

REPORT N° 70012014

A1307 HAVERHILL TO CAMBRIDGE

PREFERRED OPTIONS REPORT
EXECUTIVE SUMMARY

PUBLIC

FEBRUARY 2017

A1307 HAVERHILL TO CAMBRIDGE

Cambridgeshire County Council



Type of document (Version 6.0)
Public

Project no: 70012014
Date: February 2017

WSP | Parsons Brinckerhoff
62-64 Hills Road Cambridge
CB2 1LA

Tel: +0 (0) 1223 558071
Fax: +0 (0) 1223 558051
www.wsp-pb.com

QUALITY MANAGEMENT

ISSUE/ REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3	REVISION 4	REVISION 5
Remarks	Version 1.0	Version 2.0	Version 3.0	Version 4.0	Version 5.0	Version 6.0
Date	19 December 2016	13 January 2017	9 February 2016	9 February 2016	16 February 2016	17 February 2016
Prepared by	Paula Cuthbertson	Paula Cuthbertson	Paula Cuthbertson	Paula Cuthbertson	Paula Cuthbertson	Paula Cuthbertson
Signature						
Checked by	Darren Pacey	Adrian Hames	Adrian Hames	Adrian Hames	Adrian Hames	Neil Poulton
Signature						
Authorised by	Darren Pacey	Adrian Hames	Adrian Hames	Adrian Hames	Adrian Hames	Adrian Hames
Signature						
Project number	70012014	70012014	70012014	70012014	70012014	70012014
Report number						
File reference						

1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 WSP Parsons Brinckerhoff has been appointed by Cambridgeshire County Council to identify a package of sustainable transport interventions for the A1307 corridor from Haverhill to Cambridge. This report documents the option development and selection process and outcomes following a first round of public consultation in Summer 2016.
- 1.1.2 This work has been undertaken on behalf of the Greater Cambridge City Deal to inform the first tranche of the City Deal infrastructure programme. This work is part of a wider package of major public transport improvements across the city and into South Cambridgeshire, based on a corridor approach, as set out in the Authority's adopted Transport Strategy for Cambridge and South Cambridgeshire (TSCSC). The Greater Cambridge City Deal has successfully secured a first tranche of Government's City Deal funding to unlock major growth and economic potential in the Greater Cambridge area.

1.2 A1307 CORRIDOR

- 1.2.1 The A1307 Haverhill to Cambridge corridor is one of the key radial routes into Cambridge and suffers from congestion during peak periods, particularly at the Cambridge end, at the junction with the A11 and around the village of Linton..
- 1.2.2 The corridor is over 20km in length and connects a large number of important settlements and key employment areas including:
- Haverhill (a major town in Suffolk with substantial industry and business parks including the future Haverhill Research Park);
 - Horseheath;
 - Linton (near the Cambridgeshire border with Essex);
 - Great Abington / Little Abington / Hildersham;
 - Granta Park (a major employment area for science, technology and biopharmaceuticals);
 - Babraham and the Babraham Research Campus (a major bioscience employment area).
- Furthermore, close to the corridor are:
- Sawston, Great Shelford & Stapleford; and
 - Addenbrooke's Hospital / Cambridge Biomedical Campus.
- 1.2.3 Recognising that there is significant economic growth planned for the A1307 corridor and in a wider context, proposed developments within the Greater Cambridge area may also interact with the A1307 corridor through their connections to the A505, and A11. This will lead to increased transport demand in the south east of Cambridge which could potentially be mitigated by creating more capacity for sustainable travel along the A1307 corridor, seeking to maintain traffic volumes at today's levels. Therefore this study aims to identify potential sustainable travel interventions which would create more capacity for non-car modes and increase the attractiveness of public transport, walking and cycling within the A1307 corridor to encourage mode shift.

1.3 STUDY SCOPE

- 1.3.1 The geographic scope of the project shown below in Figure 1.1 below and currently considers the section of A1307 between Haverhill and Cambridge. The extents of the route considered are from the A1017 junction west of Haverhill to the south arm of Addenbrooke's Hospital site access Roundabout on Hills Road in Cambridge.

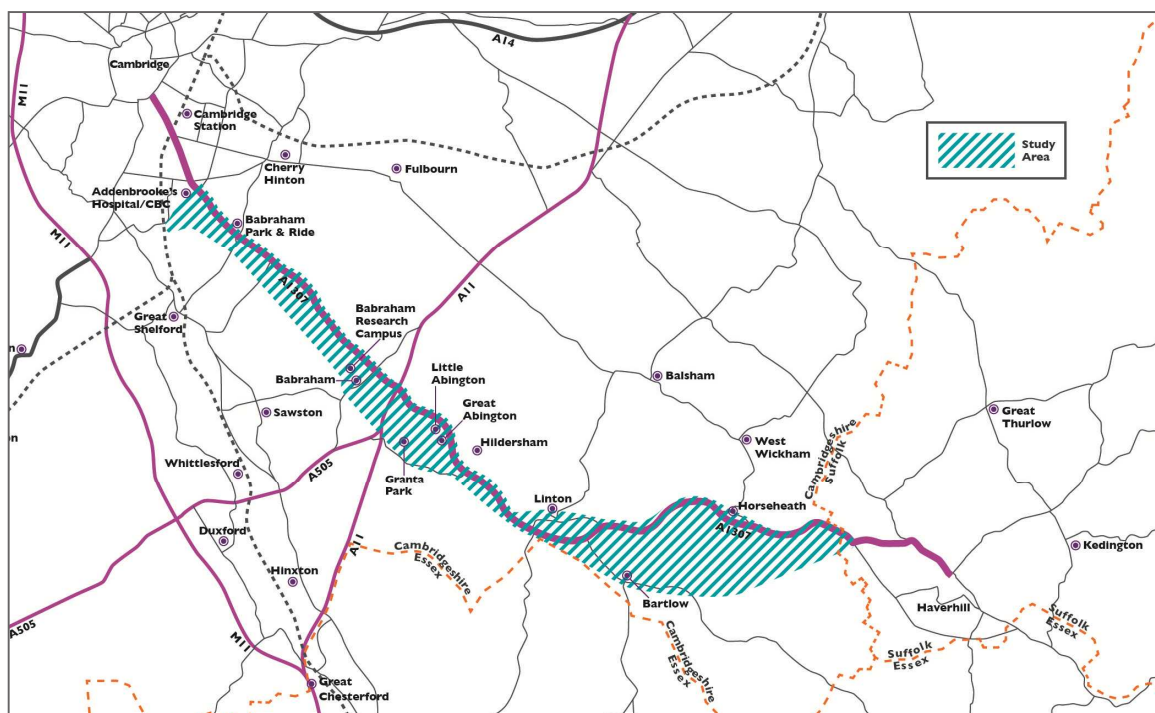


Figure 1.1 A1307 Haverhill to Cambridge Study Scope

1.4 CITY DEAL OBJECTIVES & TRANSPORT VISION

- 1.4.1 The project is to be funded through the first tranche of Cambridge City Deal. Potentially up to £39m can be allocated to the A1307 for delivery of schemes which can be implemented (or commenced) by 2020. Therefore the solutions proposed are naturally focussed on schemes which are potentially deliverable within the City Deal First Tranche budget and likely to be feasible for delivery (commencement on site) by 2020. Solutions which could be delivered in the second tranche of the City Deal are identified for further consideration.
- 1.4.2 In order to maximise opportunity for funding, the option selection process therefore seeks to prioritise those schemes and packages which best meet the City Deal objectives and vision:

City Deal Objectives:

- Securing future economic growth and quality of life, supporting growth, and facilitating easy movement between major employment and residential areas.
- The City Deal will invest in enhancing transport infrastructure that makes it easier for people to travel between places of work, home or study using sustainable modes of transport, reduce congestion and support our city region's connectivity with regional and national transport networks.

City Deal Transport Vision:

The City Deal will make it easier to travel in, out and around Cambridge and South Cambridgeshire by public transport, cycle or on foot, and reduce and maintain lower traffic levels to ease congestion

1.5 A1307 STUDY AIMS

1.5.1 The A1307 study aims to:

- Identify a variety of options which will improve the reliability, safety and speed of movement along the A1307 corridor, and ultimately reduce the number of vehicles driving into the city of Cambridge.
- Investigate whether combinations of schemes will provide the greatest benefit.

1.6 A1307 STUDY OBJECTIVES

1.6.1 The project objectives can be summarised as follows:

- To improve opportunities for sustainable travel along the A1307 corridor, including consideration of public transport and non-motorised users, within all scheme elements.
- To maintain traffic levels at today's levels in Cambridge.
- To consider the potential for enhancing the environment, streetscape and air quality in the A1307 corridor.
- To assess the impacts on existing residents and highway capacity for each option.
- To identify areas along the corridor, and measures, where safety for all modes of travel can be improved.
- To improve the connectivity with surrounding villages and places of employment along the corridor.

1.7 SUPPORTING ECONOMIC GROWTH WITHIN THE CORRIDOR

1.7.1 The Cambridge and South Cambridgeshire submitted Local Plans have identified future growth in housing and employment along the corridor, both immediately to the south of Cambridge, to the north-east of Haverhill as well as key employment areas within the corridor. The committed developments alone proposed for the area alongside the corridor need to cater for over 8,500 new homes and nearly 20,000 additional jobs through to 2031.

1.7.2 This growth includes the following major developments (amongst others) which are likely to increase travel demand along the corridor. The study seeks to support this economic growth, seeking to provide transport interventions which help improve opportunities for sustainable travel between these key growth areas:

- Haverhill – up to 4,260 homes (2009-2031).
- Granta Park – up to 3,200 new jobs.
- Babraham Research Campus – up to 1,000 new jobs.
- Cambridge Biomedical Campus – around 6,000 new jobs in the next 3-5 years, with further growth to follow.

1.8 INITIAL OPTION CONCEPTS CONSULTATION

1.8.1 A first round of public consultation was held in summer 2016 with a series of high level option concepts presented to members of the public. These included 'on-highway' and 'off-highway' options for improving and prioritising sustainable and healthier travel options as well as seeking to enhance road safety along the corridor.

1.8.2 The initial concept options presented for public consultation are summarised below:

→ Park & Ride

- Concept 1A - Babraham Road Park & Ride – redevelopment and expansion of the Park & Ride site to cater for committed and future growth within the Addenbrooke's Hospital / Cambridge Biomedical Campus area. and
- Concept 1B – A11 Park & Ride Site – new Park & Ride adjacent to the A11 Fourwentways junction.

→ Bus Rapid Transit

- Concept 2A – Granta Park to Addenbrooke's Hospital / Cambridge Biomedical Campus (off highway) – segregated, off highway rapid transit from Granta Park via a new A11 Park & Ride, Babraham Research Campus to Addenbrooke's Hospital / Cambridge Biomedical Campus. Potential for guided Busway, dedicated public transport road or other method of rapid transit. Additional walking, cycling and equestrian improvements provided alongside.
- Concept 2B – Granta Park to Addenbrooke's Hospital / Cambridge Biomedical Campus (on highway) – segregated, on highway rapid transit from Granta Park via new A11 Park & Ride, Babraham Research Campus, Babraham Road Park & Ride to Addenbrooke's Hospital / Cambridge Biomedical Campus. Additional walking, cycling and equestrian improvements provided alongside;
- Concept 2C – Linton Bus Priority – on highway bus priority improvements through Linton. Additional transport and public realm improvements alongside;
- Concept 2D – Babraham Road Park & Ride to Addenbrooke's Hospital / Cambridge Biomedical Campus (off highway) – segregated, off highway, rapid transit from Babraham Road Park & Ride to Addenbrooke's Hospital / Cambridge Biomedical Campus from the west. Additional walking, cycling and equestrian improvements alongside; and
- Concept 2E – Babraham Road Park & Ride to Addenbrooke's Hospital / Cambridge Biomedical Campus (on highway) – segregated, on highway, rapid transit from Babraham to Addenbrooke's Hospital / Cambridge Biomedical Campus from the east. Additional transport and public realm improvements alongside.

→ Walking & Cycling

- Concept 3A – Three Campuses Cycling & Walking Route (off highway) – segregated, off highway, route from Granta Park via new A11 Park & Ride, Babraham Research Campus with a connection to National Cycle Network (NCN) 11;
- Concept 3B – Three Campuses Cycling & Walking Route (on highway) – segregated, off highway, route from Granta Park via new A11 Park & Ride, Babraham Research Campus and along the A1307 through to Babraham Road Park & Ride and Addenbrooke's Hospital / Cambridge Biomedical Campus;
- Concept 3C – Haverhill to Three Campuses Route (on highway) – segregated, on highway route from Haverhill via Horseheath and Linton linking to the Three Campuses cycle route at Granta Park; and
- Concept 3D – Haverhill to Three Campuses Route (off highway) – segregated, on highway route from Haverhill along the disused railway corridor to Linton and Granta Park linking to the Three Campuses cycle route at Granta Park.

→ Other Schemes

- Public Realm Improvements - Ensure all schemes incorporate appropriate public realm improvements to meet with the objectives of the City Deal;
- Bus Stop Accessibility Improvements - Ensure all bus stops along the corridor are fully accessible and meet the latest guidance for bus stops; and
- Road Safety Improvements - Additional road safety improvements are proposed for a number of locations on the corridor, outside the major concept areas, to deliver a consistent route length approach to the road (e.g. junctions, speed limits etc).

1.8.3

An overview of the initial option concepts is shown below in Figure 1.2

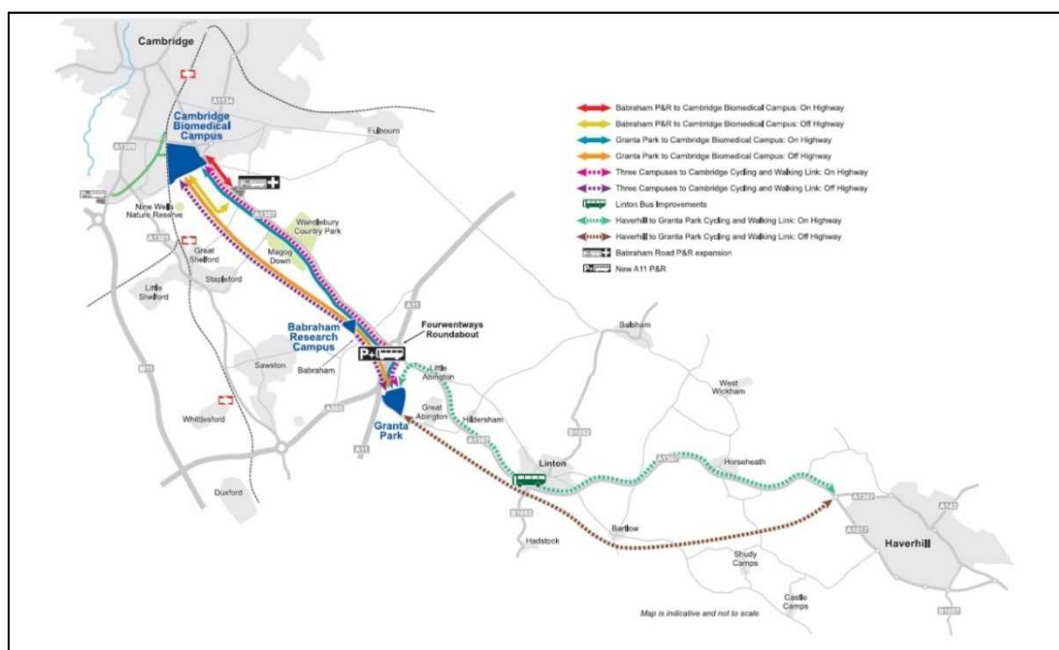


Figure 1.2 Summer 2016 Consultation Initial Option Concept Ideas

1.9 DISCOUNTED OPTIONS

1.9.1

Prior to public consultation, several major schemes were considered as part of the study. A number of these schemes were discounted because they were unlikely to be affordable or implementable within the first tranche of City Deal funding allocation of £39m or within the timescales required for the first tranche of spending (by 2020) due to the scale of works involved and land acquisition requirements. The discounted options included the following:

- Reopening the railway line between Haverhill and Cambridge
 - Capital cost £390-650M
 - Benefit to cost ratio assessed as 0.5 – 1.0
- Introducing an off-road Bus Rapid Transit route from Haverhill to Cambridge
 - Capital cost £150-200M
 - Benefit to cost ratio assessed as 1.0-1.5
- Several road options, including duelling and a Linton bypass
 - Capital cost £15M - £100M
 - Benefit to cost ratios assessed as 0.2 – 0.5

1.9.2 However, the above schemes could potentially be considered or pursued via other studies using alternative budgets in the future.

1.10 DEVELOPING THE PREFERRED OPTIONS

1.10.1 This report outlines how a preferred option package for the A1307 from Haverhill to Cambridge was identified taking into account a range of factors and design considerations.

1.10.2 The A1307 route has been split geographically into sections, and preferred options for each section of the route have been considered and developed, taking into account public consultation feedback and initial high level transport modelling where relevant as well as outline costing and high level constraints:

- **Addenbrooke's to Hinton Way** – this section considers the opportunities for implementing an on-road bus lane between the existing Babraham Road Park and Ride site and Addenbrooke's hospital. The on-road option is compared with alternative options for creating new off-road bus only links directly connecting with the Cambridge Biomedical Campus Development with onward connections within the Addenbrooke's site.
- **Hinton Way to Babraham Village** – This section considers the feasibility and viability of bus priority measures from Hinton Way to Babraham Research Campus (BRC) and improved cycle routes west of Babraham Research Campus to Hinton Way. Junction enhancements are also considered where there are specific capacity or safety issues.
- **Babraham Village and Granta Park to Linton** – Options to create or enhance new off-road cycle and pedestrian routes crossing the A11, connecting the village of Babraham with Great Abington as well as key employment sites at Babraham Research Campus and Granta Park.
- A **Park and Ride study** has been carried out to consider in more detail the potential scheme options of either expanding Babraham Road Park & Ride site versus a potential new Park and Ride site close to the A11 junction. The viability of retaining the existing Park and Ride site in addition to a new A11 facility is also considered.
- **Linton Village** – This chapter considers key junctions on A1307 around the village of Linton and the feasibility of bus priority measures that could be installed to improve bus journey times. Public realm enhancements for reducing congestion within Linton High Street are also considered, seeking to improve the flow of buses through the village centre.
- **Linton to Haverhill** – This section considers safety management opportunities and road safety enhancement options, seeking to reduce the frequency and severity of accidents along this stretch of the route.

2 RECOMMENDATIONS

2.1 A1307 RECOMMENDED DRAFT PREFERRED OPTIONS

2.1.1 The draft preferred option report recommends the following scheme options are taken forward for further development and assessment:

- **Addenbrooke's to Hinton Way** – Widening of the existing A1307 carriageway to create a new on-highway westbound bus lane between the existing Babraham Road Park and Ride site and Addenbrooke's hospital, coupled with widening of cycleways within the northern verge to improve connectivity to the Park and Ride site for non-motorised users.
- **Junction improvements at Worts Causeway junction** to create a bus only bypass lane and changes to Granhams Road junction to facilitate right turning movements.

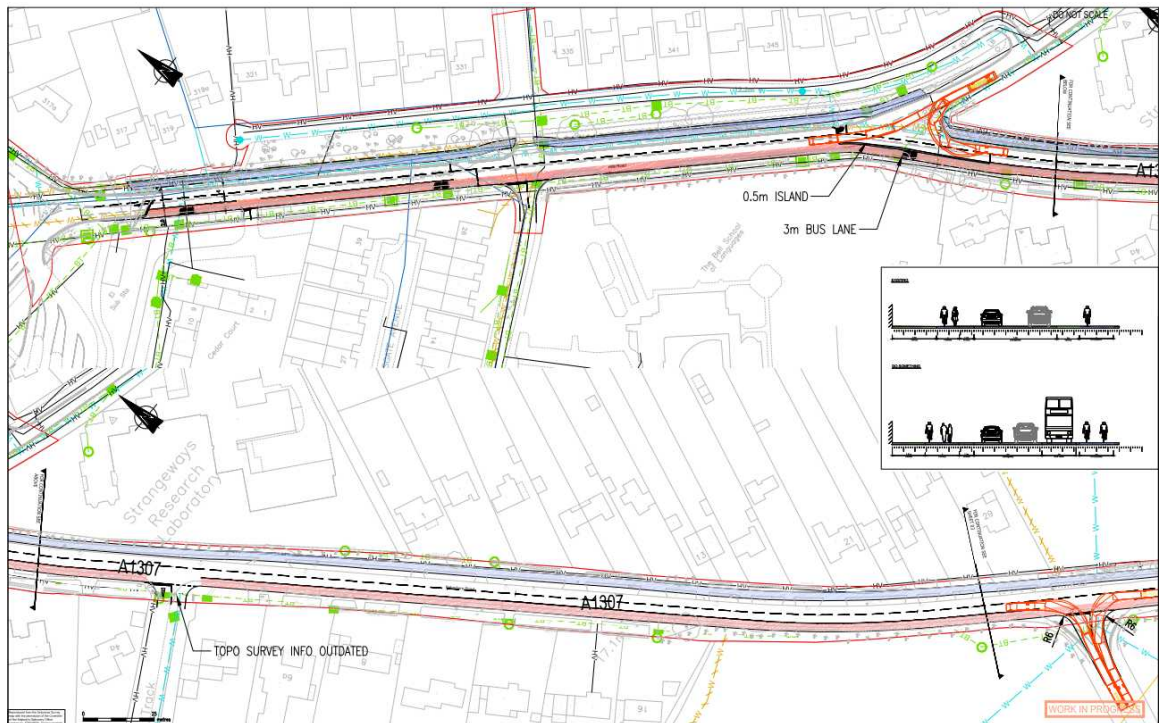


Figure 2-1 Westbound 'on-highway' bus lanes from Hinton Way to Addenbrooke's

- **CBC to Babraham Road Park and Ride off-highway bus and cycle link** – a new bus only road could be created to improve bus connectivity with the CBC site and reduce bus journey times to Cambridge station and central Cambridge.

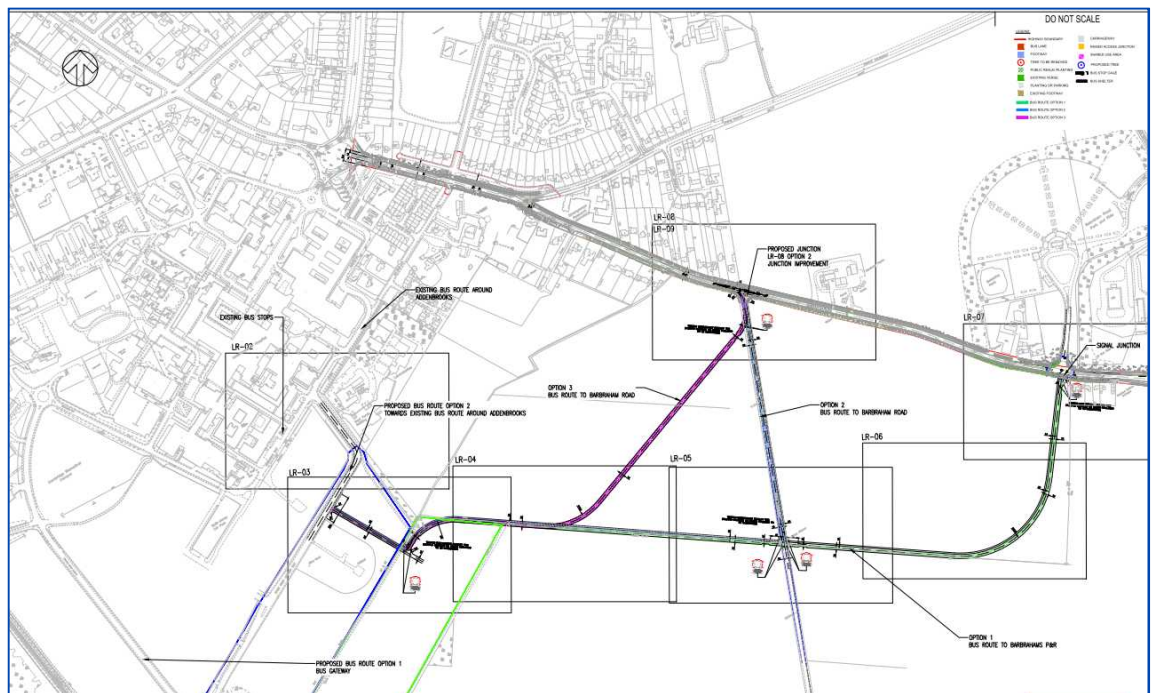


Figure 2-2 CBC to Babraham Park and Ride 'off-highway' bus link Options

→ Granhams Road junction to Hinton Way westbound bus lanes

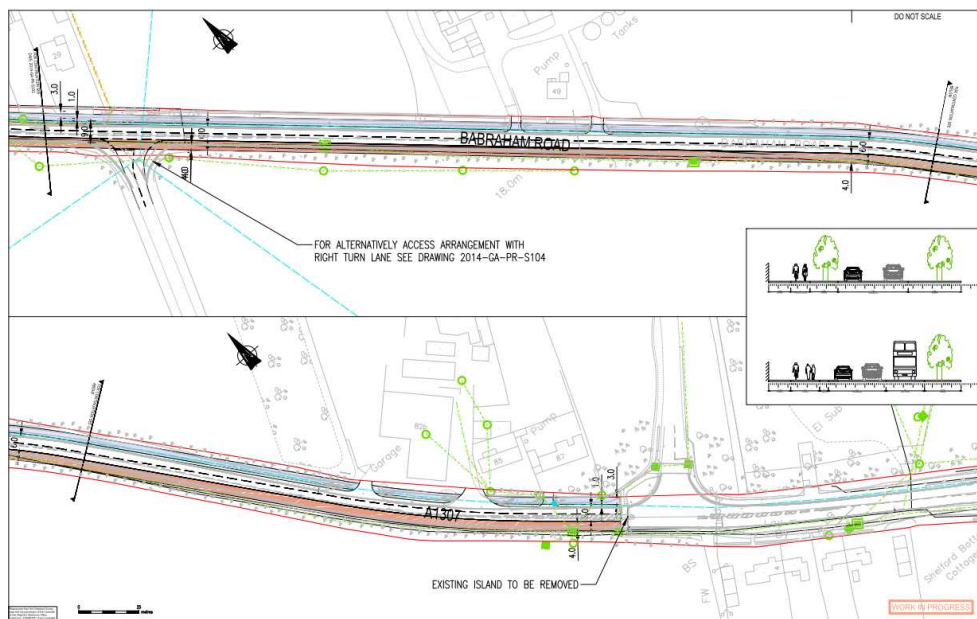


Figure 2-3 Westbound 'on-highway' bus lanes from Hinton Way to Addenbrooke's

→ **Hinton Way Roundabout bus priority scheme** – install a section of busway within the A1307 central reserve on approaches to the junction and through the central roundabout island to create a 'Hamburger' bus priority scheme.

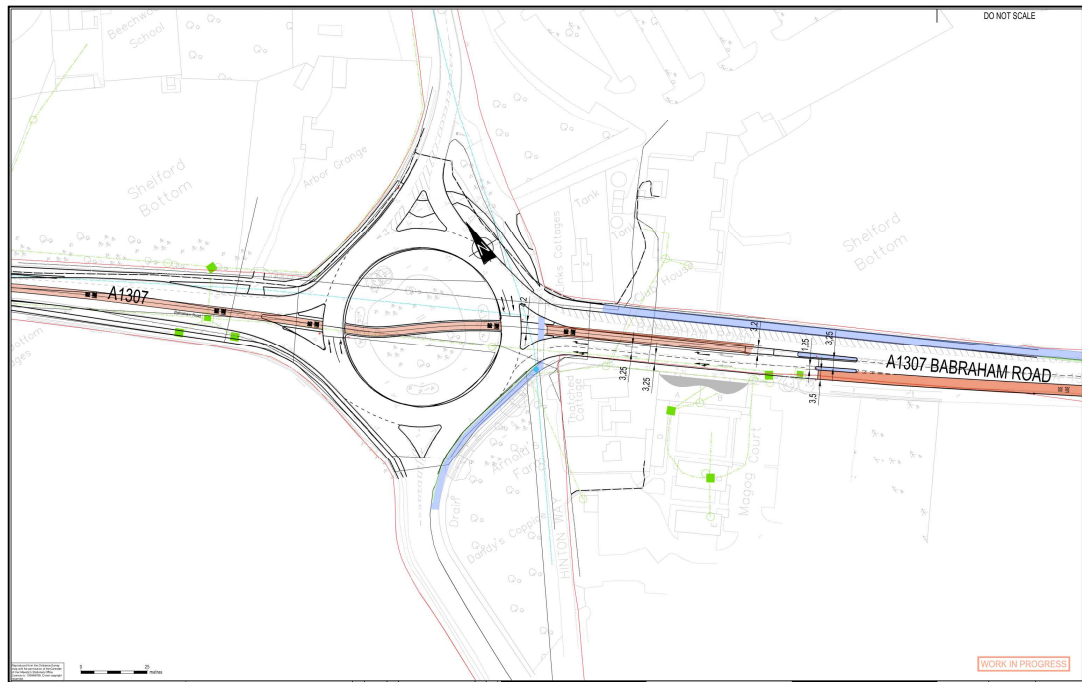


Figure 2-4 Hinton Way Roundabout 'Hamburger' Bus Priority Scheme

- **Hinton Way to Babraham Village** – Widening of the existing A1307 carriageway to create a new on-highway westbound bus lane from Hinton Way roundabout to Babraham Research Campus access roundabout.

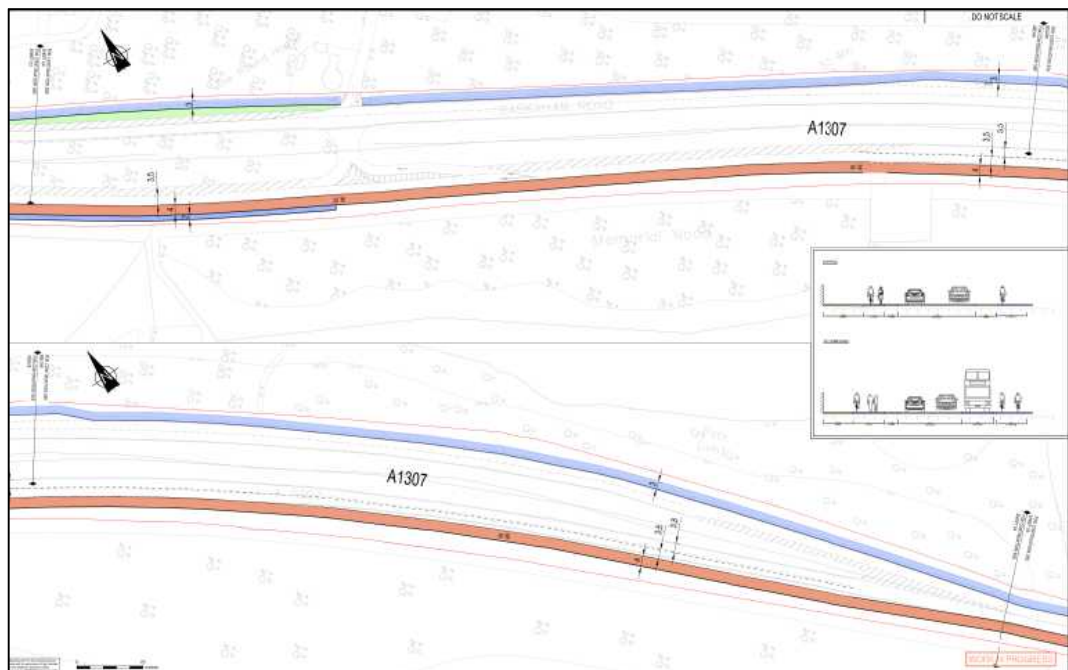


Figure 2-5 Hinton Way to BRC Roundabout Westbound bus lane

- **The Gog Farm Shop Junction safety Improvements** - Enlargement of the central island on approach to The Gog Farm Shop junction, seeking to improve road safety by creating a staggered layout and reducing vehicle approach speeds on approach.

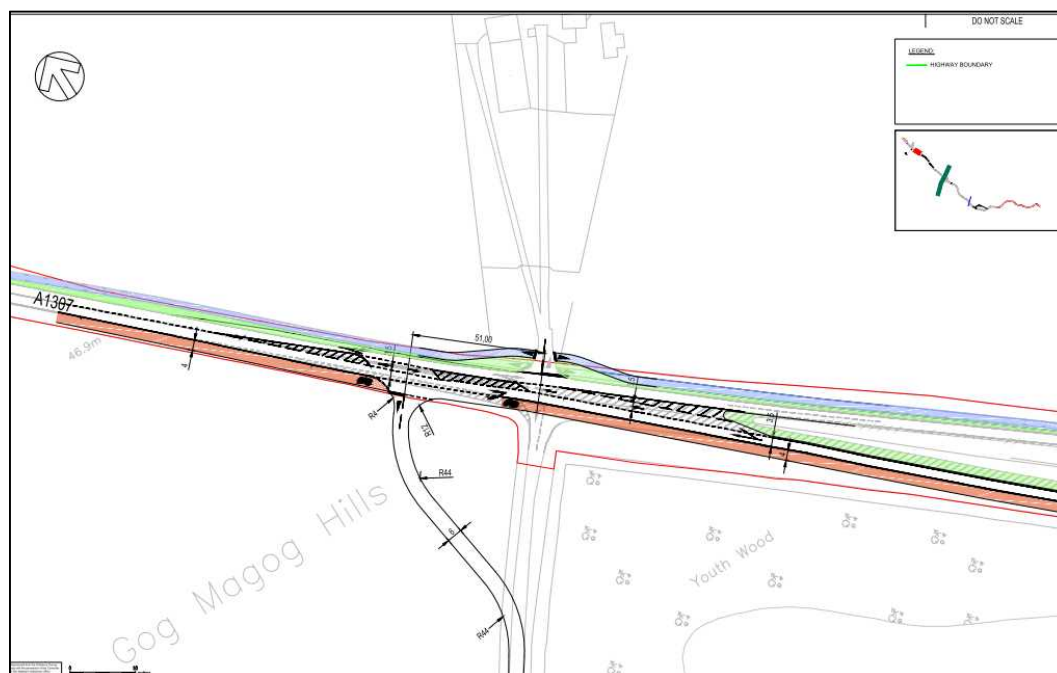


Figure 2-6 Westbound bus lanes, north verge cycleways and The Gog Farm Shop junction changes

- A new Park and Ride site to the south of A1307 either west OR east of A11 junction in addition to the existing Babraham Road Park and Ride facility a new site at the A11 junction would be added to enhance Park and Ride capacity. The existing facility could become more Addenbrooke's focussed with additional cycle parking capacity to support use of the facility as a Park and Stride location. Either option could potentially be coupled with junction improvements at Babraham High Street crossroads and/or A11 services access.

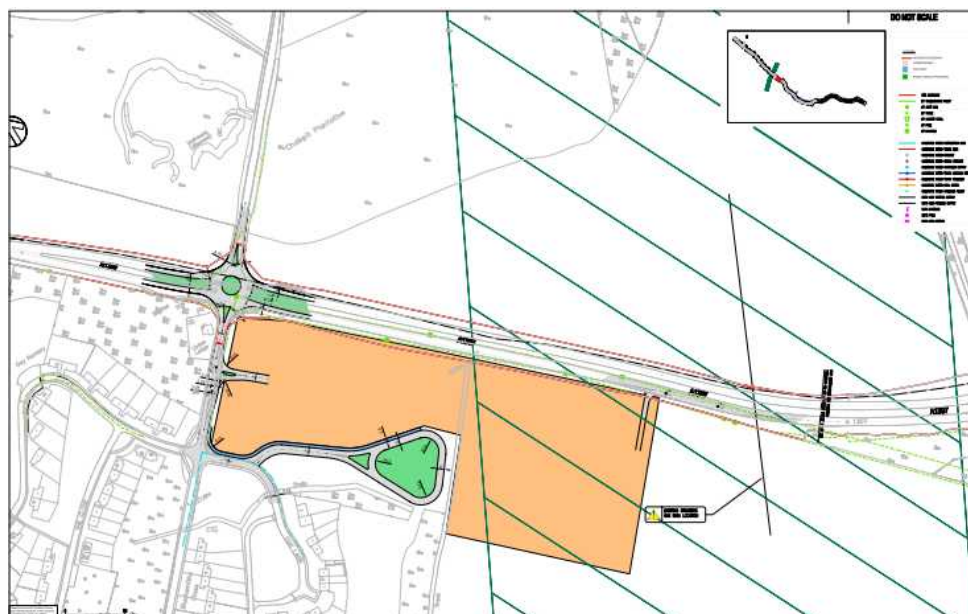


Figure 2-7 Proposed A11 SW Park and Ride Site

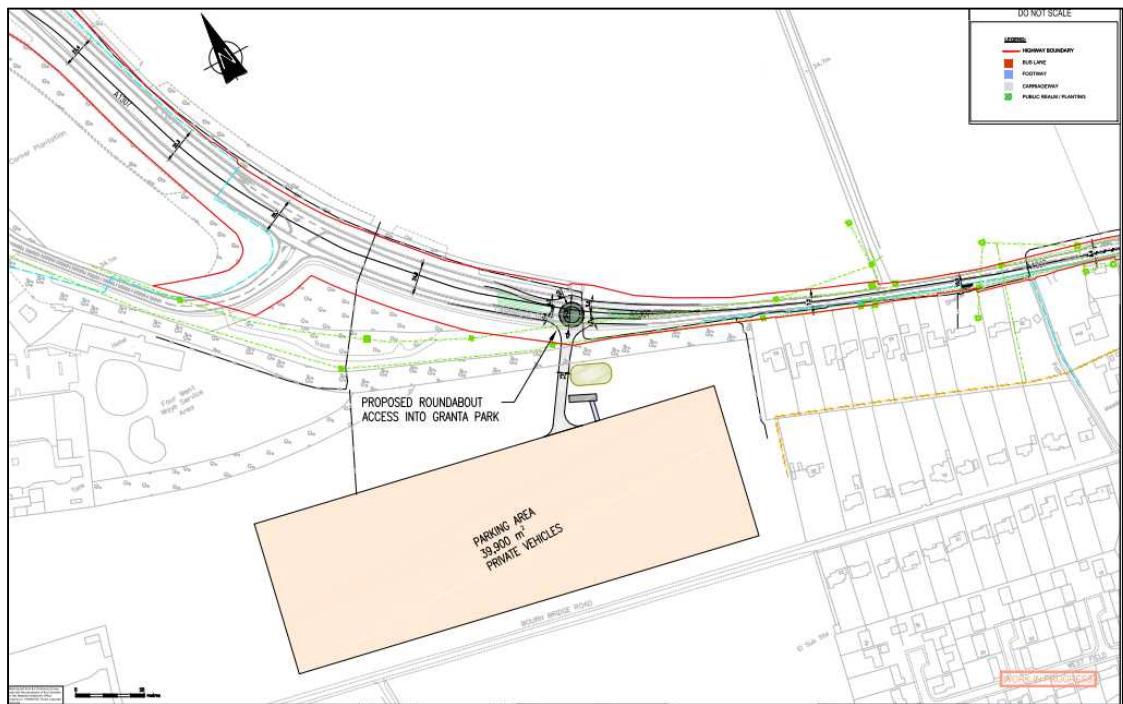


Figure 2-8 Proposed A11 SE Park and Ride Site

→ **Babraham Village and Granta Park to Linton** – Implementation of new cycleways along the existing public footpath alignment to enhance off-road cycle and pedestrian access crossing the A11, connecting the village of Babraham with Great Abington as well as key employment sites at Babraham Research Campus and Granta Park. Ramps could be appended to the existing stepped footbridge to improve access for all and equalities compliance. This could also potentially connect to the proposed A11 park and ride site. Landowner consent would be required to agree the proposed routing through private land on approach to the A11 crossing.

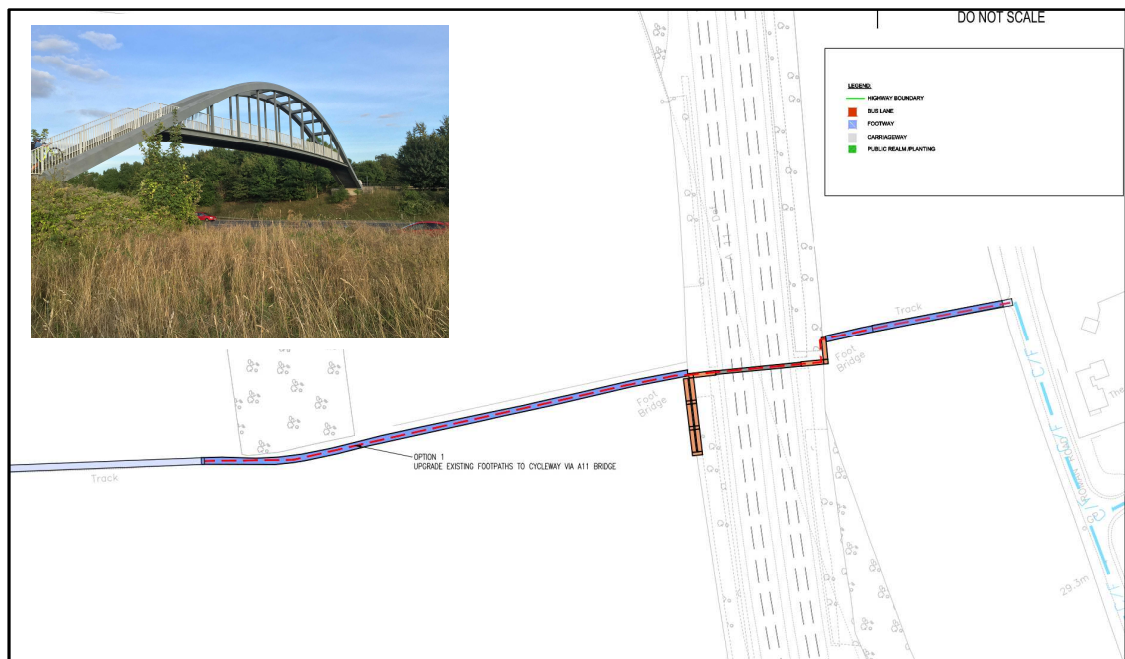


Figure 2-9 A11 Footbridge modifications to add ramps to the existing structure

- **Cycle route via A11 underpass** - A new cycle route via the underpass to the south of the A11 footbridge could be created, subject to landowner, EA and Highways England consent to dedicate new Public Rights of Way over the affected land alongside A11 and/or the River Granta.



Figure 2-10 A11 new cycle route options via the River Granta underpass

- **Pampisford Road junction** – a new raised crossing point or signalised at grade crossing of the A1307 on a key desire line to facilitate pedestrian movement between Hildersham and Great Abington as well as safer access to bus stops and improved cycle connectivity towards Granta Park, BRC and Linton Village College. New cycleways from Linton Road Great Abington could also be added.

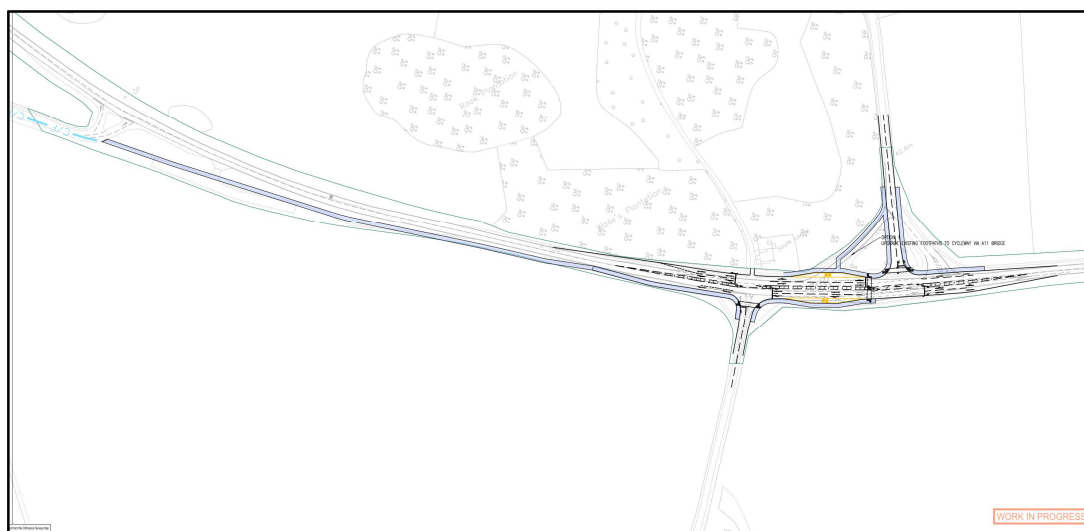


Figure 2-11 Linton Road to Pampisford Road crossing improvements and new cycleway

- **Linton Village** – Improvements to signal timings (via MOVA control) at Linton Village College access junction and the integration of traffic signals and pedestrian crossings at the High Street junction with A1307.

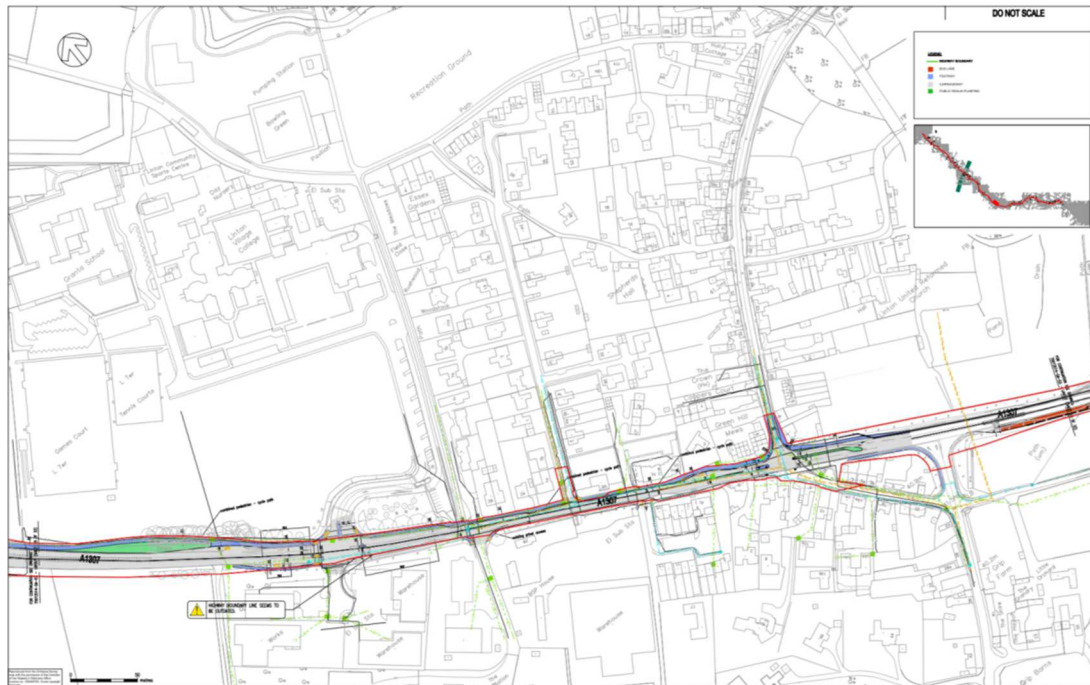


Figure 2-12 Linton Proposed Streetscape and Junction enhancements through A1307

- **Linton Westbound bus lanes** on A1307 approach to the High Street junction.

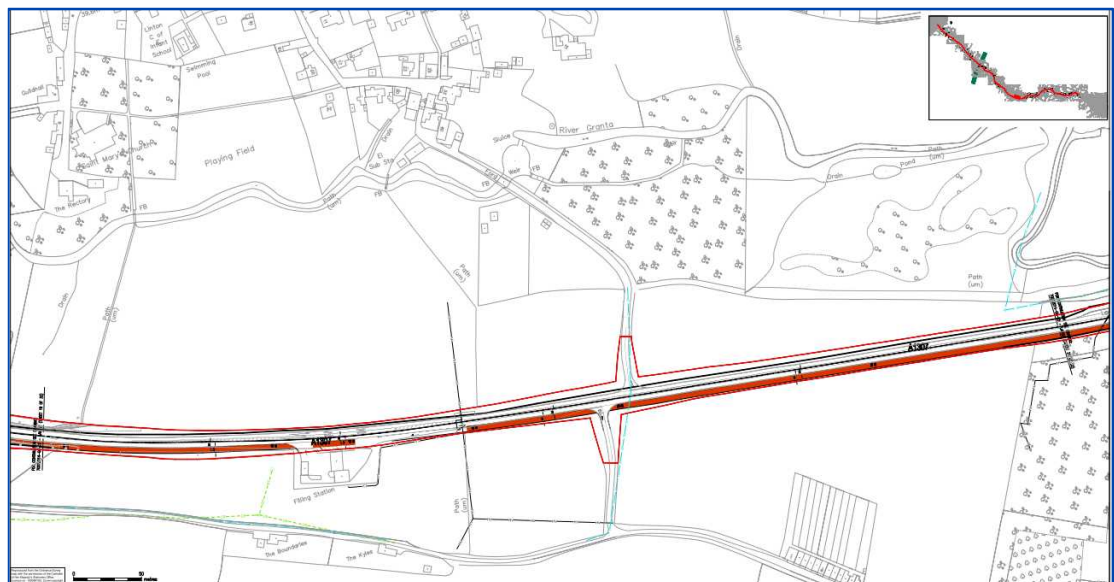


Figure 2-13 Westbound bus lanes on approach to Linton High Street junction

- **Linton High Street Public realm enhancements** for reducing congestion within the High Street, seeking to improve the flow of buses through the village centre.



Figure 2-14 High Street Public Realm Enhancement Proposals

- **Linton to Horseheath safety management** – A review and refresh of the existing collision reduction measures and signage could be carried out and changes to Dean Road Crossroads seeking to improve safety at this junction.

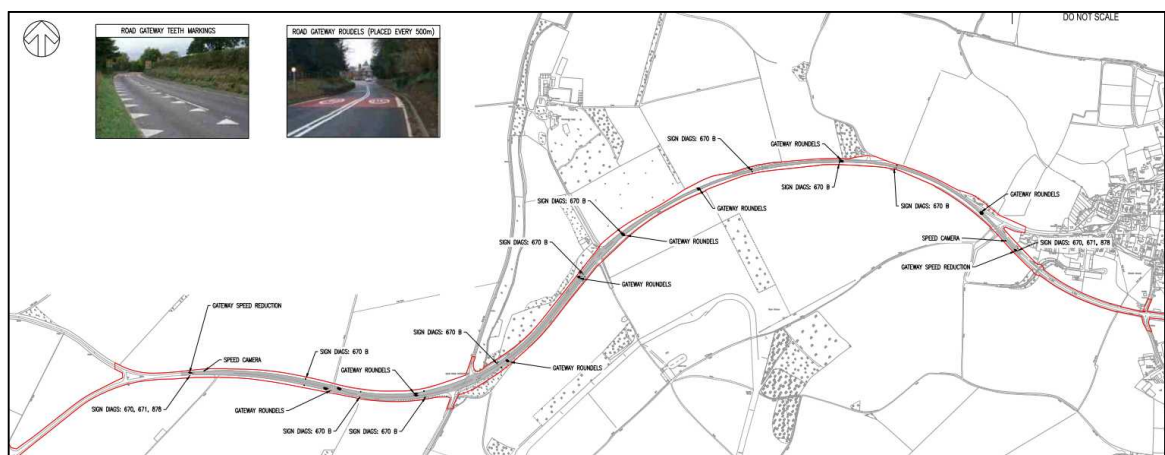


Figure 2-15 Safety Management Proposals Linton to Horseheath

2.1.2

At this draft preferred options stage, it is also recommended that more detailed discussions with key stakeholders are required to fully understand environmental, utility and operational effects prior to confirming the final preferred scheme option package to the City Deal Executive Board in advance of developing of a major scheme business case.

- **Haverhill to Cambridge bus service improvements** – A key aspect linking all of the proposals is the overarching bus strategy for the route which is summarised in the diagram below. The proposed package of infrastructure measures from Haverhill to Cambridge is likely to make bus services more attractive and reliable. This in combination with the levels of housing and employment growth proposed for the corridor as part of the Local Plans should increase the viability of more frequent bus services between Haverhill and Cambridge, particularly on the current X13 most rapid and direct route. This would also facilitate mode shift away from the private car.
- The proposed additional Park and Ride site at the A11 junction will help to influence additional mode shift to Park and Ride and this is envisaged to be coupled with new frequent bus services on the corridor which would increase capacity.
- The on highway and off highway bus priority measures would also help to improve the image of public transport and increase the accessibility of the CBC campus. The new CBC off highway link in particular would also create new opportunities for more flexible onward routing to the rail station via the Cambridge Guided Busway or linkage with other wider initiatives such as the western orbital scheme or Trumpington Park and Ride.

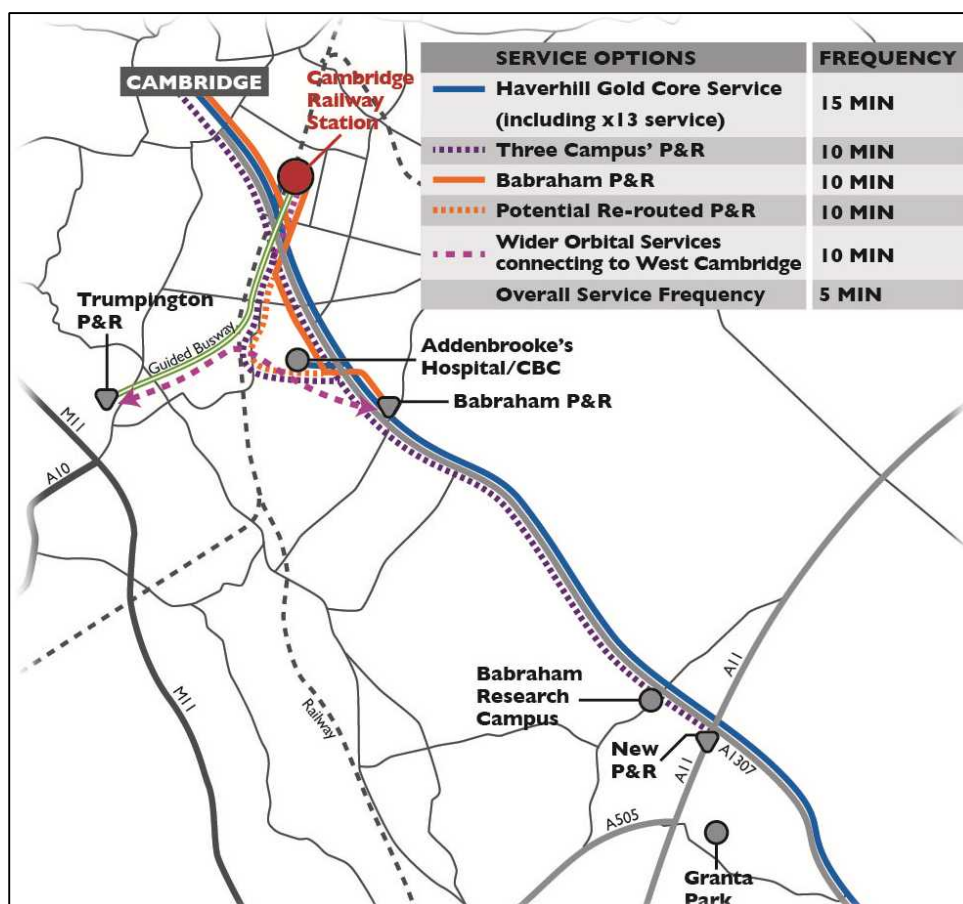


Figure 2-16 Proposed indicative Bus Strategy.

2.2 PROPOSED A1307 ROUTE-WIDE STRATEGY

2.2.1 An overview of the proposed package of measures for the A1307 Corridor is provided below in Figure 9-16.

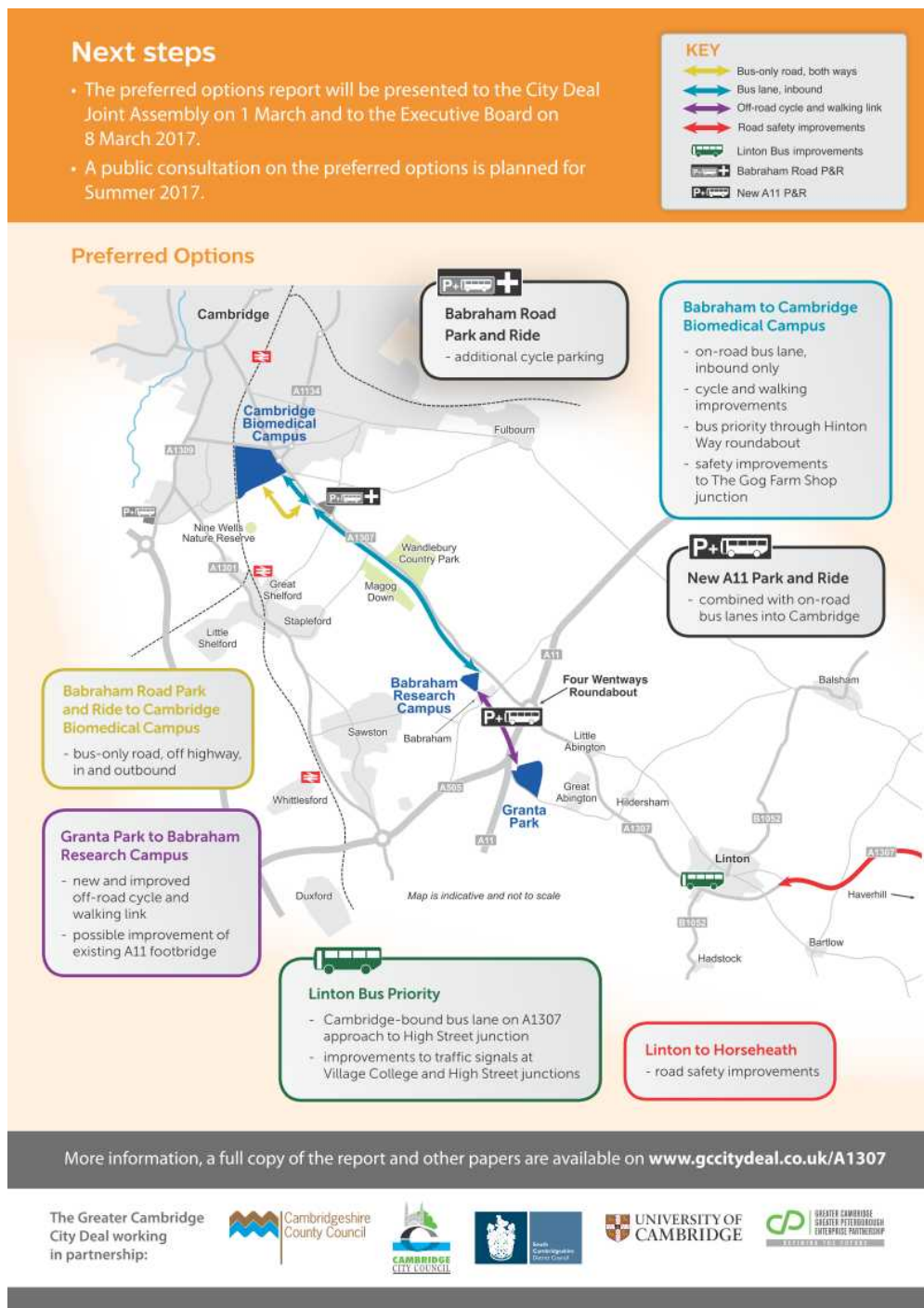


Figure 2-17 Route-Wide Strategy Overview for A1307

3 REASONS FOR RECOMMENDATIONS

- 3.1.1 During the Public Consultation there was generally a high level of support expressed for the proposed concept options presented to the public in June 2016, with 83.3% of respondents supporting or strongly supporting the concept of bus, cycling and walking improvements on the A1307.
- 3.1.2 The options which are considered to best meet the strategic objectives of the A1307 Study and the Greater Cambridge City Deal have been prioritised at this stage in order to maximise opportunity for securing funding. The requirement for schemes to be affordable within the first tranche of City Deal funding (with an upper limit of £39m available to the A1307 corridor) and the need for schemes to commence by 2020 are fundamental to the selection of options. Less complex options and those requiring less land take have therefore been prioritised within the budget and timescales for the first tranche of City Deal funding. Other more complex schemes may be possible to consider under other projects or via alternative sources of funding in the future.
- 3.1.3 The selected package of schemes therefore seeks to support economic growth within the corridor by facilitating sustainable travel links between the three research campuses which are currently experiencing significant employment growth. The study also takes into account increased travel demand generated by large scale allocated housing development at each end of the corridor.
- 3.1.4 Environmental concerns from members of the public were expressed around the extent of works within Greenbelt land and close to sensitive environmental landscapes such as the Gog Magog Hills, Wandlebury Country Park and Nine Wells Nature reserve. Therefore, the scheme options proposed generally focus on maximising improvements within the extents of available public highway land and only purchasing additional land where a suitable improvement cannot be achieved or where an off-highway option for cycle and pedestrian improvements would offer a safer alternative to an option within the public highway.
- 3.1.5 Stakeholder workshops have helped to inform the selection of preferred options. However further work with stakeholders is required to be undertaken in early 2017 to understand the views of bus operators, land owners and environmental groups, local Police and other interested parties before finalising the preferred options for input to a major scheme business case.

3.2 EMERGING STRATEGIC CASE

- 3.2.1 The emerging strategic case for the A1307 Scheme is informed by the available evidence base considering the existing and future transport situation. Additional travel demands within the corridor are likely to arise as a result of economic growth which the preferred scheme aims to address by influencing mode shift towards sustainable travel alternatives such as bus, park and ride, walking and cycling.

Scheme Aim

- 3.2.2 The strategic aim of the A1307 scheme is to achieve the objective of keeping traffic growth on the A1307 corridor similar to today's levels, whilst accommodating substantial employment growth at the three campuses as well as housing growth at the Haverhill and Cambridge ends of the route. It is clear that a significant mode shift away from private car is required to achieve this strategic aim.

Strategic Case for Intervention

- 3.2.3 The strategic case for an A1307 scheme is based on the analysis of the existing route performance, stakeholder feedback, and the growth aspirations of the corridor. The analysis has considered how an A1307 Improvement Scheme could positively contribute to growth along the corridor.
- 3.2.4 The A1307 is a significant growth corridor with the combined Local Plans for Cambridge City, South Cambridgeshire and St Edmundsbury planning for more than 4,000 new homes and 10,000 jobs in the A1307 corridor in the next 10 years with further growth planned beyond this period.
- 3.2.5 However, currently the A1307 route generally has a poor highway safety record, with several junctions classified as accident cluster sites due to the concentration of accidents on record within the last 5 years (e.g. at Hinton Way Roundabout, The Gog Farm Shop access, A11 services access junction).
- 3.2.6 The section of road between Linton and Horseheath has a high frequency and severity of speed-related accidents on the more open sections of road, with 20 accidents in five years of which two were fatal and 8 were serious. There have also been several serious and fatal accidents in 2016 to the east of A11, although the statistics have yet to appear in the published accident record data, so have not been assessed within this study.
- 3.2.7 The A1307 scheme would positively contribute to growth along the corridor by:
- Improving local sustainable transport links between homes and jobs;
 - Improving road safety along the corridor by making changes to key junctions to reduce conflict or by reducing the speed of vehicles with appropriate enforcement where there have been speed-related accidents.;
 - Support the delivery of job and housing growth along the corridor including important growth sites at Granta Park, Babraham Research Campus and the Cambridge Biomedical Campus; and
 - Help address local transport issues for example bus reliability along the A1307 corridor.

Corridor Transport Intervention Package

- 3.2.8 The A1307 scheme seeks to provide a step change in bus services and infrastructure which would offer realistic alternatives to the private car for longer trips within the corridor; as well as improving opportunities for sustainable access for pedestrians and cyclists travelling shorter distances between key workplace and home locations along the corridor.
- 3.2.9 The proposals include a new Park and Ride site close to the A11 junction which would increase park and ride car parking capacity along the route by 1,000 vehicles and cycle parking at Babraham Road Park and Ride would also be increased by 30-40%.
- 3.2.10 The preferred option scheme includes a new bus only road between the Babraham Park and Ride and Cambridge Biomedical Campus that would provide a segregated traffic free route for buses (and emergency service vehicles) only with direct access into the heart of the CBC campus where substantial employment growth is occurring. This would potentially reduce journey times for buses and increase opportunities for bus services operating on the A1307 to use the Cambridgeshire Guided Busway for more rapid access to the rail station and City Centre. This new link also offers potential connectivity with other City Deal schemes such as the western orbital scheme. The plans for improved bus access to the CBC Campus require further discussions with CUHP and CBC partners, seeking to dovetail with emerging access proposals for the CBC site.

3.2.11 In relation to environmental considerations, and in response to public consultation feedback, the scheme seeks to minimise land take where possible, especially in close proximity to the sensitive ecological and Heritage assets on the route such as Wandlebury Country Park and Nine Wells Nature Reserve. The majority of the preferred scheme options are therefore proposed within the existing extents of public highway land, with only a small number of notable exceptions where it was felt that there were wider strategic connectivity or journey time benefits as a result of the additional land take which were likely to outweigh the cost and environmental impacts of the proposals.

3.3 HIGH LEVEL COST BENEFIT CASE

3.3.1 To understand the potential value for money that the preferred option package may deliver, a high level assessment of costs and benefits has been carried out. The early stage indicative assessment at this stage has focussed on benefits derived from potential journey time savings to bus users on the corridor.

3.3.2 It should be noted that for a robust assessment at this stage, the costs of safety and Cycling improvements are included in the cost element of the assessment only as they form part of the total scheme package costs but the benefits considered do not take into account the benefits that these may bring about (eg health benefits to cyclists and accident reduction cost and time savings).

3.3.3 It is envisaged that including these benefits would increase the BCR value. The mode shift and patronage assumptions are based on the Local Plan growth expectations for the corridor, rather than standard NTEM growth. However, the Cambridge Central Access study and additional effects that this and other city Deal schemes may bring about in relation to mode shift from car to bus are not currently taken into account.

3.3.4 The results of the high level value for money assessment suggest that the scheme would be likely to offer a medium level value for money (in the range 1.5-2.0 BCR).

3.3.5 The data used at this stage is taken from the early stage CSRM1 modelling work and observed data set out above which will be updated in the next stage of work when the CSRM2 model is available. Moving forwards, the updated modelling will be used to inform the development of an outline business case.

4 BACKGROUND

4.1 PARK AND RIDE STUDY

4.1.1 The public consultation indicated potential support for a new park and ride site at the A11 junction. However a slightly higher number of respondents also supported expansion of the exiting Babraham Road Park and Ride Facility. 62.8% of respondents supported Babraham Road Park & Ride Site expansion, whilst 60.8% supported a new A11 Park & Ride.

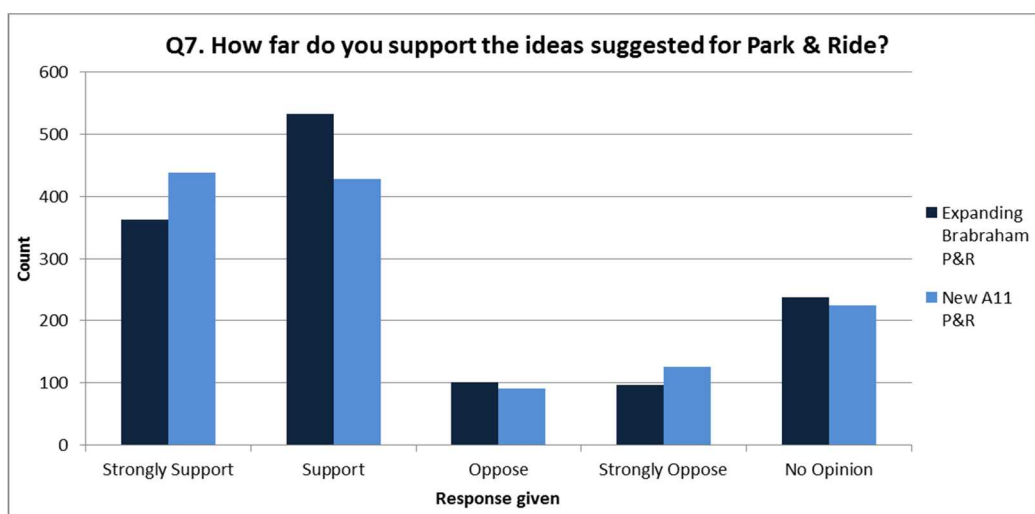


Figure 3.1 Public Support for Park and Ride Options Summer 2016

4.1.2 An additional park and ride study was therefore commissioned to investigate the viability of a new A11 park and Ride site versus expansion of the existing. High level strategic modelling was undertaken using the County Council's CSRM1 model to test various options. The study concluded that by 2026 a new A11 park and ride facility to replace the existing Babraham Road Park and Ride site would potentially attract 19-36% more patronage than the existing Babraham Road site due to its location adjacent to two strategic routes with a wider catchment. This assumes that the existing Green Park and Ride service diverts to the new site.

4.1.3 There is unlikely to be sufficient demand to justify implementation of both a new Park and Ride facility and expansion of the existing within the City Deal first tranche funding timescales to 2020. This is due to an overlap in the catchments for the two sites, which would result in some trip transfers from the existing facility to the new A11 P&R site. A new A11 Park and Ride facility is therefore the preferred option, whilst retaining the Babraham Road Park and Ride site as existing. The introduction of the additional A11 site would help to intercept westbound trips sooner offering traffic relief to the section of A1307 between A11 and Hinton Way, predominantly at peak times.

4.1.4 Once other City Deal projects are in place, demand may increase at either of the two sites. Further testing of the preferred option package using the CSRM2 model with the City Deal foundation case when it becomes available in early 2017 is recommended. This would help to understand any wider cumulative effects with other City Deal schemes, in particular the Cambridge Central Access study which may increase the demand for Park and Ride travel in the A1307 corridor.

4.1.5 The preferred option for the A11 Park and Ride is expected to cost approximately £10-£12m, depending on which quadrant of the A11 junction the Park and Ride could be built.

Cost Elements	New P&R	New P&R	New P&R	New P&R
	SW of A11	SE of A11	NW of A11	NE of A11
Q4 2016				
Total Construction Cost Estimate including land purchase, risk and contingency	£11,460,000	£12,030,000	£10,820,000	£10,520,000

Table 3.1 High Level Park and Ride Site Costs

- 4.1.16 The patronage is likely to vary slightly by site location (east or west of A11 junction) with the CSRSM model indicating that a site located to the west would be slightly more attractive to users than a site to the east. The extent of bus priority measures implemented on A1307 alongside the Park and Ride option was also found to influence user propensity to use the new A11 P&R facility.
- 4.1.17 The model indicates that patronage is maximised with a two-way bus priority scheme which offers a 30% journey time improvement. However a one-way bus priority scheme was considered to be more realistic given space constraints. Therefore the patronage calculations were based on one-way westbound bus lanes only. With one-way bus priority taken in to account the model suggests that the car park at the proposed A11 site would reach a maximum occupancy of up to 1559 vehicles in 2026.
- 4.1.18 Whilst some existing trips would relocate to the new facility, the CSRSM1 model indicated that traffic around the existing Park and Ride site would increase in response to the removal and relocation option, with up to 200 additional peak hour trips at Hinton Way roundabout.
- 4.1.19 The preferred option is therefore to retain the existing and add a new facility at the A11 junction to the south of A1307, either east or west of the junction (with further consultation required to confirm the preferred site location). Growth forecasts suggest that the substantial growth in development proposed in the Local Plans would increase demand for the existing site and this could be altered to serve the CBC campus more directly.
- 4.1.20 Access options for the new site were considered with priority junctions and roundabout options tested for either the south west or south east preferred options. The roundabout option was selected as it is envisaged to offer safety and accessibility benefits over a priority T junction or Ghost Island layout. However further road safety audits are required prior to detailed design.

4.2 BABRAHAM ROAD PARK & RIDE TO CAMBRIDGE BIOMEDICAL CAMPUS BUS LINK

- 4.2.1 A variety of 'on-highway' and 'off-highway' bus link options were considered for this section of the A1307 route which is a key gateway to Cambridge and often the most congested section of route. The proposed scheme option seeks to support the expansion proposals at Cambridge Biomedical Campus (CBC) as well as improve bus journey times to central Cambridge.
- 4.2.2 The proposed options have been tested in terms of journey time impacts and a SWOT analysis has been undertaken. A high level cost assessment of the options and early stage land valuation rates produced by Carter Jonas have been taken into account within the options study.
- 4.2.3 During the public consultation, on-highway options received slightly more support than off-highway options:
- 49.9% supporting the 'On Highway' option
 - 44.9% supported for the 'Off Highway' option
 - 16% strongly opposed 'Off Highway' option; whereas
 - 8.5% strongly opposed the 'On Highway' option.
- 4.2.4 The option assessment has compared a westbound only 'on-highway' bus lane with three variants of the two-directional off-highway option. The 'off-highway' options are shown below:

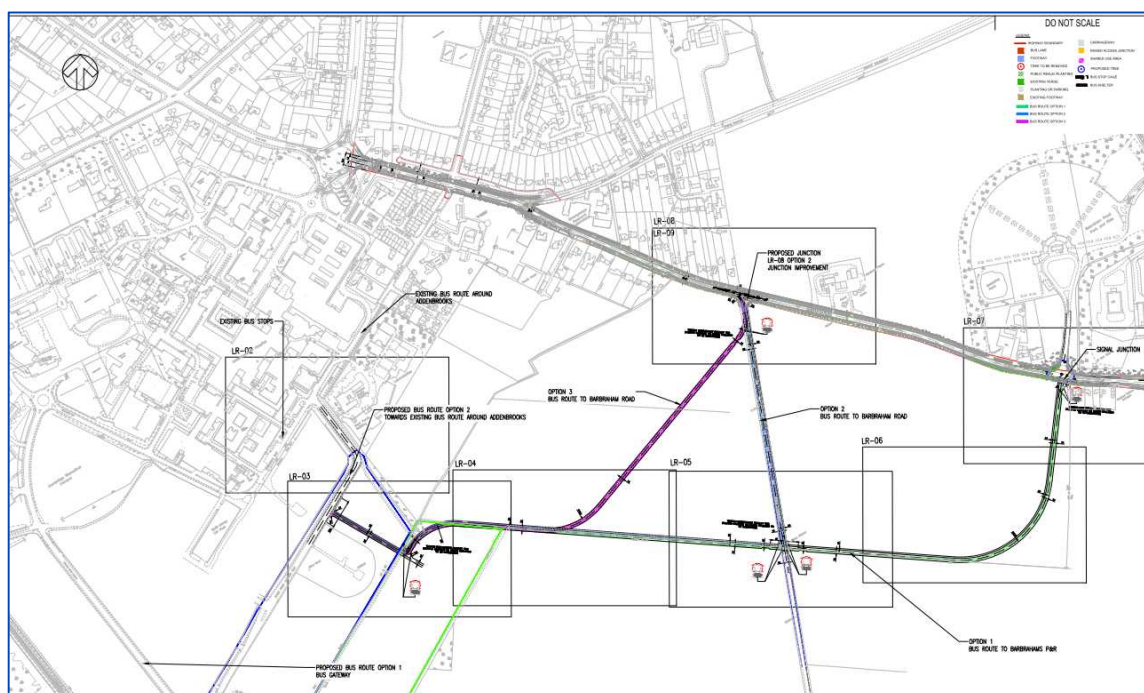


Figure 3.2 Off-highway bus link options

- 4.2.5 Table 3-2 below shows the potential journey time savings to the CBC campus centroid. This is compared with potential journey time savings to the Hills Road/Addenbrooke's frontage.

SCENARIO	ROUTE DIST M TO CBC CENTRE	2WAY JT (S) TO CBC	BUS JT SAVING PER BUS (S) CBC VERSUS EXISTING A1307	ROUTE DIST M TO HILLS RD	2WAY (S) TO HILLS RD	BUS JT SAVING PER BUS (S) TO HILLS RD VERSUS EXISTING A1307	TOTAL COMBINED JT SAVINGS	RANK
Off-highway Opt1	1998	223	206	2398	246	131	338	1
Off-highway Opt2	2347	300	130	2747	364	14	144	4
Off-highway Opt3	1970	252	178	2370	315	62	240	2
On-highway WB only	1770	329	101	1370	299	78	179	3
A1307 existing (peak)	1770	430	0	1370	377	0	0	6
Worts Causeway existing	2772	385	45	2372	355	22	68	5
On-highway WB EB via Worts Causeway	1770	310	120	1370	280	97	217	3

Table 3-2 Journey time calculations for the on-highway and off-highway options

4.2.6 This indicates that the Option 1 off highway link is likely to offer the most pronounced journey time improvements, with over 3 minutes saving for every two way bus movement between the Babraham Road Park and Ride site and the Addenbrooke's site. Option 3 offers the next best option with almost 3 minutes saving and the on-road option offers a 2 minute saving for buses routed via Worts Causeway.

4.2.7 Clearly the above analysis is focussed on improving bus access and reducing delays for buses travelling only to the CBC site. However, all of the current services operating to Addenbrooke's from the Park and Ride and the Stagecoach Gold service also currently continue onwards to the city centre of Cambridge, so journey time savings on this section may have a wider benefit. The proposed off-highway link also opens up opportunities for access to the CGB which would further speed up bus services to the rail station.

4.3 HINTON WAY TO BABRAHAM VILLAGE

4.3.1 The Park and Ride study indicated that the proposed A11 Park and Ride site would maximise patronage if coupled with improved priority for public transport to improve journey times for bus between the Park and Ride site and Cambridge. Therefore to enhance bus movement and minimise journey times, a westbound bus lane is proposed this is only of benefit in one direction. However, journey time data on bus travel indicates that the morning inbound movement of traffic tends to be slower moving than the out bound PM peak eastbound movement.

4.3.2 The bus lane would be used by up to 6 Park and Ride buses per hour (assuming current P&R service frequency is maintained for the proposed site) and 4 buses per hour on the various 13/13A/13B/13C and X13 routes. This gives a combined service frequency of 10 buses per hour. Each bus is capable of carrying at least 70 passengers, therefore the proposal would provide capacity for about 700 trips per hour. Taxis emergency service vehicles and National Express coaches would also be able to use the proposed bus lane.

- 4.3.3 Widening of the existing A1307 carriageway within Highway verge land to the south of A1307 is proposed and this would create a new 4m wide on-highway westbound bus lane between BRC and Hinton Way roundabout, offering bus priority for Park and Ride users all the way to Cambridge.
- 4.3.4 The preferred option also includes the creation of a staggered layout to The Gog Farm shop access junction and enlargement of the central main carriageway splitter island on the eastern approach to this junction seeking to influence reduced speeds on the downhill section to improve road safety at the junction. The staggered layout option requires purchase of additional land which would require negotiation with the affected landowners to the south of A1307. The cycleway to the north would also be realigned to improve safety for vulnerable users crossing the farm shop access.
- 4.3.5 In response to public consultation comments about the queue lengths on the westbound approach to Hinton Way roundabout (200m east of Babraham Road Park and Ride bus access), this junction has been modelled to test the geometrical capacity and several layout options have been considered (such as signalisation and a 'Hamburger' arrangement with a central signalised bus link through the roundabout island running east-west connecting to a central two way busway via a signalised bus gate). However, the model of existing capacity indicates that any capacity issues, queues and delays experienced at this junction are unlikely to be related to the existing geometry and are more likely to be related to onward queues blocking back into the junction.
- 4.3.6 Converting the junction to a signalised crossroads layout is therefore unlikely to solve the problem and would be expensive and disruptive to install. Major geometrical changes would be required to the central island which would be visually intrusive and would also potentially have ecological impacts as mature trees within the island would be lost.
- 4.3.7 Of the options considered the 'Hamburger' arrangement was seen to offer more high profile priority to bus services, whilst retaining the current roundabout layout. This would allow buses to bypass queues at the junction via a central busway with convenient access to the existing Park and Ride site to the west.
- 4.3.8 West of Hinton Way, cycleways continue on the north side of A1307 to Wandlebury Country Park. These existing routes are suitably wide and of good quality. However, some localised improvements are proposed to the east of Wandlebury to create a consistent shared surface route of 3m-3.5m width where possible in the northern verge and join up with the Babraham Research Campus cycleway scheme which has recently opened.
- 4.3.9 The westbound bus lanes would start to the west of Babraham Research Campus access roundabout, avoiding the narrower section alongside the listed Babraham Hall perimeter wall. Cyclists approaching BRC from the west would be directed to use the recently installed campus cycleway. One of the proposals would be to install safer crossing points at the roundabout on approach to BRC.

4.4 BABRAHAM VILLAGE AND GRANTA PARK TO LINTON

- 4.4.1 The presence of the A11 strategic trunk road running north south between Babraham Village and Great Abington evidently causes severance issues for local residents in the two villages and workers at BRC (Babraham Research Campus) and Granta Park as very few travel by non-car modes between the two areas despite geographic proximity.
- 4.4.2 The A11 junction is a major grade separated trunk road junction which is intimidating for cyclists and there are no pedestrian footways within the junction, except on the bridge decks. Vehicles approach and circulate at relatively high speed on all arms and there have been several slight severity accidents at this interchange in the last 5 years.

- 4.4.3 This does not offer an attractive route for cyclists and pedestrians to cross the A11 currently and it would be undesirable to attract more vulnerable users to the junction. Therefore a segregated off-road route is required in this instance which enables cyclists and pedestrians to cross the A11 in relative safety and comfort.
- 4.4.4 A Greenways study considering cycle accessibility through the rural area surrounding the A11 junction was completed by Nigel Brigham & Associates in 2016. The route shown below was recommended for cyclists in the report.



Figure 3.3 Linton Greenways Proposals (Source Nigel Brigham & Associates)

- 4.4.5 The recommendations of the Linton Greenways study included four potential options for crossing the A11 of which the option to use an existing stepped footbridge over the A11 or to divert cycles via an existing underpass where the River Granta crosses under the A11 would potentially be accessible options for A1307 users, so have been considered in more detail. These two options connect well with the existing research campuses.
- 4.4.6 The A11 footbridge is only 476m south of A1307 whereas the River Granta underpass is a further 419m south of the footbridge (a total of 895m away from the study area). Therefore in terms of diversion length the A11 footbridge is likely to be preferred by users. However for trips between Babraham village and Granta Park the underpass would offer a relatively direct route, although the proposed route alongside the River Granta requires new rights of way to be dedicated over third party land.
- 4.4.7 Both existing structures have accessibility limitations which need to be addressed in order to improve accessibility for cycles and other types of NMUs other than able bodied pedestrians. The river underpass has restricted headroom and the footbridge has stepped access only. Although there are cycle gullies on the footbridge, these are not of use to people with mobility issues, so an equalities compliant ramp could be added to improve access.
- 4.4.8 The underpass route is not currently a public right of way and may suffer from flooding as it is within the functional floodplain of a main river. The underpass proposal would require landowner consent and also approvals from the EA in relation to works within 9m of a watercourse. Both the footbridge and the underpass options require consent from Highways England as part of the works proposed fall within HE land alongside the A11. The underpass is also secluded and may be less attractive for use in hours of darkness, whereas the footbridge is open and overlooked as well as being located on an existing public footpath which is already well used, with an estimated 150 cyclists crossing the bridge per day.

- 4.4.9 Further work is required to consider the structural feasibility of the works required to install ramps to the existing structure. Due to the bespoke design of the bridge with steps integrated within the structure. From a user point of view an online ramp option is likely to be preferred. However, to minimise impact on farming operations (and avoid clashing with an existing mature tree on the west side of A11) the ramps could be perpendicular to the bridge deck either within A11 Highways England land or within private land. Because the A11 is in a cutting at the footbridge, only a short ramp on the east side is required so the addition of a perpendicular ramp would have a maximum diversion length of 136m at a 1:20 gradient.
- 4.4.10 The proposed footbridge option is shown below. This would also offer better synergy with the proposed Park and Ride preferred options and new cycleways could be created to connect the bridge with the P&R. However further discussions are required with affected landowners on each side of the A11 to understand their views on upgrading the existing footpaths to cycleway status and adding ramps and Park and Ride options. The feasibility and cost of replacing the existing narrow bridge with a new fully accessible bridge has also been considered however the cost of works c£2-3m are likely to be prohibitively expensive, especially when the demolition of the existing footbridge is taken into account. The works would also require a lengthy closure of the A11. Hence at this stage this option has been discounted.
- 4.4.11 The recommended option is to upgrade the A11 footbridge to add ramps (if feasible) and upgrade approach routes to cycleway status, this would be coupled with an alternative cycleway route alongside the A11 and River Granta to reach the underpass to improve connectivity with Granta Park and offer a level access route. This may not be available at all times of year due to flood risk alongside a Main River. However, the footbridge would provide an alternative in times of flood.

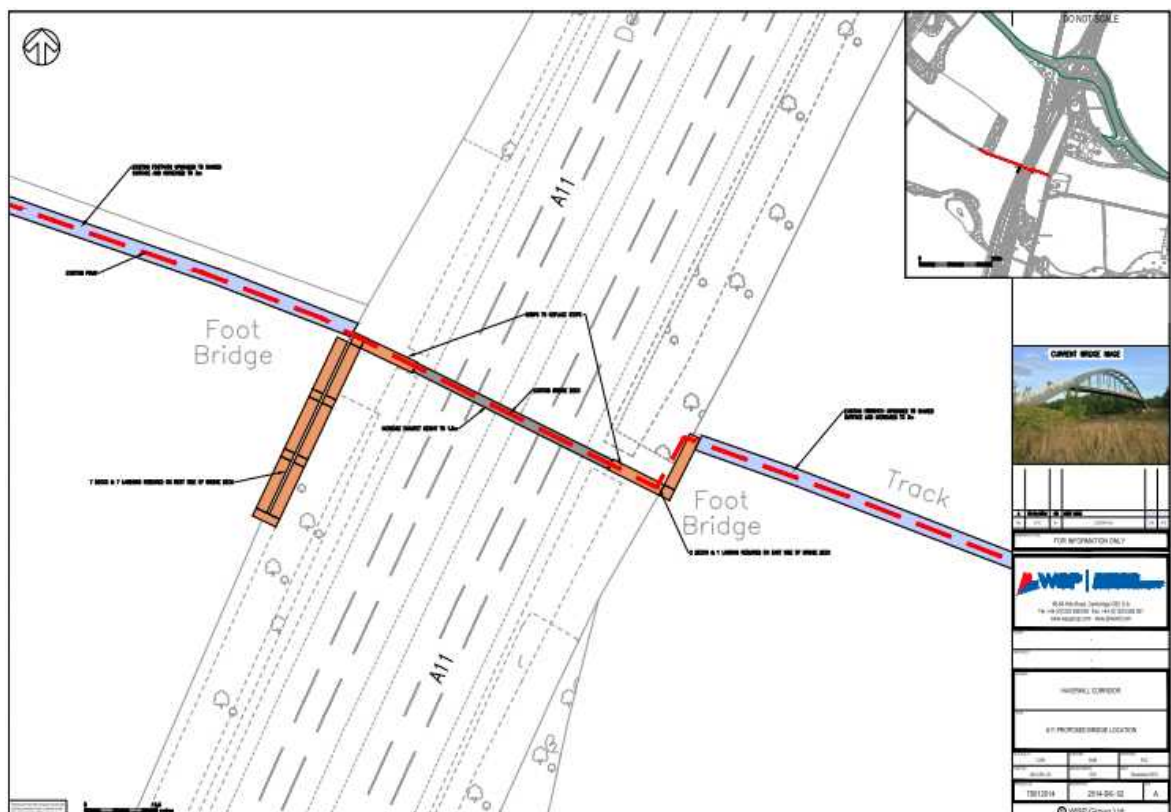


Figure 3.4 Proposed A11 Footbridge Modifications to Replace Stairs with Ramps

4.4.12 The underpass cycle diversion option is also shown below in Figure 3-5.



Figure 3-5 Proposed A11 cycleway diversion route to River Granta underpass.

4.4.13 To the east of A11, the footbridge route connects to an existing public footpath which would again be upgraded to cycleway status. Further east the proposed cycle route joins the local road network which is a relatively low traffic environment through the village. Users would be directed to the on-road signed routes where traffic speeds are low in the 30mph zone. The route continues through the village to the east via Church Lane, High Street and Linton Road before re-joining A1307 at the Linton Road junction.

4.4.14 A new cycleway would be constructed in the highway verge land on the west side of A1307 taking users to a new safer crossing point with raised central island at Pampisford Road junction which would also be helpful to bus users accessing bus stops on the opposite side of the road. At this point the route connects with existing cycleways on the east side of A1307 which continue to Linton Village. Pinch points would be addressed along the section to Linton Village and minor widening in places would allow a more consistent level of provision.

4.5 LINTON VILLAGE

4.5.1 The proposals through Linton Village seek to improve journey times for bus services. Consultation feedback focussed on poor journey time reliability, particularly in a westbound direction and delays to bus services through the section of A1307 to the south of Linton, with the Village College and High Street junctions being cited as a main source of congestion.

4.5.2 The Linton High Street is also a one way narrow corridor which is served by the majority of buses from Haverhill to Cambridge. There is only a small existing village centre car park and the historic street can become cluttered with on-street ad hoc parking through this route which hinders the flow of bus services. A review of available opportunities for creating a new or enlarged car park indicates that there are currently not many options available. However, the current Fire station from a planning perspective arguably could be better relocated. Therefore in the event that Cambridgeshire Fire and Rescue were minded to relocate the fire station the existing fire station site in the future could potentially be converted into a car park as part of another scheme.

- 4.5.3** The scheme options for Linton focus on improving operation of the Linton Village college traffic signals and incorporating bus priority measures at the existing High Street pedestrian signals or conversion of the High Street/A1307 junction to a fully signalised layout. These are designed to assist pedestrians crossing safely and vehicles on exit from High Street (especially buses). Both junctions would be MOVA controlled to optimise capacity, seeking to minimise delays on all arms by detecting queue lengths and allocating green time to the arms with the longest stationery queues.
- 4.5.4** A roundabout option was tested as an alternative for the Linton Village College junction but it was found to offer only a minor improvement in capacity terms in comparison with the MOVA upgrade at a much higher cost £500-£750K (excluding earthworks) therefore a signal controller upgrade was considered to be a more cost effective solution at a substantially cheaper cost of £40-£60K which would offer similar capacity benefit to the junction without the disruption of a major change to the layout of the road.
- 4.5.5** Westbound bus lanes would also be created on the A1307 to the east of High Street to enable buses to bypass the majority of the queuing traffic heading towards Cambridge. This should provide journey time improvements for the direct bus services operating on this section such as the X13.
- 4.5.6** Since the High Street in Linton is one way, it is envisaged that the road carriageway can be narrowed to a minimum lane width of 3.5m-4m with wider footways on both sides. A minimal kerb upstand would be used and informal on pavement loading where there is sufficient width available. Adoptable materials would be used within the public highway, with some use of contrasting surfaces to assist visually impaired users and highlighted with conservation street furniture appropriate to the historic nature of Linton.
- 4.5.7** However, the aim of the scheme is to smooth the flow of buses through the street in the interests of rider comfort and narrow the kerb to kerb carriageway to allocate more space to pedestrians and avoid attracting additional strategic traffic to the route at peak times. St John's Street in Bury St Edmunds is an example of a similar concept and main carriageway width, albeit not on a main bus route and is located in Suffolk.



Figure 3-6 St John's Street Bury St Edmunds example public realm scheme

4.5.8 The Gallery in Ely is also a helpful example of a one way bus route through a historic setting which is located in Cambridgeshire, so the materials used here may be more representative of the type of finish to be expected at Linton. However a materials palate would need to be agreed with the highway authority which is sustainable and suitable for bus use at the detailed design stage.

4.6 LINTON TO HORSEHEATH SAFETY MANAGEMENT

4.6.1 The section of A1307 between Linton and Horseheath has a relatively poor accident record with at least 20 personal injury accidents recorded in the five year period 2011-2015. This included two fatal accidents and 7 serious accidents. On review of the accident statistics, it is apparent that several of the recorded accidents involved only a single vehicle which suggests that the driver lost control. STATS19 Personal Injury Accident data by severity is shown in Table 3-3 and Figure below.

	SLIGHT	SERIOUS	FATAL
2015	5	1	0
2014	2	1	1
2013	2	1	0
2012	2	2	0
2011	6	2	1

Table 3-3 Accident Data Linton to Horseheath

4.6.2 The frequency and severity of accidents appeared to have reduced between 2012 and 2013 but has begun to increase again between 2013 and 2015. There are also anecdotal reports of additional accidents occurring during 2016 which are yet to be included in the published accident data. This suggests that some road safety enhancements are required to resolve the poor accident track record of this stretch of road.

4.6.3 This section of route is geometrically composed of a series of gradual bends and there are very few junctions or delays on this stretch, except the Dean Road crossroads. Reviewing the accident data from the previous five years relating to the above accidents shows the following accidents by severity.



Figure 3-7 Personal Injury accidents Linton to Horseheath 2011-2015

- 4.6.4 Currently this section of route is subject to the National speed limit but it is possible that safety could improve with vehicles travelling at reduced or more appropriate speed during off-peak times of day. A speed management approach also appears to have some level of support from members of the public. However, additional data on observed average and 85th percentile speeds along this section of is needed to inform a speed limit review.
- 4.6.5 The options available for speed reduction include:
- Red surfacing with painted roundels
 - Dragons teeth
 - Count down markers
 - Chevron arrows on bends
 - Interactive signs
 - More visible road markings giving the appearance of a narrower carriageway
 - Roadside Warning Signage to advise of hazards such as Bends and junctions
- 4.6.6 A combination of the above options are proposed for the section of A1307 from Horseheath to Linton, seeking to make the speed limit self-enforcing to influence driver behaviour towards a more appropriate choice of speed in accordance with the highway code. The speed limit review would also consider whether the current speed limit and safety measures requires a refresh to increase driver awareness (such as high collision warning signage) and the extent of enforcement measures required along the route if it were to be changed to a lower limit.
- 4.6.7 A more detailed review of the geometrical design of the Dean Road Crossroads (which has historically been an accident cluster site previously) would also be undertaken to identify any further measures which could help to reduce the frequency and severity of accidents in this location.
- 4.6.8 It will be important to discuss the proposals with Cambridgeshire Police to understand whether they would be able to support a reduced speed limit from an enforcement point of view. Some changes to the road layout and additional enforcement measures would be required to make the current speed limit more self-enforcing.

5

NEXT STEPS & IMPLICATIONS

5.1 NEXT STEPS

5.1.1 The following steps will be taken prior to the development of a major scheme business case.

- A second round of public consultation is also expected to be held in Summer 2016 to share the preferred options schemes with members of the public. A similar programme of events is anticipated to the round 1 consultation.
- Transport Modelling of the preferred option package using the new CSR2 model when it is validated adequately, based on the City Deal Foundation Case Scenario. This would check for consistent results with the CSR1 outcomes presented in this report and potentially allow sensitivity testing for cumulative effects with other City Deal schemes (such as the central access study) which may increase demand for park and ride, bus services and cycling in the A1307 corridor.
- Discussions with relevant CCC officers and A1307 Project Board regarding the detail of the preferred options package to understand if a design development is required.
- Local Liaison Forum is also being established for the A1307 scheme to seek input from local stakeholders and residents for consistency with other City Deal projects. It is likely that these will commence in February 2017

5.2 SITE SPECIFIC IMPLICATIONS

Cambridge Biomedical Campus to Hinton Way

- The On-highway preferred option proposal involves the removal of sections of highway verge and works within tree root protection areas alongside the road. Arboricultural surveys may be required to understand the condition of any affected trees and the feasibility of works within the RPAs.
- In addition to ecology and arboricultural risks, the off-highway option also carries below ground risk of archaeology therefore a desk study is advisable to understand the risk in more detail to help scope future geophysics surveys and intrusive investigation.
- Further consultation to decide if both options should go ahead and modelling of the options using CSR2.
- Landowner liaison is also required for the off-highway bus link to CBC where it connects with the proposed development masterplan.
- There are likely to be significant utilities diversions required for both options and this needs to be discussed and agreed in principle with the statutory undertakers.
- Phase 1 ecology habitat survey is recommended to check if any of the hedges or trees to be removed offer suitable habitat for protected species.
- Phase 1 heritage desktop assessment of proposed changes to the streetscape and affected arable land for the off-highway option, given the context and surrounding historic landscape of City of Cambridge.
- Liaison with Addenbrooke's sustainability team regarding revisions to bus access routes.
- Design development and capacity testing of Addenbrooke's roundabout to understand the need for upstream junction changes which may have a capacity impact on the corridor.
- Liaison with bus operators regarding proposed westbound bus lanes and to understand potential future re-routing of buses in response to the proposals.

Hinton Way to Babraham Village

- Ecology Phase 1 surveys where land take removes verges or trees within the public highway or where third party land is proposed
- Liaison with third party land owners around The Gog Farm Shop junction regarding the proposed junction changes.
- Ecology phase 1 of the highway verges proposed route for cycleways and widening to create bus lanes.
- Given that this section of the route passes Wandlebury Country Park and several listed buildings, a Phase 1 desktop heritage assessment is necessary.
- Utilities surveys and diversions for the bus lane sections are also required to be discussed with the statutory undertakers.

A11 Park and Ride at A11

- CSRM2 tests using the new model to understand patronage impacts of other City Deal studies.
- Landowner liaison with third parties who are potentially affected by the proposed works.
- The proposal involves the removal of sections of highway verge and works within tree root protection areas alongside the road. Arboricultural surveys may be required to understand the condition of any affected trees and the feasibility of works within the RPAs.
- Phase 1 ecology habitat survey is recommended to check if any of the hedges or trees to be removed offer suitable habitat for protected species.
- Phase 1 heritage desktop assessment of proposed changes to the streetscape, given the context and surrounding historic landscape.
- Liaison with Addenbrooke's sustainability team in relation to changing the existing Park and Ride site at Babraham Road to become more CBC focussed.
- Design development and capacity testing of proposed roundabout access options
- Liaison with bus operators regarding proposed Park and Ride facility and understand potential future re-routing of buses in response to the proposals.

Babraham Village and Granta Park to Linton

- Structural assessment is required to understand the feasibility and cost of installing additional ramps on the existing footbridge
- Liaison with the Lead Local Flood Authority regarding the underpass option.
- Landowner liaison regarding potential upgrade to the footpaths to cycleway status and connections to the proposed Park and Ride facility.
- Phase 1 ecology survey of A11 highway verge where the proposed works could be installed

Linton Village Proposals

- Liaison with utilities providers, Parish Council and emergency services reps regarding the proposed changes to Linton High Street
- Liaison with Stagecoach regarding bus movement through the Village and the proposals for reconfiguring High Street public realm as well as bus lanes on A1307.

Linton to Horseheath Safety Management

- Discuss the safety management proposals with the Police liaison officer and CCC road safety officers.
- Speed surveys along this section of route to inform a speed limit and safety review.

6 SCHEME COSTS & RISKS

6.1 OVERALL SCHEME COST

- 6.1.1 Based on the preferred option package for the A1307 route as set out above, the following summary of scheme costs shown in Table 5-1 has been produced. At this early stage an 'order of magnitude' cost has been prepared. For consistency with other City Deal schemes, this includes a 44% optimism bias at this early stage prior to detailed design, with large value risk items (where known) included separately. Further work will be undertaken to refine these cost estimates as the study progresses to the next stage of scheme development.
- 6.1.2 Land values have been obtained from a high level review of third party land affected by the proposals produced by rural surveyors Carter Jonas Ltd. At this stage the overall scheme value includes both the on-highway and off-highway options for bus improvements at the Cambridge end of the A1307 route as it is possible that both of these options would be taken forward simultaneously. However, only one A11 Park and Ride site option is included as it is not likely that both would proceed.
- 6.1.3 The proposed scheme cost is very close to the £39m budget available for this project as part of the Greater Cambridge City Deal first tranche funding. It is envisaged that moving forward through the design process, with greater certainty on the preferred option scheme design and mitigation that a value management approach may lead to a total scheme value equivalent to the project budget.

COST ELEMENTS Q4 2016	TOTAL PREFERRED OPTION PACKAGE
Total Construction Cost Estimate	£38,945,600

Table 5-1 High Level Total Preferred Scheme Package Cost

6.2 KEY RISKS

- 6.2.1 Potential risks to the delivery of the preferred package of measures for the A1307 are envisaged at this stage to be as follows:
- Road safety impacts of the proposed scheme - A thorough highway safety review of all options is required prior to public consultation.
 - Objections to proposals located in the Green belt land or close to sensitive assets
 - Objections from affected landowners where their land is directly affected
 - Utilities risks where works require relocation or protection of below ground assets
 - Unknown extent of archaeology below ground assets
 - TPOs and ecology risks need more detailed review
 - Requirement to use statutory powers where third party land is required
 - Model results from the new CSR2 model may lead to alternative conclusions
 - Objections from members of the public