is being set up in order to manage and track the programme as well as ensure data sharing portals are available for the main works contractor (DSO) and project management team.

6.5. Assurance & Approvals

SBC will follow its Gateway Process as a mechanism for assessing projects at critical stages in their lifecycle prior to commencing the next stage. The use of the Gateway process enables:

- Realistic and achievable targets to ensure successful delivery;
- Deployment of relevant skills and competencies to a project;
- Compliance with best practice;
- Key stakeholder input and understanding;
- Project feedback through lessons learnt; and
- A visible audit trail.

The planning of this scheme has run in-line with the BLTB Assurance Framework procedures.

The project milestones have been built into the project programme and will be monitored by the SBC Project Manager and reported to the Project Board.

6.6. Project Reporting

Responsibility for accurate, timely and appropriate communications within the project team rests with the SBC Project Manager to ensure that the Project Board is kept up-to-date with programme developments.

The Project Manager identified is responsible for ensuring the Project Board is provided with sufficient information and that the Project Board clearly understands that information in order to provide necessary guidance on programme decisions. The Project Manager is responsible for

leading both Delivery Team and reporting to the SRO to ensure that all parties are up-to-date with relevant information.

The SRO is responsible for keeping the Lead Members aware of the development of the scheme towards meeting the project objectives.

It is the responsibility of the Project Director to ensure that the Project Board has sufficient information and is involved in all decisions that affect performance of the project, achievement of the project objectives or deviation from agreed and delegated responsibilities.

Project team meetings are held on a monthly basis, with the outcomes escalated to the Project Board.

6.7. Communication & Stakeholder Management Strategy

6.7.1. Objectives

The key objectives of the Communication and Stakeholder Management Strategy for the scheme are to:

- Keep stakeholders aware of the schemes progression and give an opportunity for feedback to help gain scheme approval;
- Give an opportunity for stakeholders to provide views and recommendations for improvements so that the scheme meets stakeholder requirements as far as is practical;
- Meet statutory requirements;
- Increase public and stakeholder awareness of the scheme;
- Provide consistent, clear and regular information to those affected by the scheme, including the nature of any scheme-related impacts and when and how it will affect people of groups both during delivery and once operational; and
- Address perceptions of the scheme where these are inconsistent with the scheme objectives and forecast outcomes.

6.7.2. Key Stakeholders

Key stakeholders for the scheme include the following:

- Heart of Slough Regeneration Project Partners;
- Bus operators: First in Berkshire; Thames Valley Buses (a subsidiary of Reading Transport Ltd); Transport for London; Major commercial landowners: SEGRO and AEW (Trading Estate);
- Heathrow Airport Limited;
- Neighbouring authorities: Royal Borough of Windsor and Maidenhead and Buckinghamshire County Council;
- Thames Valley Berkshire Local Enterprise Partnership.
- Local residents;
- Land agents / owners / tenants; and
- Local user groups e.g. cyclists, walking and disability groups.

Interests of stakeholders centre around mitigating congestion locally while maintaining the attractiveness and appeal of the area as a place to do business, plus consideration of complementary projects and schemes.

Letters of support are included in Appendix B11.

This proposal has the support of Adam Afriyie MP (Windsor, covering Colnbrook with Poyle Ward) and Tan Dhesi MP (Slough).

6.7.3. Communication and Stakeholder Engagement

The individuals and organisations noted above will be key influences in establishing support for the scheme and whose support will be needed, or where there will be an opportunity to minimise opposition or negative publicity, for the project.

Stakeholders will be managed via a bi-monthly working group established to steer the programme. This approach has worked well on other projects locally, for example the Burnham Station Traffic Scheme. Another purpose of these meetings will be to build advocacy for the project.

Wider stakeholder engagement will take the form of letters or briefings that will provide and update on the scheme's progress and its implementation. They will also set out any potential impact as a result of the project and offer meetings to discuss how this may be mitigated or reduced wherever possible.

6.7.4. Engaging with the public

Public engagement will be undertaken to set out the plans, rational and delivery plan for the scheme. This should be aligned with general communications activities for the scheme.

6.7.5. Handling of the media

Pro-active media engagement will be undertaken to provide information on the scheme and its implementation. Key local outlets will be targeted as early as possible and provided with briefing to help reduce misinformation and increase the accuracy of reporting in the early days.

6.7.6. Public Consultation

SBC will follow their Community Engagement Policy when consulting the public. The scheme will be publicised in the public domain for public consultation in advance of construction and direct engagement with statutory consultees will occur during the Detailed Design Stage of the project and further during the public consultation stage.

The design team along with the project team will undertake these consultation activities in partnership with Slough Borough Council's communication team.

6.8. Implementation Plan

6.8.1. Key Workstreams and Issues

The scheme's key workstreams can be summarised in Table 6-2 below, and accompanying these are potential issues that could affect the delivery of each workstream. The workstreams are outlined in chronological order, starting with the update of the design and finishing with the construction of the scheme.

Table 6-2 - Key Workstreams and Potential Issues

Key Workstream	Potential Issue for Delivery
Design update	The design update needs to be undertaken under tight timeframes and is required to support a robust and successful Business Case. A delay in information required for the design update, or to the update itself, will impact on the Business Case's submission and therefore on other workstreams
Business Case development and approval	The Business Case may not meet submission deadline or submission requirements and is not approved for funding, delaying subsequent workstreams
Detailed design	The detailed design work could be more complex than anticipated, highlighting new risks for the scheme and its successful delivery
Utilities works	The diversion process could encounter disruption, which had previously been discounted or identified in earlier processes

Planning consent	New legislation, opposition, or general delays to the planning processes could delay or prevent the construction of the scheme
Construction works	Construction workstreams can be prone to a number of issues which can affect delivery, such as seasonal slowness, equipment damage, disputes with contractors, and faulty work.

6.8.2. Milestones

A full Project Plan is presented in Appendix B7.

The Implementation Plan aims to meet milestones below in order to ensure the successful delivery of the scheme by March 2022. The anticipated key milestones for this project are as follows; the detailed Programme Plan, which includes these milestones as well as more detailed tasks, is presented in Appendix B7:

- BLTB grant programme entry: July 2018
- Update previous design/start detailed design: April 2018
- Update business case including Park & Ride to assessors: December 2018
- Financial approval from BLTB: January 2019
- Detailed design completed: March 2019
- Council Cabinet: March 2019
- Utility diversion process activated: May 2019
- Statutory consent procedures, TROs, cycle path adoption, highway adoption (excluding Park & Ride) completed: May 2019
- Main highway works start: April 2020
- Planning permission for P&R: November 2019
- Highway scheme completion: March 2021
- P&R scheme completion: March 2022

6.9. Risk Management

A Risk Workshop was held in May 2014 between the SBC Project Management Team, designers, planners and external consultants. The workshop resulted in the formation of a risk register detailing risks associated with:

- Strategic/Political/Policy;
- Economic/ Financial/Management;
- Statutory process/ legal/ land acquisition;
- Design/technical/preparatory works;
- Stakeholder Management/Consultation;
- Procurement;
- Construction; and
- Operation.

A Quantified Risk Assessment was undertaken and has been updated as the scheme has evolved. The method in quantifying risk was based on impact likelihood and timescale, and risk values were attributed to individual risks. This is included in Appendix B10. A separate Risk Workshop will be undertaken with the selected bus operator to discuss risks to the operation and maintenance of P&R bus services in Slough.

6.9.1. Risk Management Plan

A Risk Management Plan will be developed throughout the life of the project. Following confirmation of scheme funding, ownership of the risks will be allocated to those parties best able to manage them.

The Risk Management Plan will set out the full risk management process and responsibilities for undertaking risk management to deliver this scheme. Implementation of a structured, forward looking and continuous risk and opportunity management process is intended to increase the certainty of cost-effective scheme delivery and operational success.

Further risk identification will be carried out in numerous ways such as:

- Workshops;
- Reviews;
- Meetings; and
- Day to day operation.

When a risk is identified, the data will be added to the Risk Register.

6.9.2. Risk Management and Allocation

The risk management organisation for this scheme consists of four key parties: The Project Board, the Project Manager, the Risk Manager and the Risk Owner.

The Project Board has overall responsibility for ensuring sufficient resources are available to manage risks across the scheme. Risks shall be allocated and managed in a cost-effective manner by the most appropriate party to do this and at the appropriate level. The Board shall be primarily concerned with managing strategic level risks relating to interfaces between the scheme and the wider project environment.

The Project Manager has overall responsibility for ensuring that the risk management process is implemented and managed in accordance with strategies.

The Risk Manager shall ensure that risks are actively managed in a consistent and appropriate manner across all work streams in accordance with this Plan. All severe risks shall be reported by the Risk Manager to the Project Board through the Project Manager. In addition, all risks which relate to the overall direction, organisation and control of the scheme, e.g. loss of key project staff, shall be reported to the Project Board.

The Risk Manager shall:

- Ensure that an appropriate procedural framework is adopted;
- Report to the Project Manager in review and management of project performance;
- Agree the required level of risk management support to be provided for risk identification, analysis, review and reporting;
- Facilitate risk workshops/meetings as appropriate supported by a risk co-ordinator if required; and
- Be the custodian of the risk register and the contained data.

The Risk Owner shall be responsible for the day to day management of the risk(s) that they own. The selection and appointment (by the Project Manager) of a risk owner will be on a “best person for the task” approach and, once appointed, the risk owner will monitor and update the risk register informing the risk manager of changes.

The Risk Owner will also allocate project risks to either SBC or the contractor. At this stage the allocation can be determined by risk category, where certain categories of risk are owned by SBC or the contractor or shared between both. A contractual position will be agreed by SBC and the preferred contractor to formalise this process. Table 6-3 below provides an outline for how different types of risks will be owned.

Table 6-3 - Risk Allocation

Risk Category	Potential Allocation		
	SBC	Contractor	Shared
Design			✔
Construction		✔	
Transition and Implementation			✔
Operation	✔		
Revenue	✔		
Technology			✔
Financial	✔		
Planning and Legislative	✔		

Individual and specific risks, alongside suggested mitigation measures, are discussed below in the next section.

6.9.3. Key Project Risks

Table 6-4 identifies the key project risks throughout the planning and implementation of the scheme. A full risk register can be found in Appendix B10. This includes the likelihood and magnitude for each risk, and proposed mitigation measures.

Table 6-4 - Key Project Risks

Planning / Approval Risks & Mitigation	
Risk	**Mitigation**
Delays during planning stage (including delays in statutory process orders, determination of public inquiry, advanced archaeological finds etc) leading to increased capital cost.	Ensure robust scheme and orders presented at planning application and publication. Employ experienced team to prepare and complete the statutory process.
Failure to achieve Planning Consent	Prepare robust Planning Application. The scheme will continue to liaise with a scheme specific advisory group made up of planning officers from each of the local authorities.
Changes to scheme funding	Continue communication with funding sources.
Statutory Undertaker diversions cost underestimated	Continual liaison with SU's (C3 estimates already received). Consider employment of specialist consultant to value engineer planned diversions at preliminary design stage.
Development sites affecting design criteria	Ensure agreement with planning authorities at early stage and review.

Delays during construction, including statutory undertaker diversions, access restrictions due to environmental constraints etc.	Continually review programme to ensure sufficient time allowance made for such issues. Continue to liaise with consultant contractor to seek advice on buildability issues. Liaison with external bodies to assist in development and acceptance of scheme design.
Utility diversions	The design process and value engineering employed should be necessary to deal with this risk
Land required for Park & Ride infrastructure	Negotiations for purchasing this land are in progress via a third party. However there remains the possibility that this will not be successful, in which case a CPO process may be required, with potential cost and timescale impact

A Risk Management Plan and Organisation will be developed for the life of the project. At this stage, a full Risk Register can be found in Appendix B10.

6.10. Benefits Realisation Plan

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

The scheme objectives are set out in Section 2.7, which have been examined in Table 6-1 below to highlight specific, measurable, agreed upon, realistic, and time bound realisation of the scheme benefits. In having objectives that fit these criteria, the benefits realisation plan has a foundation as well as performance indicators with which to measure the overall success of the scheme.

The SBC Project Manager will be the owner, responsible for tracking the benefits being realised and for reporting any exceptions to the Project Board. This will allow early identification of any areas where benefits are not being realised as expected. The Project Board will then appoint someone with sufficient expertise to oversee remedial actions to try to bring benefits back in line with expectations.

The monitoring of the benefits realised against each objective is controlled within the Monitoring and Evaluation plan as discussed below.

Table 6-5 – Realisation of SMaRT Phase 2 Objectives

Specific	Measurable	Agreed upon	Realistic	Time bound
Minimise stop/start travel conditions along the A4 London Road and improve journey time reliability **Encourage mode shift by extending the current SMaRT service to Heathrow and providing P&R to improve connectivity and PT capacity to Slough and Heathrow.**	Journey times reduce, and journey time variability reduces overall, compared with do-minimum, current and past rates	Supports the growth and development of the area, helping to meet LEP and SBC housing and employment growth desires	Takes into account aspirations for wider long-term employment development in the Colnbrook area to take advantage of SBC's position in relation to Heathrow. Also takes into account housing development allocations that would be served by the A4 corridor.	Monitoring and evaluation to occur 1 year following scheme implementation and 5 years after scheme implementation. See Monitoring and Evaluation Plan
Improve capacity at, and functionality of, Sutton Lane Gyratory, which will mitigate congestion impacts of future development	Future delays and queue lengths increase at an acceptable rate due to future growth and development	Supports the growth and development of the area, helping to meet LEP and SBC housing and employment growth desires Improving surface access between Slough and Heathrow supports SBC strategic goals for economic growth		
Improve the quality of the highway verges and make better use of redundant highway space	User and residents' perceptions become more positive	Advances the SBC goals to provide high quality, safe, attractive urban environments which bring vibrancy to local communities	Achieved by conducting active mode user surveys and residents' surveys before and after scheme implementation. The improved facilities should attract more users to the corridor as it results in higher journey quality	Monitoring and evaluation to occur 1 year following scheme implementation and 5 years after scheme implementation. See Monitoring and Evaluation Plan
Enhance the landscape and public realm to address poor quality visual impact	User and residents' perceptions become more positive	Fits the SBC desires to increase active mode use throughout the city		

Demand for Park & Ride is likely to focus on three major areas:

- Slough town centre;
- Slough Trading Estate; and
- Heathrow Airport.

In order to ensure that benefits area realised, attention will be paid to communicating the benefits of Park & Ride with key stakeholders located at these places, through:

- Signage on the A4, other local roads and if possible on the M4 through negotiations with neighbouring authorities and Highways England;
- Promotion with landlords and employers located in Slough town centre and in the Trading Estate, through the Council's workplace engagement team;
- Promotion with Heathrow Airport Ltd's commuter team, seeking to ensure that the heavily-discounted staff travelcard scheme is available on SMaRT services and for use at the Park & Ride;
- Ensuring that SMaRT services and the Park & Ride operate at times suitable for Heathrow Airport staff shift change times as well as normal business hours; and
- Promotion with Heathrow Airport of the site as an alternative carparking and drop off / meet and greet location for those flying.

6.11. Monitoring and Evaluation

The DfT's latest 'Monitoring and Evaluation Framework for Local Authority Major Schemes' states that the Monitoring & Evaluation Plan should be targeted for the scheme. In this scheme evaluation, this will cover standard monitoring of measures common to all schemes covering inputs, outputs, outcomes and impacts.

Monitoring and evaluation of the scheme will occur 1 year and 5 years after it is implemented by Slough. A budget of around £10k has been established in addition to the Council's existing budget for the monitoring and evaluation.

The monitoring and evaluation plan will cover the Measures for Success outlined in Section 2.8, including the monitoring of traffic volumes, journey times, mode choice, and user experience along the A4 London Road corridor. The plan will also cover accident data along with local socio-economic and economic metrics to determine any unique contribution of the scheme. benefits are included below in Table 6-6, which shows measurable and quantifiable targets for the 1 year and 5-year Monitoring and Evaluation reviews.

Table 6-6 - Monitoring and Evaluation Plan

Impact/Indicator	Definition	2021/2022 Baseline	1-year Target	5-year Target	Data Source
Journey Times and Congestion	JT reduction and JT variability reduction	13 second increase in JT in the AM peak eastbound	No increase in JT in the AM peak eastbound	30 second reduction in JT in the AM peak eastbound	JT data collection
Public Transport Journey Time and Reliability	JT reduction and JT variability reduction for PT users	2 min increase in JT in the AM peak eastbound on SMART bus services	1 min increase in JT in the AM peak eastbound on SMART bus services	2 min reduction in JT in the AM peak eastbound on SMART bus services	JT data collection/ bus operator real time information

P&R Patronage	Increased patronage on local bus services	144 users in one AM peak hour	144 users in one peak hour	200 users in one peak hours	Bus ticket data
Road Safety	Reduced number of accidents within MRT Phase 2 pre-defined polygon /corridor area	94 accidents between 01/08/13 and 31/07/18, or 18.8 accidents a year	90 accidents between 01/01/23 and 01/01/24	tbc	Traffmap/AccsMap Accident Analysis System
Air Quality	Improvement in local air quality	9,754 households within 200m expected to experience an increase of over 1,000 AADT	Less than 9,754 households within 200m expected to experience an increase of over 1,000 AADT	tbc	Air quality surveys

The project performance will be monitored via SBC's Project Management Office and will be subject to Highlight Reporting and regular meetings between the delivery team and the project management team.

6.12. Contingency Plan

As part of the scheme's Contingency Plan, actions can be taken to address fall backs to implementation, such as those outlined in Table 6-2. These are outlined below in Table 6-7. If there any cost overruns SBC's in-house team will address these using NEC 4 contracts which prioritise Government principles and best practice for procurement and project management. The Project Delivery Team and Project Board will be involved with the management of the Contingency Plan and any cost overruns. Value engineering will be utilised in further design stages to reduce costs in parts of the scheme expected to deliver few benefits. A Quantified Risk Assessment, provided in Appendix B10, gives more confidence to the effectiveness of contingency arrangements.

Table 6-7 - Contingency Arrangements

Workstream	Suggested Contingency Arrangement
Design update	Previous design is included in the Business Case submission.
Business Case development and approval	In the case of the Business Case's submission being severely delayed or its approval not granted, alternative sources of funding could be considered with a submission later in 2019. The business case is versatile to be updated to respond to different criteria for different funds.
Detailed design	Design is scaled down appropriately. Ensuring adequate resource coverage of design work and appropriate quality assurance processes of appointed contractor.

Utilities works	Additional resources are deployed to divert utilities within the timeframes required in the scheme's programme for its successful delivery.
Planning consent	Additional resources at SBC, or acquired via an external consultant, are utilised to resolve delays and issues in the scheme's planning consent and permissions processes.
Construction works	Additional resources are procured and deployed to ensure construction issues are resolved and the scheme is constructed according to programme timescales.
Operational considerations	Early review of P&R operation and consideration of potential alternatives in design phase.
Service implementation delayed	Use of existing bus services to stop at the P&R which will have minimal impact on existing passengers due to the P&R configuration.

6.13. Management Case Summary

SBC has delivered successful projects of a similar nature, including the Heart of Slough Infrastructure Improvements Scheme and the A355 Tuns Lane/Copthorne roundabout scheme, which both brought major highway network enhancements to Slough. The Council has a governance structure in place to implement transport schemes and ensure project programmes are met, as well as an assurance and approvals Gateway Process for assessing projects at critical stages within these programmes. Officers follow the principles of PRINCE2 and NEC 4 contracts.

Stakeholder management and communication will be undertaken in advance of construction and will continue for the lifetime of the project. The Project Manager will be responsible for ensuring the Project Board is informed about programme decisions.

The scheme's Benefits Realisation Plan utilises a Logic Map to track the schemes objectives and its outcomes through to the realisation of benefits for the scheme's stakeholders. The benefits will be monitored against the objectives and measures for success to assess the scheme's performance.