

REPORT N<sup>o</sup> 70012012-002

# MILTON ROAD & HISTON ROAD CORRIDORS

DRAFT OPTIONS REPORT



PUBLIC

SEPTEMBER 2015

# MILTON ROAD & HISTON ROAD CORRIDORS

## DRAFT OPTIONS REPORT

**Cambridgeshire County Council**

**DRAFT  
Public**

Project No: 70012012  
Date: September 2015

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**A P P E N D I X D OUTLINE DESIGNS (HISTON ROAD)**



# 1 EXECUTIVE SUMMARY

## 1.1 OVERVIEW

- 1.1.1 This Draft Options Report details the proposed options which have emerged from a feasibility study of both the Milton Road and Histon Road corridors in Northern Cambridge. This work has been undertaken by WSP|PB on behalf of the Greater Cambridge City Deal to inform the first tranche of the City Deal infrastructure programme.
- 1.1.2 By creating more capacity for sustainable trips along both corridors, the projects will provide the potential to mitigate the impact of further transport demand arising from developments within the Greater Cambridge area, thereby supporting the transport viability of development proposals.
- 1.1.3 **Due to further traffic surveys being undertaken in September 2015 by Cambridgeshire County Council, the transport modelling for both corridors has not yet been completed and is still being undertaken. The Final Options Report will include this modelling with additional outputs to further support the proposed options.**
- 1.1.4 The objectives of this project are to:
1. To provide comprehensive priority for buses in both directions along Milton Road and where possible, on Histon Road;
  2. To make provision for cyclists along Milton Road and Histon Road which is segregated from buses and general traffic wherever possible;
  3. To improve provision of cyclists and pedestrians in line with the public realm proposals at Mitcham's Corner whilst maintaining traffic flow through the junction;
  4. To generate options capable of maintaining traffic levels at today's levels in Cambridge;
  5. To consider the potential for enhancing the environment, streetscape and air quality in these corridors; and
  6. To assess the impacts on existing residents and highway capacity for each option.

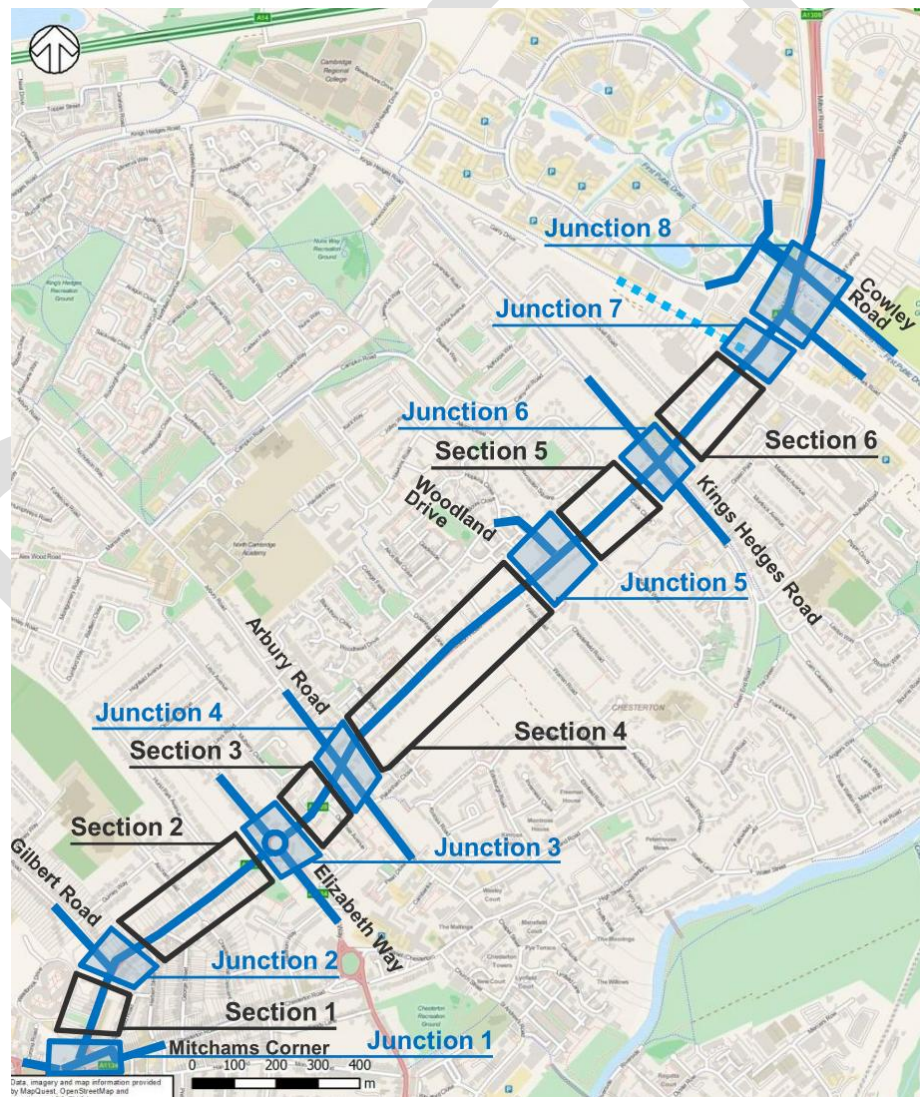
## 1.2 CORRIDOR BACKGROUND

- 1.2.1 Milton Road is one of the key radials into Cambridge and is identified as an increasingly important public transport corridor as part of the Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) and Long Term Transport Strategy (LTTS). Both corridors are high priority schemes for the City Deal infrastructure programme with both proposed schemes to be delivered by 2020. Histon Road is also a key radial route into Cambridge which is constrained in its width, which contributes to congestion and makes the consideration of small scale improvements difficult. Figure 1 shows both corridors within the context of Cambridge.
- 1.2.2 Substantial, committed development is to occur in the North of Cambridge through to 2031 including the Northwest Cambridge, Waterbeach, Ely North, Darwin Green, Orchard Park and Cambridge North Railway Station.

## 1.3 CURRENT & FUTURE SITUATION

- 1.3.1 The current conditions on both corridors was reviewed through the use of various information source including physical street audits, accident data, bus speed data, traffic speed data and traffic surveys.
- 1.3.2 From the results obtained it can be seen that there are sections along both Milton Road and Histon Road where the speed of vehicles is low indicating that there are problems with traffic congestion on the local highway network at these locations.
- 1.3.3 Both Milton Road & Histon Road currently experience significant congestion at peak times which impacts on bus journey times making journeys unreliable, unattractive and longer than necessary, as well as affecting the convenience and comfort of cycling trips along the corridor.
- 1.3.4 The following tables highlight the current corridor performance for both Milton Road and Histon Road, using the analysis undertaken, against the study objectives using a Red / Amber / Green (RAG) assessment.

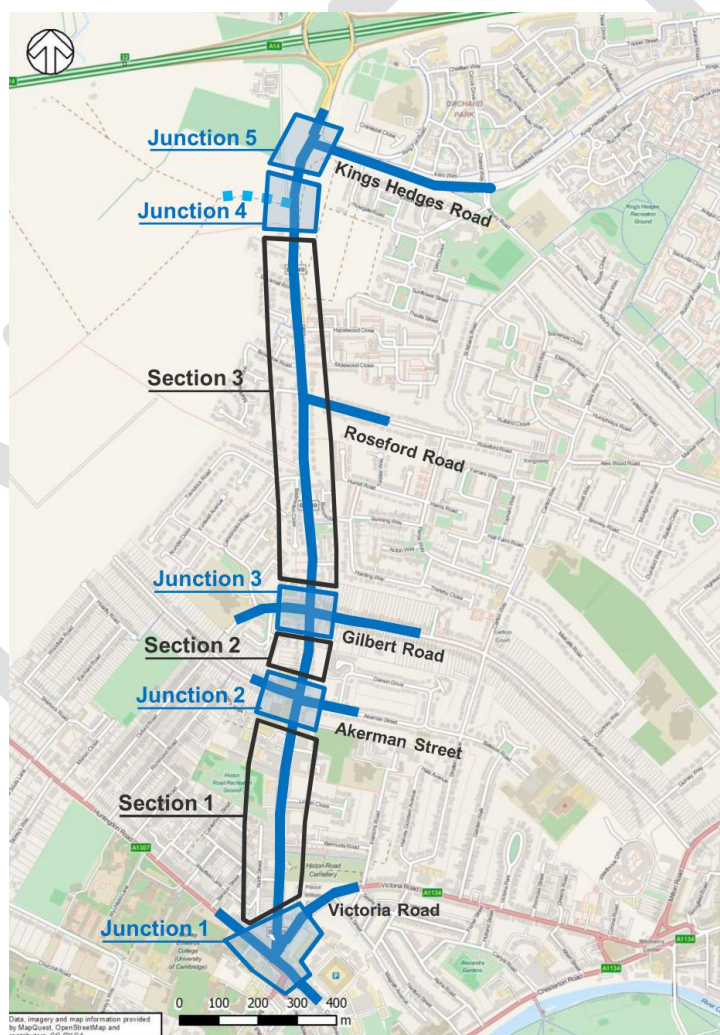
Figure 1-1 Milton Road Corridor Overview



**Table 1-1 Milton Road – Current Corridor Performance (RAG Assessment)**

CURRENT PERFORMANCE		Section 1	Junction 2	Section 2	Junction 3	Section 3	Junction 4	Section 4	Junction 5	Section 5	Junction 6	Section 6	Junction 7	Junction 8
Study Objectives														
Traffic	- Traffic delays	Red	Red	Yellow	Yellow	Red	Red	Red	Yellow	Yellow	Red	Yellow	Red	Red
Road Safety	- Road safety	Green	Green	Red	Red	Green	Red	Red	Yellow	Green	Yellow	Yellow	Yellow	Green
Buses	- Bus service delays	Red	Red	Yellow	Yellow	Red	Red	Red	Yellow	Yellow	Red	Yellow	Red	Red
	- Bus stop provision/quality	Green	Grey	Yellow	Grey	Grey	Yellow	Yellow	Yellow	Yellow	Grey	Yellow	Grey	Grey
Pedestrians	- Pedestrian crossing facilities	Green	Green	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow
Cyclists	- Cycle priority measures	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Red
	- Cyclist crossing facilities	Yellow	Green	Red	Yellow	Red	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow
Public Realm	- Quality of the public realm	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	- Provision of trees/planting	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Parking	- Parking provision	Green	Red	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red
	- Servicing provision	Yellow	Grey	Grey	Grey	Yellow	Yellow	Grey	Grey	Grey	Grey	Grey	Grey	Grey

**Figure 1-2 Histon Road Corridor Overview**



**Table 1-2 Histon Road - Current Corridor Performance (RAG Assessment)**

CURRENT PERFORMANCE		Junction 1	Section 1	Junction 2	Section 2	Junction 3	Section 3	Junction 4	Junction 5
Study Objectives									
Traffic	- Traffic delays	Red	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Red
Road Safety	- Road safety	Red	Yellow	Red	Red	Red	Yellow	Green	Yellow
Buses	- Bus service delays	Grey	Red	Red	Red	Yellow	Yellow	Yellow	Yellow
	- Bus stop provision/quality	Grey	Yellow	Grey	Yellow	Grey	Green	Grey	Red
Pedestrians	- Pedestrian crossing facilities	Green	Yellow	Yellow	Yellow	Green	Yellow	Red	Green
Cyclists	- Cycle priority measures	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow
	- Cyclist crossing facilities	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow
Public Realm	- Quality of the public realm	Yellow	Yellow	Yellow	Green	Green	Green	Yellow	Yellow
	- Provision of trees/planting	Red	Red	Red	Red	Yellow	Green	Red	Red
Parking	- Parking provision	Red	Green	Green	Green	Red	Red	Red	Red
	- Servicing provision	Grey	Yellow	Grey	Grey	Grey	Grey	Grey	Grey

- 1.3.5 The committed developments alone proposed for the area surrounding the Milton Road and Histon Road corridors need to cater for 14,000 new homes and 22,000 additional jobs through to 2031 excluding South Cambridgeshire which will provide a further 19,000 homes and another 22,000 jobs.
- 1.3.6 Currently, on average, buses on the Milton Road corridor are delayed for six minutes, with only 59% of buses on time. On Histon Road, buses, on average, are delayed for six minutes with only 56% of buses on time.
- 1.3.7 Table 1-3 provides an overview of the current peak bus frequencies and services along with the potential future frequency and services needed to support future growth.

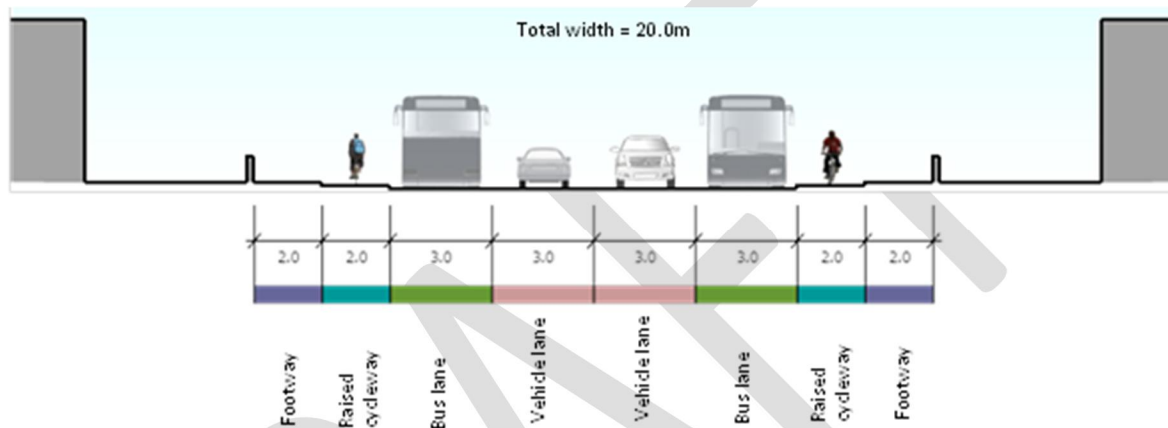
**Table 1-3 Bus Service Frequencies – Milton Road & Histon Road Corridor**

BUS SERVICE	CURRENT PEAK FREQUENCY (ONE DIRECTION)	FUTURE PEAK FREQUENCY (ONE DIRECTION)
<b>Milton Road</b>		
Busway (every 3 to 4 minutes)	7 services per hour	18 services per hour
Busway C	1 service per hour	NA
Waterbeach Busway	NA	6 services per hour
99 Park & Ride	6 services per hour	12 services per hour
Route 9	2 services per hour	3 services per hour
Citi 2 (part corridor north of Golden Hind)	5 services per hour	6 services per hour
Citi 1 (part corridor south of Gilbert Road)	4 services per hour	6 services per hour
<b>Total No Services (using corridor in part / full)</b>	<b>27</b>	<b>51</b>
<b>Histon Road</b>		
Busway B	7 services per hour	14 services per hour
Citi 8	4 services per hour	8 services per hour
<b>Total No Services (using corridor in part / full)</b>	<b>11</b>	<b>22</b>

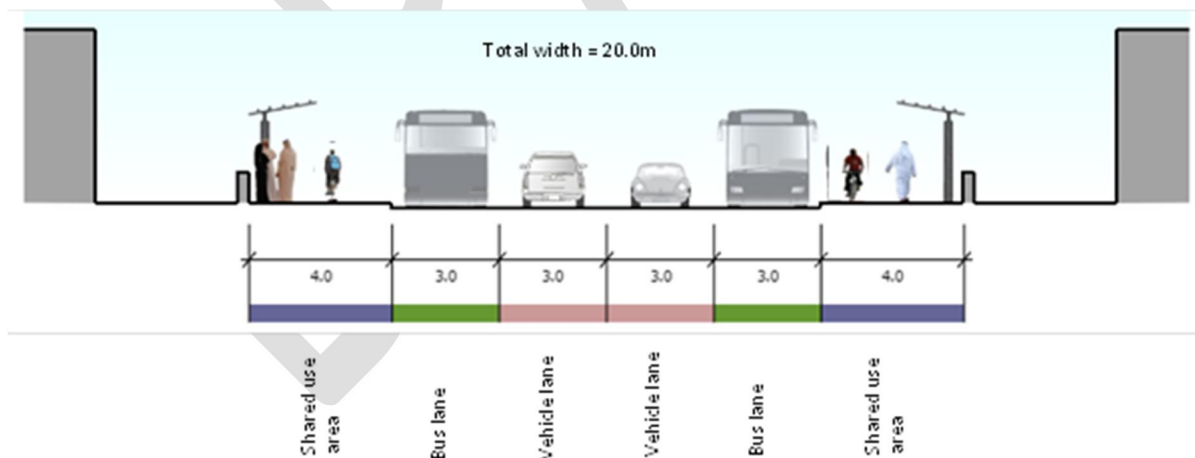
## DESIGN OPTIONS

- 1.3.8 Given the available highway space available, optimum road cross sections were applied to both corridors to provide appropriate and optimised facilities for pedestrians, cyclists, buses and general traffic to meet the project objectives set. New junction layouts were developed along with new methods of control where appropriate. Where the optimised cross sections could not fit within the available highway space, these were modified appropriately, whilst considering the needs of the corridor users.
- 1.3.9 The development of the options on this basis allowed two sets of proposed measures to be developed for both corridors, which were 'Do Maximum' and 'Do Something'. These options are shown on the plans contained within Appendices C and D of this report.

**Figure 1-3 Optimised Cross Section – Bus Lane & Raised Cycleway**



**Figure 1-4 Optimised Cross Section - Shared Use Areas at Bus Stops**



- 1.3.10 The 'Do Maximum' measures for both corridors aim to provide the maximum benefit in terms of the project objectives and the corridor users. For example, bus journey times and service reliability would improve considerably. They provide high quality, segregated bus and cycling infrastructure throughout the majority of the corridors (where space is available, noting the highway width issues on Histon Road) and improved crossing facilities for pedestrians. Improvements are also made to the cycling infrastructure with segregated facilities along with improved journey times. However, the measures raise significant issues in terms of their impact on the public realm.
- 1.3.11 The 'Do Something' measures offer less overall benefit for buses although journey time and reliability would still improve (modelling in progress to quantify the improvements for buses). A similar level of improvement for cycling and walking would be achieved. These measures also reduce the impact on the public realm.
- 1.3.12 Both sets of measures would include the provision of early bus detection, linked to the real time passenger information system (RTPI) at all signal controlled junctions to prioritise bus movements at times when required.
- 1.3.13 The application of the cross sections to Histon Road, due to the highway width restrictions (lack of space), has required the cross sections to be compressed and only the key elements retained that meet the project objectives.

## 1.4 MILTON ROAD – PROPOSED INTERVENTION SUMMARY

- 1.4.1 Table 1-4 provides a summary of the proposed interventions on the corridor. Further reference should be made to the drawings contained in Appendix C and D of this report.

**Table 1-4 Milton Road – Proposed Intervention Summary**

TRANSPORT MODE	'DO MAXIMUM'	'DO SOMETHING'
Bus	Almost continuous inbound bus lane from approach to Green End Road junction through to Mitcham's Corner	Inbound bus lane on approach to Green End Road Almost continuous inbound bus lane from Woodhead Drive junction to Mitcham's Corner
	Outbound bus lane on approach to Gilbert Road Almost continuous outbound bus lane from Ascham Road junction to bus way junction	Outbound bus lane on approach to Elizabeth Way junction and approach to Arbury Road junction Almost continuous outbound bus lane from Woodhead Drive junction to bus way junction
Cycling	Early bus detection on all approaches to signal controlled junctions	
	Continuous segregated inbound cycle lane from approach to Green End Road junction through to Mitcham's Corner	
	Continuous segregated outbound cycle lane from Mitcham's Corner to Lovell Road junction	
	Bi-directional segregated cycle lane between Lovell Road and Bus way junction Segregated cycle lane from Bus way junction to Science Park junction	
Walking	Floating bus stops where space permits Raised crossing points across side roads	
	Upgraded signal crossings near Lovell Road and Kendall Way to provide better links for cross routes Upgraded footway surfaces	
Junctions	Removal of Elizabeth Way roundabout and installation of traffic signals Prohibition of right turn into Arbury Road	
	Closure of Union Lane for motor vehicle access and egress	
	Prohibition of right turn into Gilbert Road	

## 1.5 MILTON ROAD – EMERGING KEY ISSUES

### HIGHWAY TREES AND VERGES

- 1.5.1 Both sets of measures will have an impact on highway trees and verges with the 'Do maximum' measures requiring the removal of almost all the existing trees in the highway and the loss of substantial areas of verge. Some opportunities for new highway landscaping will arise from both sets of proposals but there will be limited space for new tree planting under the 'Do maximum' measures whereas the 'Do something' proposals provide areas for new landscaping and tree planting at the expense of some lengths of bus lane. A tree condition survey has been undertaken of part of the study and has identified 141 highway trees with most being of low quality.

### WAITING AND LOADING

- 1.5.2 Both sets of measures will impact on current highway parking and consideration will need to be given to how any displacement of parked vehicles might be managed. The measures would also have implications for servicing and deliveries and it is expected that existing traffic parking restrictions would need to be revised to better manage these operational aspects.

### TRAFFIC DISPLACEMENT

- 1.5.3 The potential displacement of traffic onto other routes as a result of restricted turns and entry restrictions will also need to be considered and this is being modelled to assess the change in traffic patterns. It may prove necessary to widen the scope of the scheme to provide mitigation measures on some side roads, where appropriate.

### BUS STOPS

- 1.5.4 Whilst the use of floating bus stops to avoid cyclists needing to overtake buses is not explicit on the plans, calls for their inclusion are expected. Further development may be required.

### ELIZABETH WAY ROUNDABOUT

- 1.5.5 Removal of the roundabout with the installation of traffic signals to improve cycle safety and to allow the prioritisation of bus movements is one of the most significant changes being proposed. The public realm would change significantly but the current central island landscaping could be replaced by other areas of landscaping around the new junction.

### MITCHAM'S CORNER GYRATORY

- 1.5.6 Mitcham's Corner is identified by the City Council through the draft Local Plan as an 'Opportunity Area' with a policy objective of improving the public realm of this district centre. The City Council will be preparing and consulting on a master plan over the next 10 months to help deliver significant public realm improvements, in cooperation with the County Council and local stakeholders. Close collaboration between the councils (and these projects) is already established which is important to the success of both the City Deal and the development of a master plan for Mitcham's Corner.

## SCIENCE PARK - COWLEY ROAD AREA

- 1.5.7 The brief for the project covers the length of Milton Road from Mitcham's Corner through to the A14 interchange. The proposed measures include some short/medium term improvements for cycling and a short term measure to modify the signal sequence to improve capacity is currently being considered that may be funded through developer contributions ahead of the delivery of the City Deal project. However, it is considered premature to consider more significant junction improvements to improve bus journey times until such time as a clearer picture emerges on the implications of further growth along the A10 corridor. Therefore, it is recommended that any consideration of further, more substantial changes to the Science Park and Cowley Road junctions is held over until that time.

## LAND ACQUISITION

- 1.5.8 Some of the measures would require the acquisition of land although the areas are relatively modest. This could become a significant issue depending on the attitude of the owners but the designs can be amended to avoid this if required, albeit at the expense of the benefits likely to be achieved.

## 1.6 HISTON ROAD – PROPOSED INTERVENTION SUMMARY

- 1.6.1 Table 1-5 provides a summary of the proposed interventions on the corridor. Further reference should be made to the drawings contained in Appendix C and D of this report.

**Table 1-5 Histon Road – Proposed Intervention Summary**

TRANSPORT MODE	'DO MAXIMUM'	'DO SOMETHING'
Bus	Inbound bus lane from King's Hedges Road to Gilbert Road	Inbound 'broken' bus lane from King's Hedges Road to Gilbert Road
	Early bus detection on all approaches to signal controlled junctions	
	Some bus stops relocated	
Cycling	Continuous segregated inbound cycle lane from King's Hedges Road junction through to Victoria Road junction	Continuous segregated inbound & outbound cycle lanes from King's Hedges Road junction through to Rackham Close
	Continuous segregated outbound cycle lane from Rackham Close to King's Hedges Road junction	Inbound and outbound advisory cycle lanes from Rackham Close to Victoria Road
Walking	Floating bus stops where space permits	
	Raised crossing points across side roads	
	Upgraded footway surfaces throughout	
Junctions	Prohibition of right turn into Warwick Road	
	Prohibition of entry to Victoria Road except for buses and cycling	
	Prohibition of right turn from Victoria Road into Histon Road except buses and cycling	



## 1.7 HISTON ROAD – KEY EMERGING ISSUES

### HIGHWAY TREES AND VERGES

- 1.7.1 Both sets of measures will have an impact on highway trees and verges with the 'Do maximum' measures requiring the removal of a number of existing trees in the highway and the loss of areas of verge. However, some opportunities for new highway landscaping will arise from both sets of proposals. A tree condition survey is currently being undertaken for Histon Road.

### WAITING AND LOADING

- 1.7.2 Both sets of measures will impact on current highway parking and consideration will need to be given to how any displacement of parked vehicles might be managed. The measures would also have implications for servicing and deliveries and it is expected that existing traffic parking restrictions would need to be revised to better manage these operational aspects. Public consultation will help inform this process. The concerns over residents' parking raised when additional parking controls were proposed but not implemented on Histon Road in 2013 can be expected to resurface.

### DISPLACED TRAFFIC

- 1.7.3 The potential displacement of traffic onto other routes as a result of restricted turns and entry restrictions will also need to be considered and this is being modelled to assess the change in traffic patterns. It may prove necessary to widen the scope of the scheme to provide mitigation measures on some side roads, where appropriate.

### BUS STOPS

- 1.7.4 Whilst the use of floating bus stops to avoid cyclists needing to overtake buses is not explicit on the plans, calls for their inclusion are expected. The opportunity to provide this type of bus stop will be explored at public consultation although it is unlikely that adequate room will exist along Histon Road to permit their use. The experience gained from the floating buses stops recently constructed along Huntingdon Road and Hills Road will help inform this process.

### VICTORIA ROAD/HUNTINGDON ROAD JUNCTION

- 1.7.5 Much of the delay caused to buses on Histon Road stems from this junction and changes here are crucial to improving bus service performance. Whilst not currently shown on the accompanying plans (work in progress), it is proposed to restrict access to Victoria Road except for buses and cycling. Egress from Victoria Road to Huntingdon Road would be maintained but the turn from Victoria Road into Histon Road would also be prohibited except for buses and cycling. These changes will simplify the junction operation, freeing up more green time for Histon Road to improve bus reliability. As a result, some traffic would be displaced with Castle Street and Chesterton Lane likely to be the most attractive alternative route. As previously mentioned, mitigation measures may be required as a result. Modelling work is progressing to assess the impacts so that they can be considered as part of public consultation

## 1.8 ESTIMATED COSTS

- 1.8.1 Milton Road ('Do Max' and 'Do Something' options) are estimated to be within the budgetary allocation whilst Histon Road ('Do Max' and 'Do Something') are likely to be approximately twice the budgetary allocation.

- 1.8.2 However, any outturn cost estimate should be treated with caution as it is not possible at this stage to assess the costs associated with items such as land purchase, compensation claims and the potential relocation of utilities which is expected to be substantial.

## 1.9 CONCLUSIONS AND RECOMMENDATIONS

- 1.9.1 The key conclusion of this report is that both the Milton Road and Histon Road corridors require significant infrastructure interventions to support the future growth and aspirations of the Greater Cambridge City Deal. With the transport network already constrained, particularly at peak times, the need for investment in public transport, cycling and pedestrian infrastructure for the future aspirations of the Local Plan through to 2031 is substantial.
- 1.9.2 It is recommended that the four options presented here for the Milton Road and Histon Road corridors are taken forward for further technical development to support future public consultation events and subsequent outline business case development.

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# 2 INTRODUCTION

## 2.1 PROJECT BACKGROUND AND OVERVIEW

2.1.1 WSP|PB were commissioned in April 2015 by Cambridgeshire County Council (CCC) on behalf of the Greater Cambridge City Deal, to undertake a study establishing options to deliver the most effective corridor-based public transport scheme (complemented by comprehensive cycling and walking routes) for the Milton Road and Histon Road corridors, located in the north of Cambridge. The commission includes the following core tasks:

7. Study of the existing conditions including problem identification;
8. Scheme optioneering;
9. Corridor Modelling; and
10. Outline business case including non-technical summary.

2.1.2 By creating more capacity for sustainable trips along both corridors, the projects will provide the potential to mitigate the impact of further transport demand arising from developments within the Greater Cambridge area, thereby supporting the transport viability of development proposals.

2.1.3 The Greater Cambridge City Deal has successfully secured a first tranche of the Government's City Deal funding to unlock major growth and economic potential in the greater Cambridge area. 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). Both Milton Road and Histon Road corridors are high priority schemes for delivery within the City Deal.

## 2.2 STUDY AREA

2.2.1 Milton Road is one of the key radials into Cambridge and is identified as an increasingly important public transport corridor as part of the Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) and Long Term Transport Strategy (LTTS).

2.2.2 Histon Road is also a key radial route into Cambridge which is constrained in its width, which contributes to congestion and makes the consideration of small scale improvements difficult. Figure 2-1 shows both corridors within the context of Cambridge.

2.2.3 Both Milton Road & Histon Road experience significant congestion at peak times which impacts on bus journey times making journeys unreliable, unattractive and longer than necessary, as well as affecting the convenience and comfort of cycling trips along the corridor.

## 2.3 PURPOSE OF THE REPORT

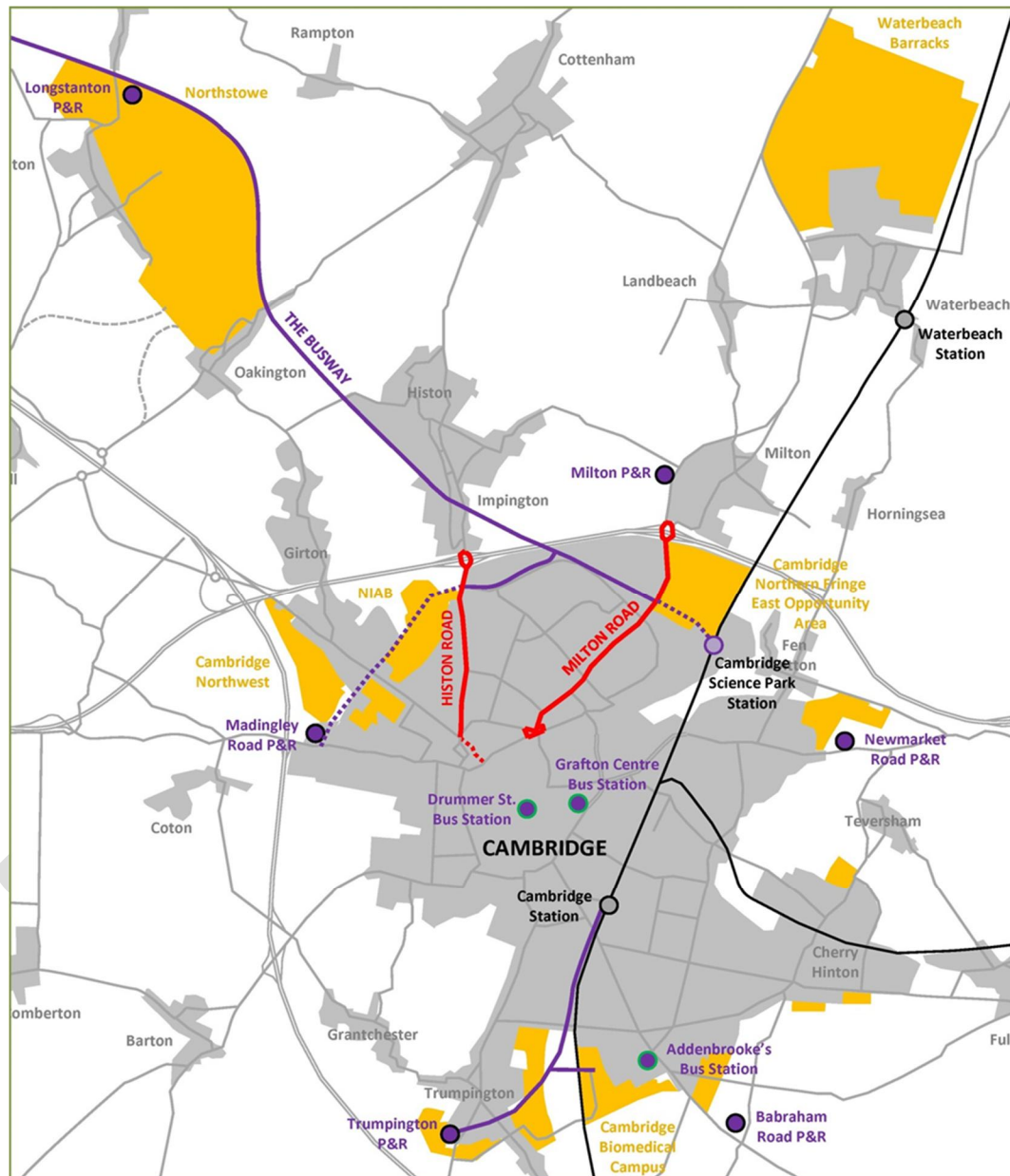
2.3.1 The development of the options for both transport corridors, where appropriate, uses the agreed methodology produced by WSP|PB, supplemented by the Department for Transport's Transport Analysis Guidance (2013).

2.3.2 This Draft Options Report provides an overview of the current and future issues on both corridors along with the formulation of a preferred package of interventions for both corridors to support the objectives of the study, and hence, further development of the delivery of these interventions.

## 2.3.3

Due to further traffic surveys being undertaken in September 2015 by Cambridgeshire County Council, the transport modelling for both corridors has not yet been completed. The Final Options Report will include this modelling with additional outputs to support the proposed options being put forward.

Figure 2-1 Milton Road & Histon Road in Cambridge



Source: Cambridgeshire County Council

## 2.4 REPORT STRUCTURE

2.4.1 The report chapters are set out as follows:

- Chapter 3 – Project Objectives
- Chapter 4 – Evidence Review
- Chapter 5 – Current Situation

- Chapter 6 – Future Situation
- Chapter 7 - Option and Design Development
- Chapter 8 - Design Appraisal & Impacts
- Chapter 9 – Costs & Delivery Programme
- Chapter 10 - Conclusions & Recommendations

# 3 PROJECT OBJECTIVES

## 3.1 INTRODUCTION

- 3.1.1 The proposals produced as part of this report are based upon a clear presentation of the problems and challenge that have established the need for both the Milton and Histon Road Corridor projects. The first key element in doing this is to establish project objectives that set out what is trying to be achieved whilst considering the City Deal.

## 3.2 OBJECTIVES

- 3.2.1 This project supports the City Deal priority of achieving efficient and reliable movement between key existing and future housing and employment sites with the overall objectives of this study being:

1. To provide comprehensive priority for buses in both directions along Milton Road and where possible, on Histon Road;
2. To make provision for cyclists along Milton Road and Histon Road which is segregated from buses and general traffic wherever possible;
3. To improve provision of cyclists and pedestrians in line with the public realm proposals at Mitcham's Corner whilst maintaining traffic flow through the junction;
4. To generate options capable of maintaining traffic levels at today's levels in Cambridge;
5. To consider the potential for enhancing the environment, streetscape and air quality in these corridors; and
6. To assess the impacts on existing residents and highway capacity for each option.

- 3.2.2 These objectives are directly linked to the policies and evidence base reviewed as part of this study.

# 4 EVIDENCE REVIEW

## 4.1 INTRODUCTION

4.1.1 This section provides an overview of the evidence reviewed in the Draft Stage 1 Report relating to both the Milton Road and Histon Road Corridors. The Draft Stage 1 Report is available as a separate document and supports the Draft Options Report.

## 4.2 EVIDENCE REVIEW

### PREVIOUS STUDIES

4.2.1 A number of previous studies relevant to both Corridors have been reviewed or discussed with the Client Project Team including:

- Previous proposals for both corridors associated with the Cambridge TIF Bid (2005 – 2010); and
- Proposals for the Mitcham's Corner Gyratory Opportunity Area produced by Cambridge City Council (2015).

### POLICY REVIEW

4.2.2 A number of previous studies relevant to both Corridors have been reviewed on the following pages including:

- Cambridgeshire Local Transport Plan 2011 – 2031;
- Transport Strategy for Cambridge and South Cambridgeshire (2014); and
- Greater Cambridge City Deal (2014).

### FUTURE COMMITTED DEVELOPMENTS

4.2.3 The project undertook a review of the following:

- Committed developments either currently planned or under construction; and
- Future committed developments identified as part of the Cambridge Local Plan (2014).

### ROAD NETWORK, TRAFFIC FLOWS AND CONGESTION

4.2.4 The following was reviewed to ascertain a better understanding of the existing road network and associated issues via the various transport modes that the two corridors support:

- Audit of the highway network (including public transport) and identification of crucial junctions for further analysis;
- Audit of the non-motorised users networks including footpaths and cycleways;
- Evaluation of junction performance and capacity constraints based upon data from the Cambridge Sub Regional Model (CSRМ), Milton Road PARAMICS model and junction models for Histon Road; and
- Drive time analysis along each corridor based upon Traffic Master Data.

## PUBLIC TRANSPORT AND ACCESSIBILITY

4.2.5 A detailed review of existing public transport provision was conducted in order to understand any barriers or constraints. The review considered the following:

- Existing and potential future bus service provision along both corridors;
- Analysis of bus speed data; and
- Accessibility analysis of the existing bus stops along both corridors.

## ROAD SAFETY

4.2.6 An assessment of the collision history was undertaken to identify collision hotspots on the two road corridors.

## ENVIRONMENTAL CONSTRAINTS

4.2.7 In developing the proposals, a detailed review of the trees along the Milton Road corridor was undertaken. Further details on the natural and built environment were also considered in engineering the design proposals.

## UTILITIES

4.2.8 Given that any proposals will likely require the diversion of some utilities, a C2 review of the utilities along both corridors was undertaken with a summary description of the key utilities provided in the Draft Stage 1 report.

# 5 CURRENT SITUATION

## 5.1 BACKGROUND

5.1.1 This section provides a summary of the evidence provided in the Draft Stage 1 Report relating to both the Milton Road and Histon Road Corridors. The Draft Stage 1 Report is available as a separate document and supports this Draft Options Report.

## 5.2 MILTON ROAD

### OVERVIEW

5.2.1 Milton Road (A1309 / A1134) is one of Cambridge's main distributor roads, and connects to the A14 and the A10 at the Milton Interchange. It provides an essential link to the north of the City Centre, linking it to the Cambridge Science Park, the Cambridge Business Park, Chesterton and Arbury. Milton Road is also a natural extension of the A10 which runs in a north to south direction. The A10 / Milton Road corridor also provides an essential link to the north of Cambridge, linking to Ely, and smaller settlements such as Little Thetford, Stretham, Cottenham, Landbeach, Waterbeach and Milton.

5.2.2 The Milton Road / A10 corridor runs parallel to the national rail network, which provides rail services which can be accessed from rail stations at Ely, Waterbeach and Cambridge. A new station is to be built in North Cambridge, which is likely to be completed in 2018.

5.2.3 Whilst being a key link for Cambridge network, Milton Road also provides direct access to properties, businesses and shopping, with private drives and multiple side roads.

5.2.4 Figure 5-1 provides an overview of the Milton Road corridor.

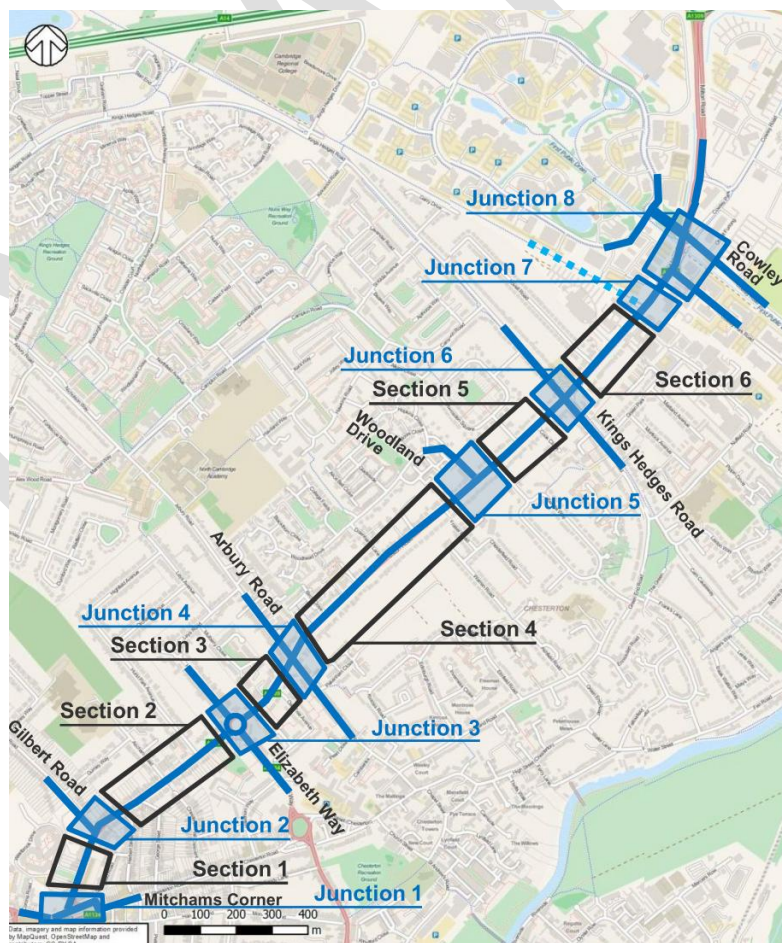
## SUMMARY OF CORRIDOR PERFORMANCE

5.2.5 The performance review provides a focus for which sections / junctions and which objectives should be targeted for improvement in the development of outline design solutions, which is discussed in the following chapter. The corridors were split into sections (links) and junctions for the purposes of appraising the current corridor performance and the impacts of the proposed corridor measures.

5.2.6 This summarises the current performance for the sections and junctions against the determinants of the study objectives (bus service delays, quality of public realm etc), where red indicates poor performance, amber is average performance and green is good performance. The objectives are in line with those identified in the study brief. For ease and accuracy of assessment, certain objectives (e.g. public realm) have been expanded to provide sub-categories. The performance is based on a combination of quantitative analysis (e.g. collisions data), desktop review, site observations and stakeholder engagement.

5.2.7 Table 5-1 for Milton Road shows that the corridor is poorly performing, particularly during peak hours, in terms of traffic and bus delay. Additionally, cycling is poorly provided for.

**Figure 5-1 Milton Road Corridor Overview**





**Table 5-1 Milton Road - Current Corridor Performance (RAG Assessment)**

CURRENT PERFORMANCE		Section 1	Junction 2	Section 2	Junction 3	Section 3	Junction 4	Section 4	Junction 5	Section 5	Junction 6	Section 6	Junction 7	Junction 8
Study Objectives														
Traffic	- Traffic delays	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Road Safety	- Road safety	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Buses	- Bus service delays	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
	- Bus stop provision/quality	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Pedestrians	- Pedestrian crossing facilities	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Cyclists	- Cycle priority measures	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	- Cyclist crossing facilities	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Public Realm	- Quality of the public realm	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	- Provision of trees/planting	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Parking	- Parking provision	Green	Red	Green	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red
	- Servicing provision	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

## CYCLING & PEDESTRIAN NETWORK

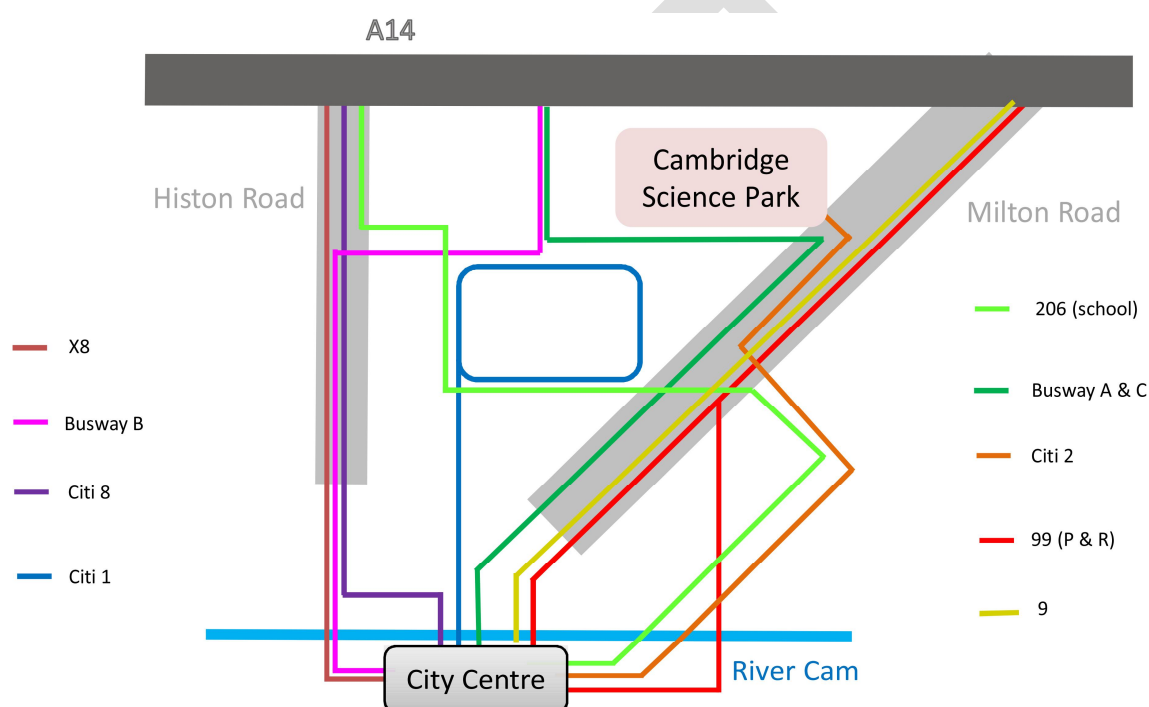
- 5.2.8 Milton Road is a major link on the Cambridge cycle network with several key cycle facilities, (including advisory cycle lanes, advanced stop lines (ASL) at junctions and crossings) made available which allow cyclists to access the centre of Cambridge over the River Cam south of Mitcham's Corner. Cyclists also use Milton Road to access Cowley Road for the bridge over the A14 which connects with Milton and further afield.
- 5.2.9 National Route No 11 (NCR 11) and (NCR 51) share a section of the south east footway / cycleway between Kings Hedges Road / green End Road junction. NCR 11 runs towards Milton Village, whilst NCR 51 uses the path alongside the guided busway.
- 5.2.10 The Milton Road corridor is also a well-used pedestrian corridor with access to a large number of facilities including shopping, businesses, public facilities, schools and public transport.

## PUBLIC TRANSPORT NETWORK

- 5.2.11 Numerous bus services use the Milton Road corridor. These services can be boarded at different bus stops located along Milton Road. The following bus services use the Milton Road corridor in all or part:
- Busway A - Busway A links St Ives to Cambridge City Centre, Cambridge Railway Station Addenbrooke's Hospital and Trumpington Park and Ride along the guided busway and Milton Road. Bus service A does not currently stop along Milton Road;
  - Busway C - Bus service C links St Ives to Cambridge and Cambridge Railway Station with this service stopping at Union Lane;
  - Park and Ride 99 – this services links Milton Park and Ride to the Science Park, Cambridge City Centre, Cambridge Railway Station, Addenbrooke's Hospital and Babraham P&R;
  - Route 9 – this route services Ely to Cambridge;
  - Citi 1 – Arbury to Cherry Hinton, via Cambridge City Centre and Cambridge Railway Station (only uses the Milton Road corridor south of Gilbert Road); and
  - Citi 2 – Cambridge Science Park via Chesterton to Cambridge City Centre and out to Romsey and Addenbrooke's Hospital (only uses the Milton Road corridor north of the Golden Hind).
- 5.2.12 The current bus services and their frequency with corridor peak service numbers are shown in Table 5-2 and Figure 5-2.

**Table 5-2 Milton Road - Bus Service Frequencies**

BUS SERVICE	PEAK FREQUENCY (ONE DIRECTION)
Busway A	7 services per hour
Busway C	1 service per hour
99 Park & Ride	6 services per hour
206 (school)	1 service per day (excluded from peak)
Route 9	2 services per hour
Citi 2 (part corridor north of Golden Hind)	5 services per hour
Citi 1 (part corridor south of Gilbert Road)	4 services per hour
<b>Total No Services (using corridor in part / full)</b>	<b>27</b>

**Figure 5-2 Bus Network Map**

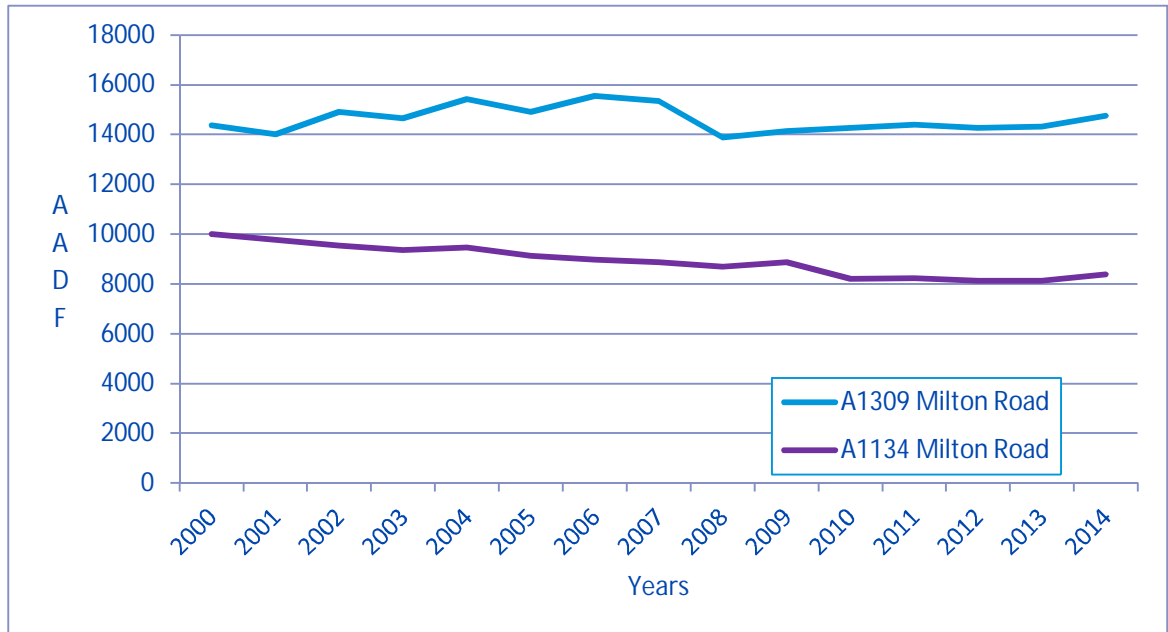
- 5.2.13 Bus lane facilities, are provided at several locations. These are generally located southbound towards the City centre, one between Woodhead Drive to Arbury Road junction and the second bus lane facility located between Elizabeth Road roundabout and Mitcham's Corner. This bus lane ends before and restarts after the junction at Gilbert Road.
- 5.2.14 Northbound bus lanes can be found on the approach to the Busway junction near Cambridge Science Park.

## HIGHWAY NETWORK

- 5.2.15 The Milton Road corridor is of significant importance to the transport network. Approximately 14,747 vehicles per day were observed using Milton Road between Arbury Road and Green End Road in 2014. This was based upon the Annual Average Daily Flow (AADF) supplied by the Department for Transport (DfT). On the southern section of the road, near the A1134 Cambridge Inner Ring Road, the road carried approximately 8,372 vehicles per day (AADF) in 2014.

- 5.2.16 It should be noted Milton Road is restricted to 30mph along the whole of the corridor study. Figure 5-3 provides an overview of the observed traffic volume along the corridor from 2000 to 2014.

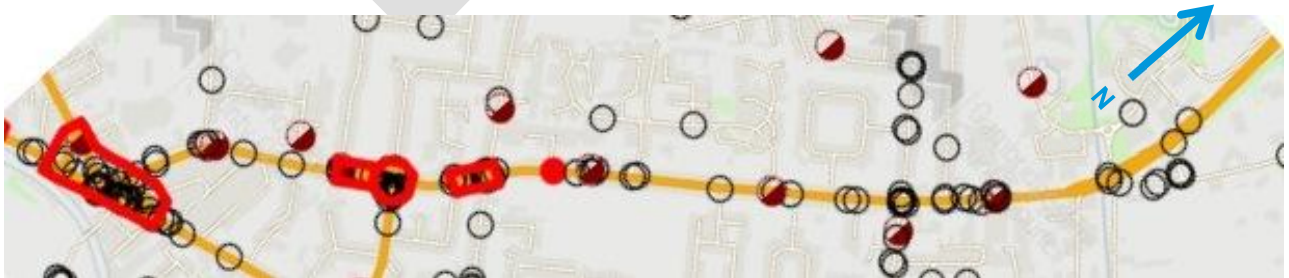
**Figure 5-3 Observed Traffic Volume on A1309 (North of Elizabeth Way) & A1134 (South of Elizabeth Way)**



## ACCIDENT ANALYSIS

- 5.2.17 Having reviewed the accident data made available by Cambridgeshire County Council from 2010 to 2014, there were approximately 100 slight severity accidents on Milton Road with an additional six slight severity accidents occurring at the A10 / A14 Milton interchange (outside of the study area).
- 5.2.18 There were 13 serious injury accidents with one fatal accident at the junction of Milton Road / Birch Close. Four slight severity accidents occurred at the A10 / A14 Milton interchange (outside of the study area). The key accident clusters have been identified as Mitcham's Corner Gyratory, Elizabeth Way roundabout and Hurst Park Avenue junction.
- 5.2.19 The CCC website provides an interactive map which details the accidents by location and severity. This map is reproduced in Figure 5-4.

**Figure 5-4 Milton Road - Accident Cluster Sites**



Source: Cambridgeshire County Council

- 5.2.20 Five accidents along Milton Road involved buses with four of these being slight severity accidents and one being a serious severity accident. Ten accidents involved pedestrians with two being serious severity accidents and eight being slight severity accidents. Sixty-four accidents involved cyclists. Out of these six were classed as serious severity accidents and one as fatal severity accident.
- 5.2.21 The numbers of accidents occurring along the Milton Road are linked to the importance of the road for a number of competing transport modes and hence, the volume of vehicular flows. Many of these accidents involved conflicts between cyclists and vehicles, particularly at junctions. Through this project, there is the opportunity to significantly reduce the number accidents occurring.

## TRAFFICMASTER ANALYSIS

- 5.2.22 A detailed analysis on vehicle speeds along Milton Road between September 2013 and August 2014 has been undertaken using the Trafficmaster data provided by CCC. The information was provided in a number of different categories and are described follows:
- All Weekdays;
  - All Weekends;
  - All August Weekdays;
  - All November Weekdays; and
  - All School Weekdays.
- 5.2.23 Due to the volume of information provided, the analysis focussed on the 'All Weekdays' and 'All Weekends' situations. This information is seen as the critical time period when the highest volume of vehicles will occur and therefore when traffic congestion is most likely to occur, thereby influencing the vehicle speeds on the local highway network.
- 5.2.24 The speed of vehicles in miles per hour for 'All Weekdays' and 'All Weekends' for the links along Milton Road were analysed in detail for both the AM peak hour (08:00 – 09:00) and the PM peak hour (17:00 – 18:00).
- 5.2.25 Figures 5-5 and 5-6 provide geographical representations of the 'All Weekdays' average link speeds by link and direction for the AM and PM peak hours respectively. Figures 5-7 and 5-8 represent the same, except for the 'All Weekends' situation.

Figure 5-5 Average Link Speeds on All Weekdays 08:00 – 09:00

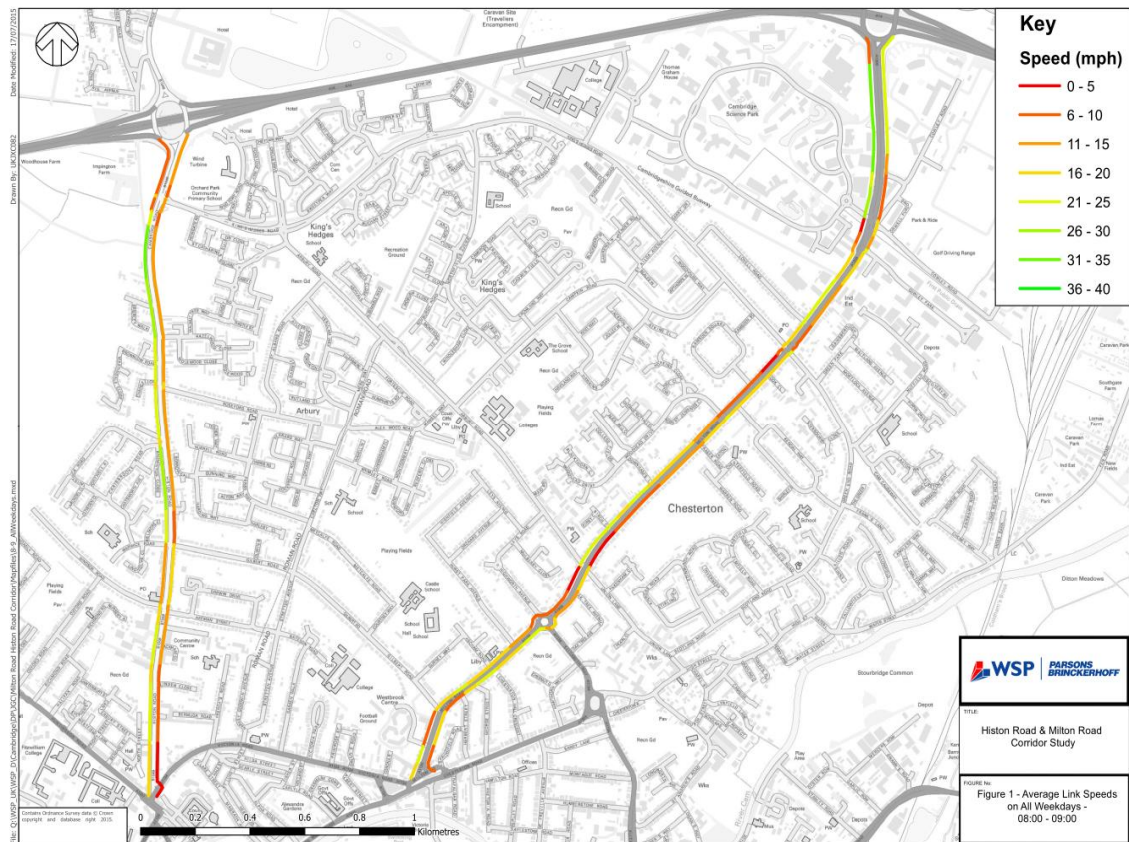


Figure 5-6 Average Link Speeds on All Weekdays 17:00 – 18:00

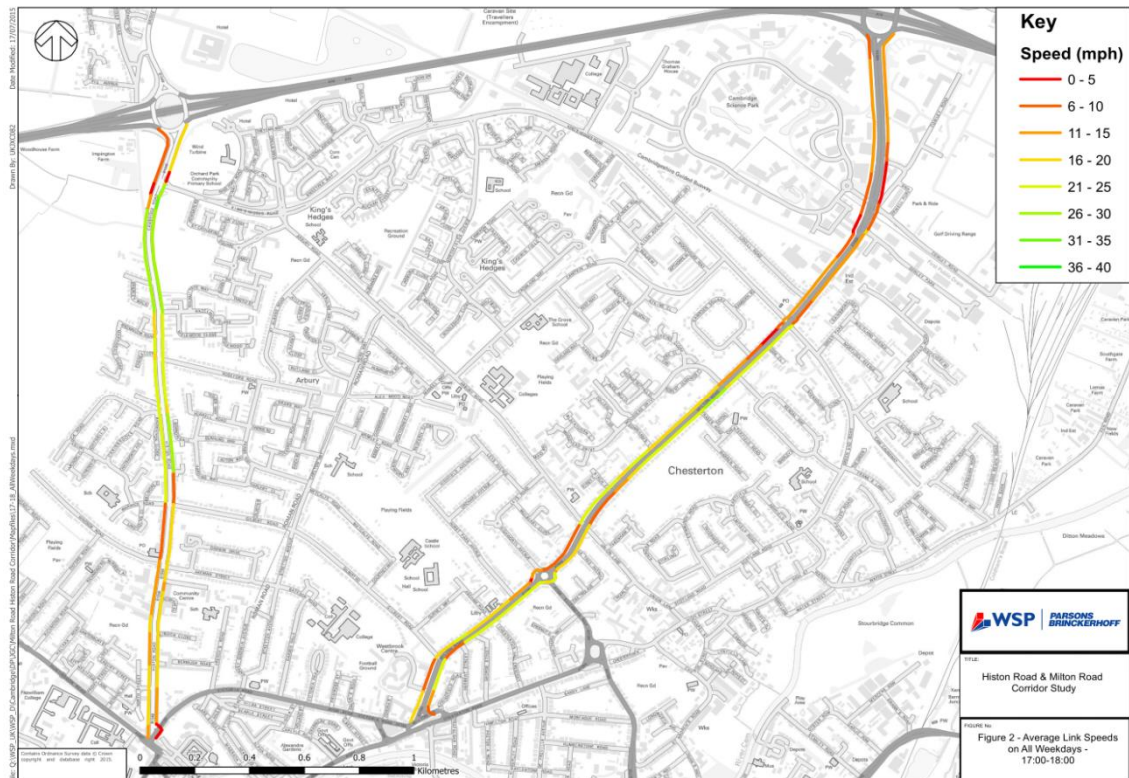
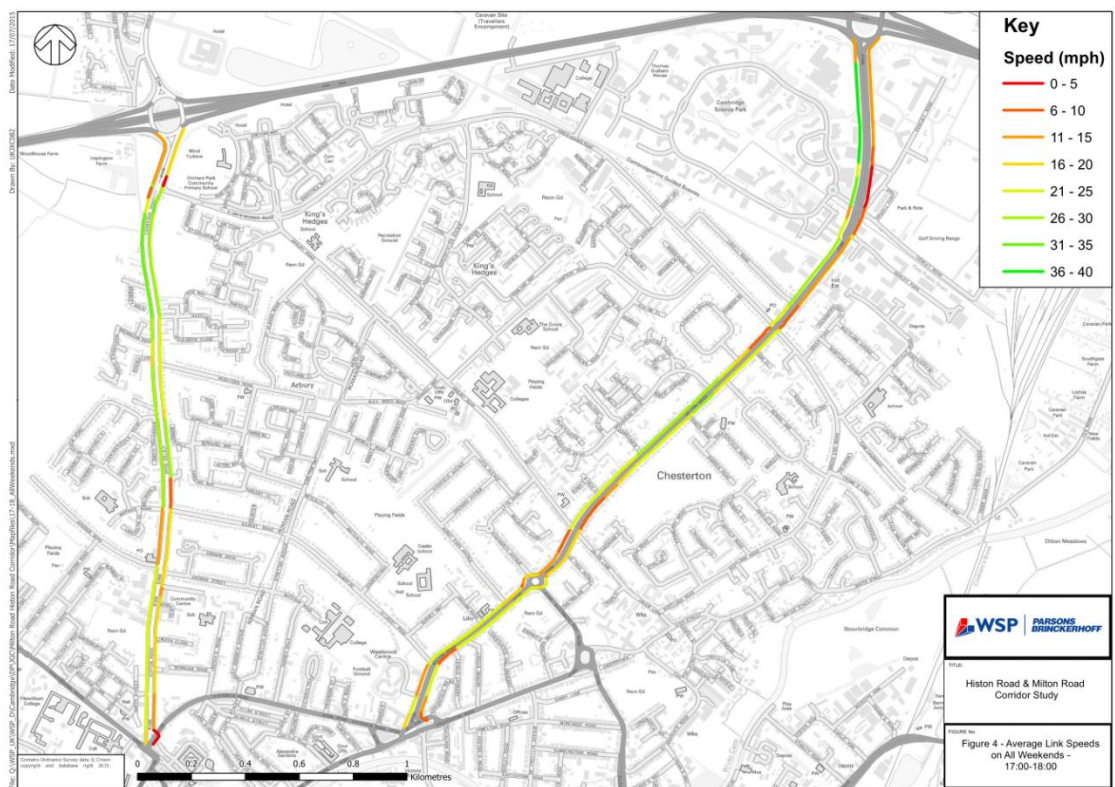


Figure 5-7 Average Link Speeds on All Weekends 08:00 - 09:00



Figure 5-8 Average Link Speeds on All Weekends 17:00 – 18:00



5.2.26 From the results, there are sections along Milton Road where the low speed of vehicles indicates potential congestion issues. There are certain links that demonstrate low speeds of vehicles in all of the scenarios and time periods that were analysed, and these are summarised as follows:

- Gilbert Road – northbound and southbound approaches;
- Mitcham’s Corner – southbound approach;
- Highworth Avenue – northbound approach;
- Arbury Road – northbound approach;
- Union Lane – southbound approach; and
- Cowley Road – northbound and southbound approaches.

### BUS SPEED ANALYSIS

5.2.27 Bus Speed information was obtained for Milton Road for a period of one year between September 2013 and August 2014 from CCC. The information was provided in a number of different categories and these are described as follows:

- All Weekdays
- All Weekends;
- All August Weekdays;
- All November Weekdays; and
- All School Weekdays.

5.2.28 Due to the volume of information provided, the analysis focussed on the data provided for the ‘All Weekdays’ and ‘All Weekends’ situations. These are the time periods where the highest volume of vehicles will occur and therefore when traffic congestion is most likely to occur, thereby influencing vehicle speeds. The speed of buses in miles per hour for the ‘All Weekdays’ and ‘All Weekends’ situations between bus stops along Milton Road and Histon Road were analysed in detail for both the AM peak hour (08:00 – 09:00) and the PM peak hour (17:00 – 18:00). The Traffic Commissioners, who oversee registered bus service performance, expect 95% of services to operate to timetable i.e. between 1 minute early and no more than 5 minutes late. Table 5-5 summarises the number of buses on time with the average delay.

**Table 5-3 Milton Road - Summary of Bus Delays (2014)**

MONTH	AVERAGE DELAY	25% OF BUSES DELAYED BY MORE THAN	10% OF BUSES DELAYED BY MORE THAN	5% OF BUSES DELAYED BY MORE THAN	% OF BUSES ON TIME
January	5 minutes	6 minutes	12 minutes	21 minutes	64%
February	4 minutes	6 minutes	11 minutes	14 minutes	66%
March	5 minutes	7 minutes	14 minutes	20 minutes	64%
April	5 minutes	6 minutes	10 minutes	12 minutes	62%
May	4 minutes	6 minutes	11 minutes	17 minutes	67%
June	6 minutes	8 minutes	13 minutes	20 minutes	52%
July	5 minutes	7 minutes	13 minutes	17 minutes	59%
August	5 minutes	5 minutes	11 minutes	15 minutes	69%
September	5 minutes	6 minutes	11 minutes	15 minutes	61%
October	9 minutes	12 minutes	20 minutes	29 minutes	48%
November	8 minutes	11 minutes	20 minutes	24 minutes	47%
December	8 minutes	12 minutes	19 minutes	26 minutes	51%
<b>Average</b>	<b>6 minutes</b>	<b>8 minutes</b>	<b>14 minutes</b>	<b>19 minutes</b>	<b>59%</b>

5.2.29 Table 5-4 provides the speed analysis with a geographical representation in Figures 5-9 and 5-10.

**Table 5-4 Bus Speed Analysis – Milton Road Weekday AM and PM Peak Hours**

BUS STOP	INBOUND LENGTH BETWEEN STOPS (M)	INBOUND SPEED 08:00-09:00 (MPH)	INBOUND SPEED 17:00-18:00 (MPH)	INBOUND TRAVEL TIME 08:00 – 09:00 (S)	INBOUND TRAVEL TIME 17:00 – 18:00 (S)	OUTBOUND SPEED 08:00-09:00 (MPH)	OUTBOUND SPEED 17:00-18:00 (MPH)	OUTBOUND LENGTH BETWEEN STOPS (M)	OUTBOUND TRAVEL TIME 08:00 – 09:00 (S)	OUTBOUND TRAVEL TIME 17:00 – 18:00 (S)
SCIENCE PARK	574.69	8.11	12.17	159	106	11.64	11.92	690.64	133	130
LOVELL ROAD	545.93	19.54	14.27	63	86	NA	NA	NA	NA	NA
KENDAL WAY	318.99	16.97	18.20	42	39	14.10	18.68	271.57	43	33
FRASER ROAD	360.18	21.48	24.63	38	33	16.00	17.37	207.17	29	27
DOWNHAM'S LANE	219.79	18.59	22.30	26	22	20.45	19.09	452.28	49	53
UNION LANE	283.00	11.69	13.70	54	46	13.92	13.38	343.97	55	58
ASCHAM ROAD	495.17	21.30	21.67	52	51	14.36	16.90	436.61	68	58
WESTBROOK CENTRE	360.90	12.17	12.66	66	64	16.17	13.53	143.06	20	24
<b>TOTALS</b>				<b>500</b>	<b>446</b>				<b>397</b>	<b>381</b>

**Figure 5-9 Average Bus Speeds on All Weekdays 08:00 – 09:00**





Figure 5-10 Average Bus Speeds on All Weekdays 17:00 – 18:00



### 5.2.30

From the results, there are certain sections along Milton Road where the low speed of buses indicates potential congestion issues. For the Weekday AM and PM peak hours, these are summarised around the following key junctions for clarity:

- Gilbert Road – northbound and southbound sections;
- Mitcham's Corner – southbound section;
- Highworth Avenue – northbound section;
- Kings Hedges Road – northbound section;
- Union Lane – southbound section; and
- Cowley Road – northbound and southbound section.

### 5.2.31

Table 5-5 summarises the data that was obtained for Milton Road between bus stops by direction for the weekend AM and PM peak hours within the study area, it is also shown in a geographical format in Figures 5-11 and 5-12.

**Table 5-5 Bus Speed Analysis – Milton Road Weekend AM and PM Peak Hours**

BUS STOP	INBOUND LENGTH BETWEEN STOPS	INBOUND SPEED 08:00-09:00	INBOUND SPEED 17:00-18:00	INBOUND TRAVEL TIME 08:00 – 09:00	INBOUND TRAVEL TIME 17:00 – 18:00	OUTBOUND LENGTH BETWEEN STOPS	OUTBOUND SPEED 08:00-09:00	OUTBOUND SPEED 17:00-18:00	OUTBOUND TRAVEL TIME 08:00 – 09:00	OUTBOUND TRAVEL TIME 17:00 – 18:00
	(M)	(MPH)	(MPH)	(S)	(S)	(M)	(MPH)	(MPH)	(S)	(S)
Science Park	574.69	22.68	21.19	57	61	690.64	16.43	16.57	94	93
Lovell Road	545.93	21.12	22.49	58	54	NA	NA	NA	NA	NA
Kendal Way	318.99	20.23	19.16	35	37	271.57	24.17	21.72	25	28
Fraser Road	360.18	25.29	26.18	32	31	207.17	24.25	19.12	19	24
Downham's Lane	219.79	23.00	24.61	21	20	452.28	22.06	19.54	46	52
Union Lane	283.00	17.90	16.09	35	39	343.97	21.21	16.05	36	48
Ascham Road	495.17	26.18	21.93	42	51	436.61	22.07	19.49	44	50
Westbrook Centre	360.90	16.25	13.90	50	58	143.06	18.32	15.59	17	21
<b>TOTALS</b>				330	351				282	316

**Figure 5-11 Average Bus Speeds on All Weekends 08:00 – 09:00**



Figure 5-12 Average Bus Speeds on All Weekends 17:00 – 18:00



5.2.32 From the results, there are certain sections along Milton Road where the low speed of buses indicates potential congestion issues. For the Weekend AM and PM peak hours, these are summarised around the following key junctions for clarity:

- Gilbert Road – southbound section;
- Mitcham's Corner – southbound section;
- Union Lane – southbound section;
- Kings Hedges Road – northbound section; and
- Cowley Road – northbound section.

## 5.3 HISTON ROAD

### OVERVIEW

5.3.1 The Histon Road (B0149) corridor is also of key importance to the transport network in Cambridge. The road provides a direction connection to the A14 and links Cambridge to key settlements in the north including Histon, Impington and Cottenham. Histon Road as well as providing direct links through to Milton Road via King Hedges Road and Gilbert Road.

5.3.2 Significant developments have been built adjacent to the corridor recently, including Kings Hedges. Further development ambitions, including NIAB and Darwin Green, will further increase the need for transport corridor improvements.

5.3.3 Whilst being a key transport link for Cambridge, Histon Road also provide direct access to properties, businesses and shopping, with private drives and multiple side roads.

## SUMMARY OF CORRIDOR PERFORMANCE

- 5.3.4 The performance review provides a focus for which sections / junctions and which objectives should be targeted for improvement in the development of outline design solutions, which is discussed in the following chapter. The corridors were split into sections (links) and junctions for the purposes of appraising the current corridor performance and the impacts of the proposed corridor measures.
- 5.3.5 This will summarise the current performance for the sections and junctions against the determinants of the study objectives (bus service delays, quality of public realm etc), where red indicates poor performance, amber is average performance and green is good performance. The objectives are in line with those identified in the study brief. For ease and accuracy of assessment, certain objectives (e.g. public realm) have been expanded to provide sub-categories. The performance is based on a combination of quantitative analysis (e.g. collisions data), desktop review, site observations and stakeholder engagement.
- 5.3.6 Table 5-6 for Histon Road shows that the corridor is poorly performing, particularly during peak hours, in terms of traffic and bus delays. Additionally, cycling is poorly provided for.

**Figure 5-13 Histon Road Corridor Overview**

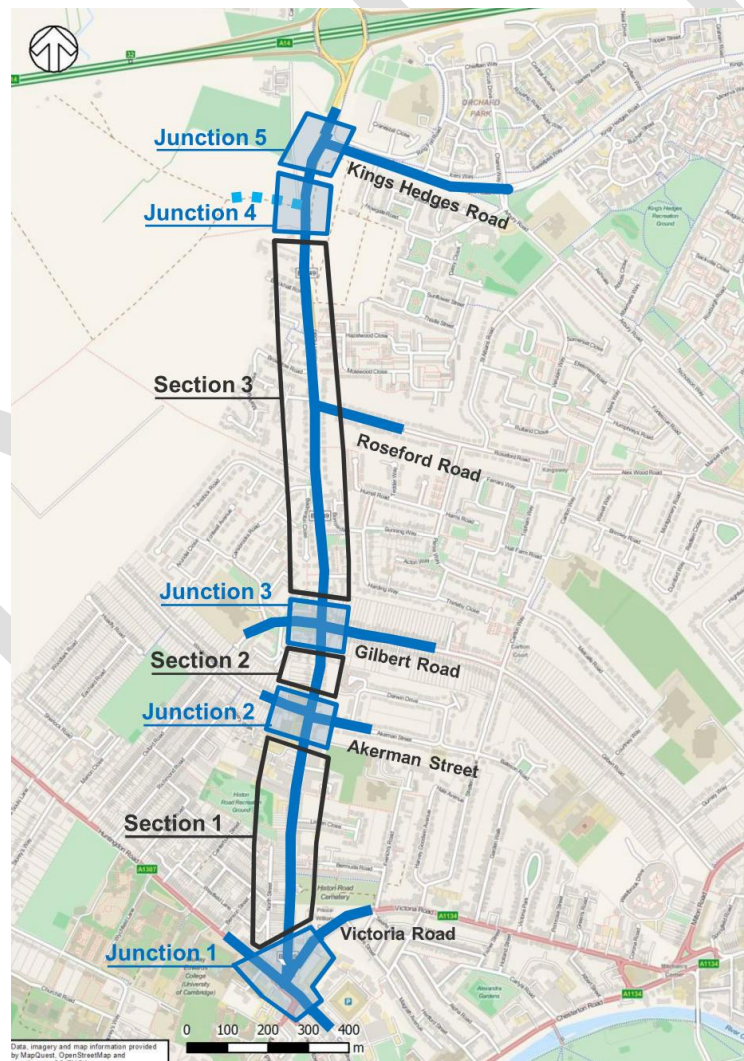


Table 5-6 Histon Road - Current Corridor Performance (RAG Assessment)

CURRENT PERFORMANCE		Junction 1	Section 1	Junction 2	Section 2	Junction 3	Section 3	Junction 4	Junction 5
Study Objectives									
<b>Traffic</b>	- Traffic delays	Red	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Red
<b>Road Safety</b>	- Road safety	Red	Yellow	Red	Red	Red	Yellow	Green	Yellow
<b>Buses</b>	- Bus service delays	Grey	Red	Red	Red	Yellow	Yellow	Yellow	Yellow
	- Bus stop provision/quality	Grey	Yellow	Grey	Yellow	Grey	Green	Grey	Red
<b>Pedestrians</b>	- Pedestrian crossing facilities	Green	Yellow	Yellow	Yellow	Green	Yellow	Red	Green
<b>Cyclists</b>	- Cycle priority measures	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow
	- Cyclist crossing facilities	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow
<b>Public Realm</b>	- Quality of the public realm	Yellow	Yellow	Yellow	Green	Green	Green	Yellow	Yellow
	- Provision of trees/planting	Red	Red	Red	Red	Yellow	Green	Red	Red
<b>Parking</b>	- Parking provision	Red	Green	Green	Green	Red	Red	Red	Red
	- Servicing provision	Grey	Yellow	Grey	Grey	Grey	Grey	Grey	Grey

## CYCLING & PEDESTRIAN NETWORK

- 5.3.7 Histon Road is a key link on the Cambridge cycle network with it being a signed primary on-road route. Off road cycleways are provided on both sides of the road from King Hedges Road northwards which carry cyclists pass Histon Interchange towards Impington and Histon villages.
- 5.3.8 These include Toucan crossings and ASLs, mostly from the Gilbert Road junction northwards with an existing cycle lane on both sides through to King Hedges Road.
- 5.3.9 There are no particular facilities south of Warwick Road / Gilbert Road junction, as the road is more constrained in width. The key issue facing Histon Road for the provision of additional cycling and pedestrian facilities is its width, particularly south of Gilbert Road.
- 5.3.10 The Histon Road corridor is also a well-used pedestrian corridor with access to a number of facilities including shopping, businesses, public facilities, schools and public transport.

## PUBLIC TRANSPORT NETWORK

- 5.3.11 Numerous bus services use the Histon Road corridor and these services can be boarded at different bus stops along Histon Road. The following bus services use the Histon Road corridor in all or part:
- Busway B - Busway B links Huntingdon and St Ives to Cambridge City Centre Drummer Street;
  - Citi 8 – Cottenham and Histon to Addenbrooke's Hospital, Cambridge City centre. Bus X8 also follows the same route but is a much lower frequency service.
- 5.3.12 There are neither existing bus lanes nor bus priority facilities provided along Histon Road. The current bus services and their frequency with corridor peak service numbers are shown in Table 5-7 and the Bus Map shown in Figure 5-2.

**Table 5-7 Bus Service Frequencies – Histon Road Corridor**

BUS SERVICE	PEAK FREQUENCY (ONE DIRECTION)
Busway B	7 services per hour
Citi 8	4 services per hour
<b>Total No Services (using corridor in part / full)</b>	<b>11</b>

## HIGHWAY NETWORK

5.3.13 Histon Road is a major arterial road linking local settlements such as Cottenham, Histon and Impington via the A14 at the Histon Interchange. No DfT traffic counts were available for this study and we are awaiting traffic count information from CCC.

5.3.14 It should be noted that Histon Road is restricted to 40mph down to the junction with Blackhall Road where the 30mph speed limit begins.

## ACCIDENT ANALYSIS

5.3.15 Having reviewed the accident data made available by CCC from 2010 to 2014, there were approximately 71 injury severity accidents. Out of these 71 accidents one was classified as fatal severity accident, eight as serious severity accidents and 62 were classed slight severity accidents.

5.3.16 The key accident clusters have been identified as:

- Between Hazelwood Close and Carisbrooke Road;
- Victoria Road junction;
- Victoria Road / Huntingdon Road / Mount Pleasant / Castle Street junction; and
- Gilbert Road / Warwirck Road junction to Linden Close junction.

5.3.17 The CCC website provides an interactive map which details accidents by location and severity. This map is reproduced in Figure 5-14.

**Figure 5-14 Histon Road – Accident Cluster Sites**



*Source: Cambridgeshire County Council*

5.3.18 Pedestrians have been involved within nine injury accidents, two serious and seven slight severity accidents. A total of 34 accidents have involved cyclists, with one fatality, three serious severity accidents and 30 slight severity accidents.

- 5.3.19 The number of accidents occurring on Histon Road corridors relates to the existing traffic flows carried by the road.
- 5.3.20 Several accidents clusters have been identified and there is the opportunity to provide facilities to reduce accident risks.
- 5.3.21 The accidents causations are mainly due to errors committed by road users. However, some improvements could be made at a number of locations to reduce conflict.

## TRAFFICMASTER ANALYSIS

- 5.3.22 A detailed analysis on vehicle speeds along Histon Road between September 2013 and August 2014 has been undertaken using the Trafficmaster data provided by CCC. The information was provided in a number of different categories and are described follows:
- All Weekdays;
  - All Weekends;
  - All August Weekdays;
  - All November Weekdays; and
  - All School Weekdays.
- 5.3.23 Due to the volume of information provided, the analysis focussed on the 'All Weekdays' and 'All Weekends' situations. This information is seen as the critical time period when the highest volume of vehicles will occur and therefore when traffic congestion is most likely to occur, thereby influencing the vehicle speeds on the local highway network.
- 5.3.24 The speed of vehicles in miles per hour for 'All Weekdays' and 'All Weekends' for the links along Milton Road were analysed in detail for both the AM peak hour (08:00 – 09:00) and the PM peak hour (17:00 – 18:00).
- 5.3.25 Figures 5-5 and 5-6 provide geographical representations of the 'All Weekdays' average link speeds by link and direction for the AM and PM peak hours respectively. Figures 5-7 and 5-8 represent the same, except for the 'All Weekends' situation.
- 5.3.26 From the results, there are sections along Milton Road where the low speed of vehicles indicates potential congestion issues. There are certain links that demonstrate low speeds of vehicles in all of the scenarios and time periods that were analysed, and these are summarised as follows:
- Victoria Road – southbound approach;
  - Gilbert Road – southbound approach;
  - King Hedges Road – southbound approach;
  - Warwick Road – northbound approach; and
  - A14 – northbound approach.

## BUS SPEED ANALYSIS

- 5.3.27 Bus Speed information was obtained for Histon Road for a period of one year between September 2013 and August 2014 from CCC. The information was provided in a number of different categories and these are described as follows:
- All Weekdays
  - All Weekends;

- All August Weekdays;
- All November Weekdays; and
- All School Weekdays.

5.3.28 Due to the volume of information provided, the analysis focussed on the data provided for the 'All Weekdays' and 'All Weekends' situations. These are the time periods where the highest volume of vehicles will occur and therefore when traffic congestion is most likely to occur, thereby influencing vehicle speeds. The speed of buses in miles per hour for the 'All Weekdays' and 'All Weekends' situations between bus stops along Milton Road and Histon Road were analysed in detail for both the AM peak hour (08:00 – 09:00) and the PM peak hour (17:00 – 18:00). Table 5-9 summarises the data that was obtained for Milton Road for the weekend AM and PM peak hours within the study area. It is also shown in a geographical format in Figures 5-9 and 5-10.

5.3.29 The Traffic Commissioners, who oversee registered bus service performance, expect 95% of services to operate to timetable i.e. between 1 minute early and no more than 5 minutes late. Table 5-8 summarises the number of buses on time with the average delay.

**Table 5-8 Histon Road - Summary of Bus Delays (2014)**

MONTH	AVERAGE DELAY	25% OF BUSES DELAYED BY MORE THAN	10% OF BUSES DELAYED BY MORE THAN	5% OF BUSES DELAYED BY MORE THAN	% OF BUSES ON TIME
January	4 minutes	6 minutes	11 minutes	14 minutes	63%
February	6 minutes	8 minutes	15 minutes	21 minutes	55%
March	6 minutes	8 minutes	14 minutes	18 minutes	55%
April	4 minutes	6 minutes	11 minutes	13 minutes	62%
May	5 minutes	6 minutes	11 minutes	15 minutes	64%
June	6 minutes	8 minutes	14 minutes	18 minutes	52%
July	6 minutes	7 minutes	12 minutes	16 minutes	56%
August	4 minutes	6 minutes	9 minutes	11 minutes	68%
September	5 minutes	7 minutes	13 minutes	18 minutes	60%
October	9 minutes	12 minutes	22 minutes	28 minutes	45%
November	9 minutes	12 minutes	22 minutes	27 minutes	43%
December	10 minutes	13 minutes	26 minutes	35 minutes	42%
<b>Average</b>	<b>6 minutes</b>	<b>8 minutes</b>	<b>15 minutes</b>	<b>19 minutes</b>	<b>56%</b>

**Table 5-9 Bus Speed Analysis – Histon Road Weekday AM and PM Peak Hours**

BUS STOP	INBOUND LENGTH BETWEEN STOPS	INBOUND TRAVEL TIME 08:00 – 09:00	INBOUND TRAVEL TIME 17:00 - 18:00	OUTBOUND LENGTH BETWEEN STOPS	OUTBOUND TRAVEL TIME 08:00 – 09:00	OUTBOUND TRAVEL TIME 17:00 – 18:00
	(M)	(S)	(S)	(M)	(S)	(S)
Blackhall Road	375.09	66	58	410.19	37	41
Brownlow Road	398.15	57	41	344.90	NA	NA
Carisbrooke Road	319.17	44	32	331.65	33	40
Gilbert Road	187.68	34	25	175.62	23	32
Akeman Street	228.27	43	37	222.58	29	39
Linden Close	291.69	53	40	309.09	41	44
Histon Road Corner	NA	NA	NA	75.76	9	16
<b>TOTALS</b>		<b>297</b>	<b>232</b>		<b>172</b>	<b>212</b>



5.3.30 From the results, there are certain sections along Milton Road where the low speed of buses indicates potential congestion issues. For the Weekday AM and PM peak hours, these are summarised around the following key junctions for clarity:

- Linden Close – southbound section;
- Windsor Road – northbound section;
- Akeman Street – southbound section;
- Warwick Road – northbound section;
- Gilbert Road – northbound section; and
- Kings Hedges Road – southbound section.

5.3.31 Table 5-10 summarises the data that was obtained for Histon Road between bus stops by direction for the weekend AM and PM peak hours within the study area, it is also shown in a graphical format in Figures 5-11 and 5-12.

**Table 5-10 Bus Speed Analysis – Histon Road Weekday AM and PM Peak Hours**

BUS STOP	INBOUND LENGTH BETWEEN STOPS	INBOUND TRAVEL TIME 08:00 – 09:00	INBOUND TRAVEL TIME 17:00 - 18:00	OUTBOUND LENGTH BETWEEN STOPS	OUTBOUND TRAVEL TIME 08:00 – 09:00	OUTBOUND TRAVEL TIME 17:00 – 18:00
	(M)	(S)	(S)	(M)	(S)	(S)
Blackhall Road	375.09	44	47	410.19	37	38
Brownlow Road	398.15	39	39	344.90	NA	NA
Carisbrooke Road	319.17	33	30	331.65	36	37
Gilbert Road	187.68	24	23	175.62	23	29
Akeman Street	228.27	30	31	222.58	31	31
Linden Close	291.69	38	38	309.09	38	40
Histon Road Corner	NA	NA	NA	75.76	7	9
<b>TOTALS</b>		209	208		171	184

5.3.32 From the results obtained it can be seen that there are sections along Histon Road where the speed of buses is low indicating that there are problems with traffic congestion on the local highway network at these locations. There are certain links that demonstrate low speeds of buses in all of the scenarios and time periods that were analysed, and these are summarised as follows:

- Gilbert Road Close – southbound section; and
- Kings Hedges Road - southbound section.

# 6 FUTURE SITUATION

## 6.1 INTRODUCTION

6.1.1 This section provides an overview of the future situation for the Milton Road and Histon corridors. This will include a summary of the modelling to be undertaken along with future development proposals which will support the proposals being put forward.

6.1.2 **Due to further traffic surveys being undertaken in September 2015 by Cambridgeshire County Council, the transport modelling for both corridors has not yet been completed. The Final Options Report will include this modelling with additional outputs to support the proposed options.**

## 6.2 COMMITTED FUTURE DEVELOPMENTS

### OVERVIEW

6.2.1 This section provides an overview of the committed developments proposed for the areas surrounding the Milton Road and Histon Road corridors both within Cambridge and the wider area. Generally, the area needs to cater for 14,000 new homes and 22,000 additional jobs through to 2031 excluding South Cambridgeshire which will provide a further 19,000 homes and another 22,000 jobs.

6.2.2 Figure 6-1 shows the increased number of dwellings and employed residents in the Preferred Development Option for the 2031 Local Plan scenario.

**Figure 6-1 Map of Dwellings & Employed Residents (2031 Preferred Development Option)**

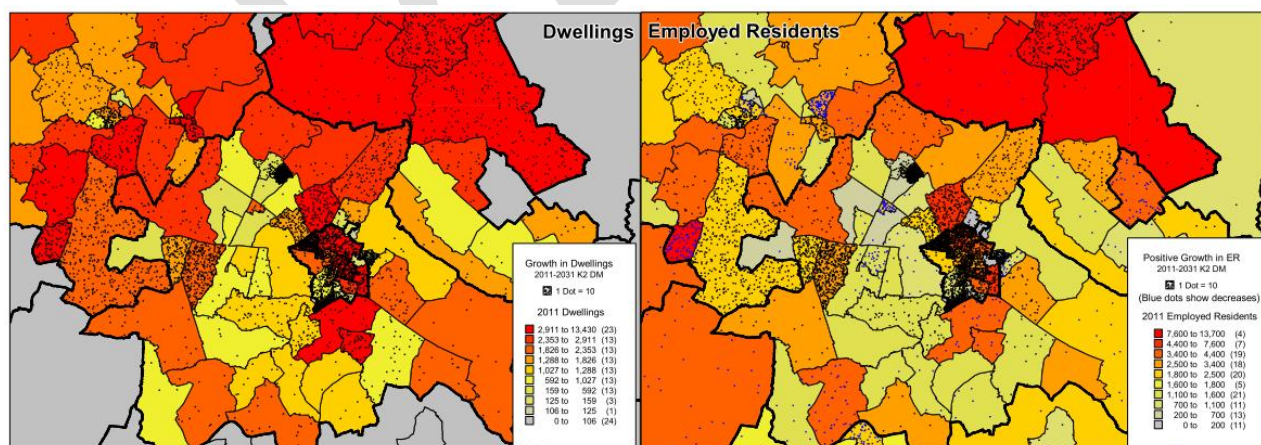
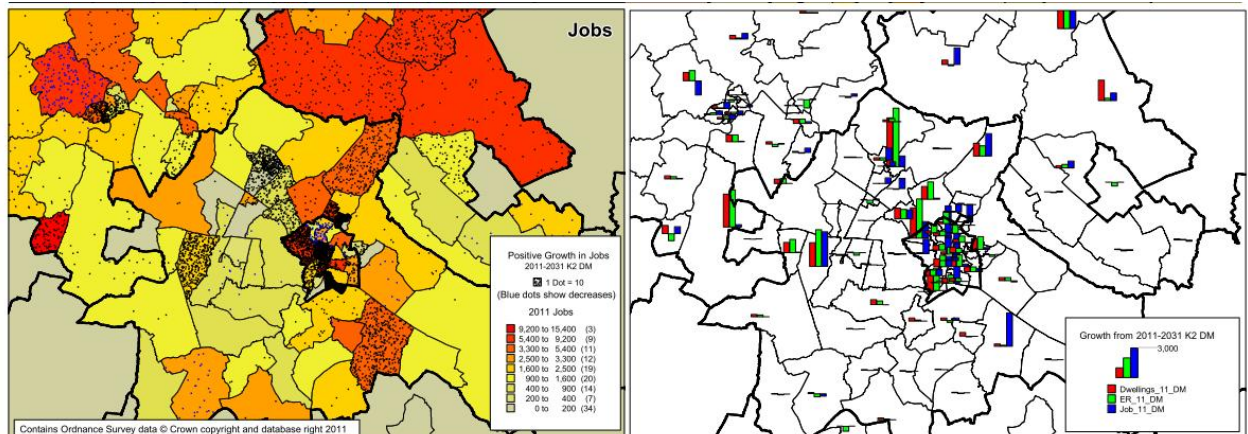


Figure 6-2 shows the increased number of jobs and overall growth, once again from the Preferred Development Option for the 2031 Local Plan scenario.

Figure 6-2 Map of Jobs and Overall Growth (2031 Preferred Development Option)



## NORTHWEST CAMBRIDGE DEVELOPMENT

6.2.3 This committed development will take place over a 150 hectare site and is located between the M11, Madingley Road and Huntingdon Road.

6.2.4 Northwest Cambridge development has been granted outline planning consent for the following land uses:

- 1500 homes for University and College key workers;
- 1500 homes for sale;
- accommodation for 2000 post-graduate students;
- 100,000 square metres of research facilities, and
- Supporting community facilities, such as a primary school, community centre, supermarkets, nursery, etc.

## DARWIN GREEN DEVELOPMENT

6.2.5 Darwin Green development has been granted planning consent for a mixed use development on land between Huntingdon Road and Histon Road on the northwest edge of the city. The site is commonly known as the National Institute of Agricultural Botany (NIAB) site. The site occupies an area of approximately 48 hectares. The proposed development will include:

- 1,593 homes, including 40% affordable;
- Primary school with Children's Centre;
- Up to six small units for mixed retail / service use;
- A centrally located park with open space for both informal use and outdoor sport facilities;
- Allotments;
- Vehicular access from Huntingdon Road and Histon Road.

6.2.6 A new access will be provided through a signal controlled junction on Histon Road just south of Kings Hedges Road junction. A proposed enhanced cycle and pedestrian route will be provided through the site to enhance connectivity between Histon Road and Huntingdon Road.

## WATERBEACH BARRACKS

- 6.2.7 North of the A14, to the east of the A10, the proposed new settlement of circa 8,000 homes at Waterbeach Barracks will bring significant additional demand on the Milton Road / Histon Road corridors. To ensure that these trips can be accommodated, a large proportion will need to be undertaken by bus, bicycle and train. Significant public transport and highway improvements will be needed to cater for growth at this site.

## ELY NORTH

- 6.2.8 It is worth noting that further along this corridor at Ely, some 3000 homes are planned in the period to 2031 (5,600 new homes in total in East Cambridgeshire) and with significant levels of out-commuting already in existence from Ely to Cambridge, further pressure is likely to be felt along Milton Road, albeit with many trips expected to be intercepted by rail and Park & Ride.

## ORCHARD PARK

- 6.2.9 Orchard Park is a development located to the north of Kings Edges Road and south of the A14.

- 6.2.10 Several phases of the development have been already completed. Once fully constructed the development will provide:

- 900 new homes - including a high percentage of affordable housing;
- employment opportunities, and
- a primary school and new community facilities.

## CAMBRIDGE SCIENCE PARK RAILWAY STATION

- 6.2.11 A new railway station is proposed by Cambridgeshire County Council in the north of Cambridge. The station will be located close to the east of Cambridge Business Park. The new proposed station will provide:

- Two mainline platforms for stopping rail services;
- One bay platform for terminating and starting rail services;
- Station building with accessible, cycle-friendly footbridge to the platforms;
- Covered platform waiting areas with modern communications and security equipment;
- Public transport interchange with Busway and on-road buses, passenger information and high-quality bus shelters;
- 450 space car park including disabled and short stay;
- Extensive cycle parking;
- Busway extension from Milton Road and vehicle access via Cowley Road; and
- Dedicated taxi and drop off area.

## 6.3 FUTURE PUBLIC TRANSPORT NETWORK

- 6.3.1 With the expected future growth through the Local Plan, the existing bus service provision is expected to grow considerably. Through informal discussions held with Stagecoach and through interrogation of the CSRM model, Table 6-1 provides an indication of the future bus services likely to use the Milton Road and Histon Road corridors in 2031.
- 6.3.2 The number of services likely to serve each corridor, due to the future committed development, is likely to double the number of services on both Milton Road and Histon Road. On Milton Road the number of bus services is likely to be 102 in both directions with Histon Road having approximately 44 in both directions during peak hours.

**Table 6-1 Bus Service Frequencies – Milton Road & Histon Road Corridor**

BUS SERVICE	PEAK FREQUENCY (ONE DIRECTION)
<b>Milton Road</b>	
Busway (every 3 to 4 minutes)	18 services per hour
Waterbeach Busway	6 services per hour
99 Park & Ride	12 services per hour
Route 9	3 services per hour
Citi 2 (part corridor north of Golden Hind)	6 services per hour
Citi 1 (part corridor south of Gilbert Road)	6 services per hour
<b>Total No Services (using corridor in part / full)</b>	<b>51</b>
<b>Histon Road</b>	
Busway B	14 services per hour
Citi 8	8 services per hour
<b>Total No Services (using corridor in part / full)</b>	<b>22</b>

## 6.4 SUMMARY OF MODELLING SCOPE

### OVERVIEW

- 6.4.1 The primary purpose of this study is to assess the impact of measures proposed for the Milton Road and Histon Road corridors between the A14 and Cambridge City Centre. On this basis, it is considered important that the modelling should be able to properly represent journey times along these road corridors for both buses and general traffic. In particular it is important that the modelling should be able to assess the interaction of queueing on upstream junctions and on the ability of buses to access measures such as bus lanes.
- 6.4.2 There are two approaches that could be taken for this modelling, namely:
- A macroscopic approach using ARCADY, PICADY, LINSIG and/ or TRANSYT; or
  - A microscopic approach using S-Paramics or VISSIM.
- 6.4.3 It is considered that a macroscopic modelling approach has several limitations, including a very limited ability to adequately model junction interactions. However, client discussion has shown that this approach would be appropriate for the Histon Road corridor where the scope for improvements is limited by the available road space. For the Milton Road corridor, where there is an existing S-Paramics model, it will be appropriate to use the existing model as the basis for option testing which allows the impacts of the potential bus priority schemes to be properly understood.

- 6.4.4 For the Histon Road corridor, an approach that utilises standard modelling software (including ARCADY, PICADY, LINSIG and TRANSYT) will be adopted. Whilst this has some limitations, it is considered appropriate for this area given the limited opportunity for significant intervention along this corridor. It is proposed that the junction of Histon Road with Victoria Road and Huntingdon Road will be added to the existing Milton Road junction but not connected to that model. This will allow connection of this significant junction to the Milton Road model in the future, if it was considered necessary, and will also allow this junction to be modelled in detail using micro-simulation for visualisation and scheme assessment purposes.
- 6.4.5 A micro-simulation model will be able to effectively model the traffic interactions between the junctions and in this highly congested local road network, where there are a number of intersections with Milton Road, this will be an important factor to consider in relation to potential capacity restrictions that may occur as a result of bus priority measures. The visualisation within a micro-simulation model means that this is easily interpreted and provides a visualisation of the highway network with the different vehicle types also being easily identifiable.
- 6.4.6 There is an existing S-Paramics model of Milton Road, which was produced by Atkins in January 2015. This model covers the entire Milton Road corridor between Milton Park and Ride site to the north of the A14 and the Mitchams Corner junction in the centre of Cambridge. Subject to an audit of the model showing no significant issues or areas of concern, it is considered that this existing model could be used to assess the impacts of bus priority measures on the Milton Road corridor. The model will have been built using the latest version of the software and has already been audited and accepted by the Council so it is assumed that there will not be any significant issues or concerns that arise from our own model audit, and that the model can be taken in its current form and used for the option testing.
- 6.4.7 There is no existing model of the Histon Road corridor, but it is considered that the microsimulation approach is still the most appropriate for the junction of Histon Road (B1049) with Victoria Road (A1134) and Huntingdon Road (A1307). The remainder of the corridor junctions will be assessed using standard macroscopic transport modelling software.

## MODELLING TIME PERIODS

- 6.4.8 The models for this study will be developed for the morning and evening peaks, plus an inter peak hour. The micro-simulation models will cover a three hour period, should include:
- A one hour warm up period, to ensure that the model is properly loaded at the start of the analysis period;
  - A one hour analysis peak, during which model statistics will be collected; and
  - A one hour cool down period, to ensure that vehicles which start their journey during the analysis peak complete their journey.
- 6.4.9 The model periods is proposed to be as follows:
- Weekday AM Peak period 07:00 – 10:00;
  - Weekday PM Peak period 16:00 – 19:00.
  - Inter peak period
- 6.4.10 The inter peak model will be a three hour period between 10:00 and 16:00 to be determined from the traffic data. The central hours of these three hour peak periods will be treated as the analysis peak. The macroscopic junction models on Histon Road will be for a single hour for the AM, PM and Inter-peak.

## ASSESSMENT YEARS

- 6.4.11 The assessment will be based on the Atkins model base year of 2014 for the Milton Road corridor and a base year of 2015 for the Histon Road corridor using recently collected traffic data.
- 6.4.12 A future assessment year of 2031 will be developed and assessed for all of the models. The existing SATURN model that includes the Core Strategy developments in Cambridge will be used to determine the level of traffic on Milton Road and Histon Road and the associated junctions in 2031.

# 7 OPTION & DESIGN DEVELOPMENT

## 7.1 OUTLINE DESIGN PROCESS

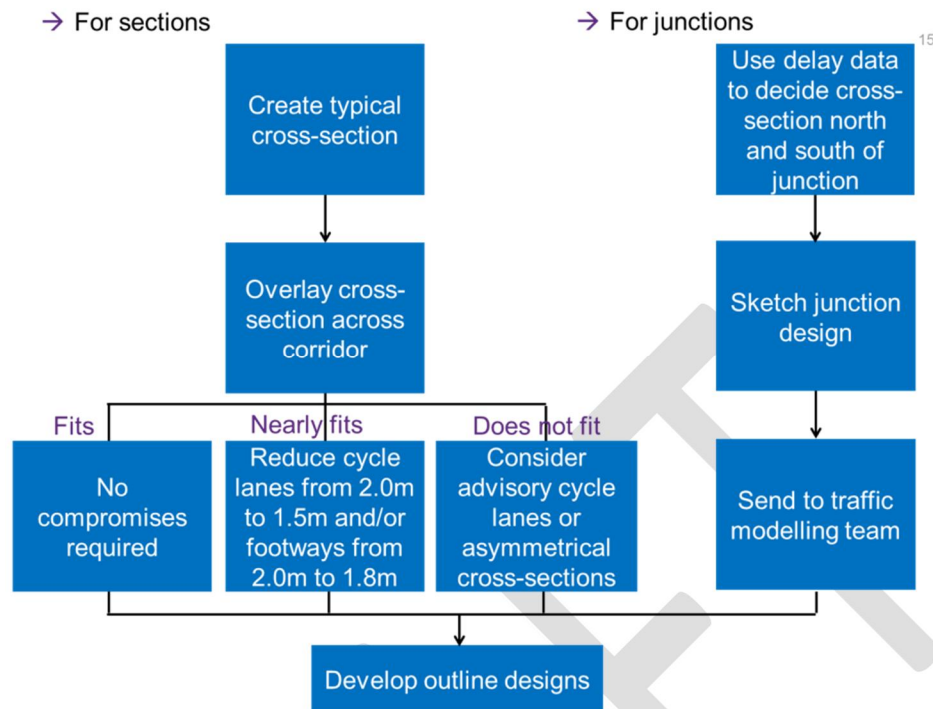
### DESIGN OPTIONS LONG-LIST

- 7.1.1 Following the identification of the corridor issues, as previously described, a 'long-list' of improvement options was developed. The options were packaged as Do Maximum, Do Something and Do Minimum scenarios. The long-list options are documented alongside the issues in Appendix A.
- 7.1.2 Following further consideration of the Do Minimum options, it was concluded that they will fall some way short of meeting the aspirations of the scheme and if taken forward will only provide localised benefits which do not provide the requisite consistent and integrated corridor improvement impact. As such the Do Minimum package of options was not taken forward to the outline design stage, albeit the majority of the Do Minimum measures are already incorporated in the Do Something and Do Maximum design options.

### OUTLINE DESIGN PROCESS

- 7.1.3 The process followed in developing the outline designs is shown in Figure 7-1. This approach was adopted in order to identify how the existing road space can be reallocated to achieve the objectives of the scheme, which thereby provide improvements in line with the following hierarchy:
- Buses: reduce journey time and improve reliability;
  - Cyclists: improve cycle priority (segregate where possible), route connectivity and consistency;
  - Pedestrians: provide adequate footway width and crossing facilities;
  - General traffic: maintain traffic at today's levels;
  - Public realm: improve quality of public realm; and
  - Parking: provide for current demand for parking & servicing.

Figure 7-1 Outline Design Process



7.1.4 The design principles applied to define the typical cross-sections are discussed in the following section.

## DESIGN PRINCIPLES

### TYPICAL CROSS SECTIONS

7.1.5 As shown in Figure 7-1, typical cross-sections were produced in order to identify the extent to which bus lanes, cycle lanes and footways can be implemented along Milton Road and Histon Road within the highway boundary, or where for relatively short sections land-take will be required. It was assumed that if a significant length and depth of land-take would be required that encroaches on developed land with active uses then the cross-section would be categorised as 'Does not fit', as it would render the option unfeasible and as such an alternative cross-section would be considered.

7.1.6 The two main cross section scenarios are shown in Figure 7-2 and Figure 7-3, which, depending on the highway width, may be symmetrical or asymmetrical. The first scenario is footway/cycleway/bus lane/vehicle lane and the second scenario is shared-use area/bus lane/vehicle lane. The shared-use areas are located where there is a cycleway which intersects with a crossing or bus stop.

7.1.7 The minimum widths are also shown in the figures below. These are informed by the precedents provided by the ongoing corridor schemes for Huntington Road and Hills Road that are being developed by Cambridge County Council, as well as being based on established good practice (including Manual for Streets). The two scenarios show the optimal design solution which is achievable if there is sufficient width, however where there is insufficient width then that has to be a compromise with, for example, the introduction of a bus lane in one direction only.



7.1.8 The minimum/desired widths are:

- Vehicle lane = 3.0m minimum;
- Bus lane = 3.0m minimum;
- Raised cycleway = 2.0m, reducing down to 1.5m minimum where required;
- Footway = 2.0m, reducing down to 1.8m minimum where required; and
- Shared-use area at bus stop/crossing = 4.0m, reducing to 3.3m minimum where required (based on a 1.8m footway and 1.5m cycleway).

Figure 7-2 Typical Cross Section - Bus Lane & Raised Cycleway

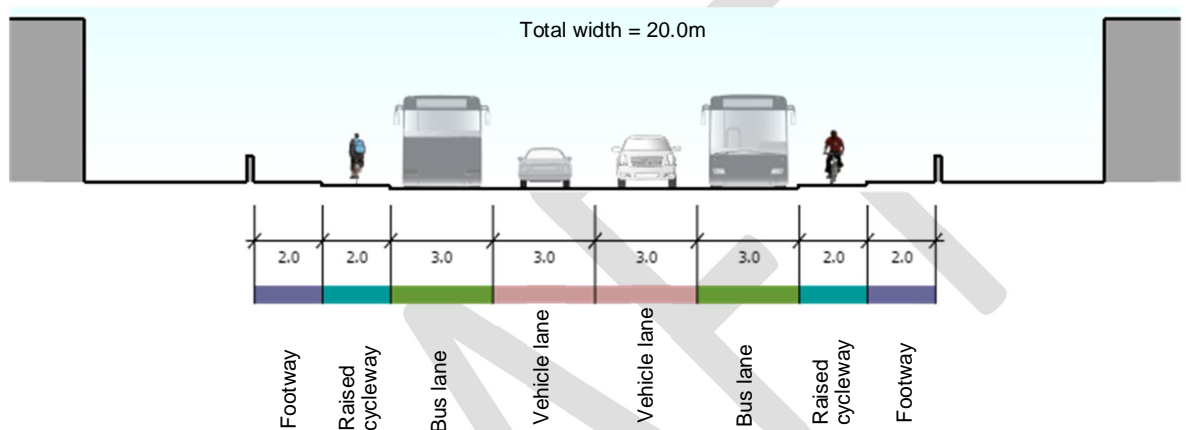
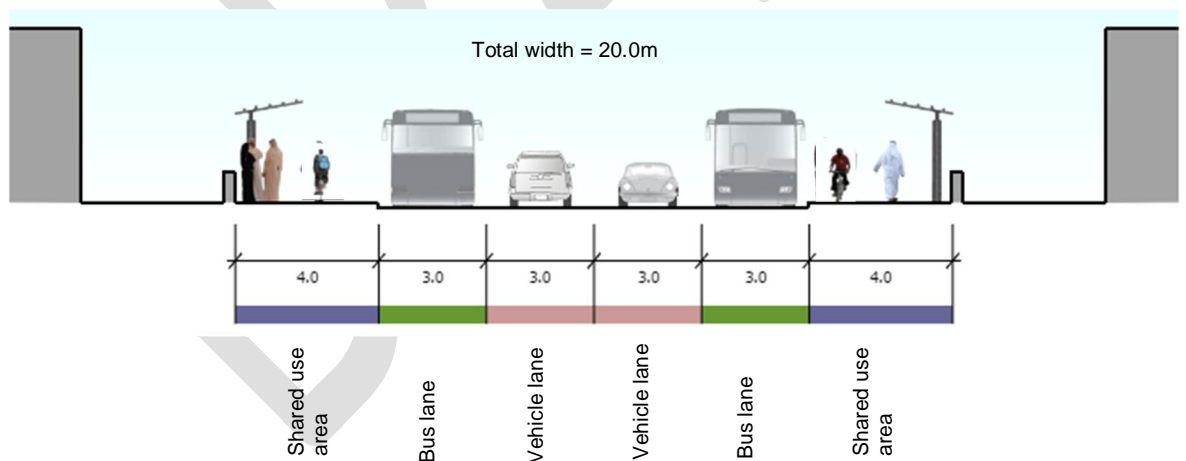


Figure 7-3 Typical Cross Section - Shared Use Area at Bus Stops & Crossings



7.1.9 The application of the cross sections to Histon Road, due to the highway width restrictions (lack of space), has required the cross sections to be compressed and only the key elements retained that meet the project objectives.

7.1.10 In addition to using standard cross-section overlays for links to reallocate roadscape, we have also used a common design approach for other elements of the scheme, including junctions, crossings and bus stops. The features and benefits associated with these measures are described below and are documented in further detail in Appendix B.

## DESIGN APPROACH – CONTROLLED JUNCTIONS

7.1.11 Our design approach for controlled junctions is:

- Tighten junction geometry and maximise space for public realm improvements and planting/trees;
- Ban turns into side roads where traffic flows are low to provide additional capacity for buses on corridor approach lanes;
- Continue bus lane to stop line where possible (in association with above banned turns);
- Provide/retain pedestrian/cycle crossings and minimise crossing distance;
- Continue cycleway/cycle lane to junction and provide Advanced Stop Lines (4m deep); and
- Provide early release signals for cyclists and two-stage right turns (where sufficient demand exists)

## DESIGN APPROACH – PRIORITY JUNCTIONS

7.1.12 Our design approach for priority junctions is:

- Minimise kerb radii to reduce vehicle exit speed and reduce crossing distance;
- Maximise space for public realm improvements and planting/trees;
- Provide raised entries where possible; and
- Introduce cycle logos between cycleway across junction.



## DESIGN APPROACH – CROSSINGS

7.1.13 Our design approach for controlled and uncontrolled crossings is:

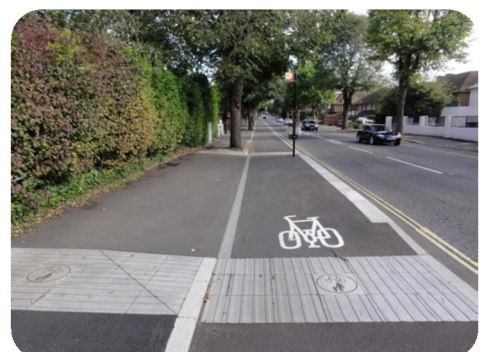
- Shared-use areas adjacent to crossings to facilitate cyclist transition from cycleway to crossing (shared-use approach consistent with bus stop design)
- Replace Zebra with Tiger crossing if significant cycle demand
- One-stage crossings where possible
- Minimise crossing distance



## DESIGN APPROACH – BUS STOPS

7.1.14 Our design approach for bus stops is:

- Use shared-use areas adjacent to bus stops, as insufficient width for floating bus stops and as minimises conflict potential compared to alternative options of running cycleway through stop or at the back of the footway. Shared-use at bus stops also



enables better utilisation of space for bus shelter and pedestrian waiting area;

- Provide shelter where possible; and
- Where bus stops are in the carriageway (rather than bus lane), relocate opposing bus stops to staggered arrangement.

## 7.2 OUTLINE DESIGNS

7.2.1 The outline designs are shown in Appendix C for Milton Road and Appendix D for Histon Road. The key features of the design are described below for each junction and section, together with alternative measures that were considered.

7.2.2 To aid interpretation of the measures that are proposed in the drawings, the following points should be noted:

- 'Unallocated land within highways boundary': indicates additional width beyond standard cross-section profile – opportunity to widen footway/retain existing verge, where applicable;
- No parking/loading permitted in bus lane or alongside raised cycleway (except off-peak within short sections of busway in Section 3 of Milton Road). No parking/loading alongside other proposed measures unless otherwise stated;
- Bus lanes to operate 24 hours per day, 7 days per week – to be reviewed following modelling of the corridor proposals; and
- Drawings do not identify small areas of existing planting/ grass verge – for simplicity, these are shown as footway. These areas within the proposed footway space will be retained or replaced where possible so that the net loss in planting within junction/sections is minimised.

7.2.3 Other than in areas where 'improved public realm and/or trees/planting' identified, standard materials/surfacing are proposed.

7.2.4 General improvements which will be undertaken as standard throughout the corridors are not shown on the drawings. These will include:

- Bus stops to be fully accessible;
- Decluttering of street furniture;
- Street furniture to be replaced where there are of sub-standard quality or made of inconsistent materials;
- Utilities to be relocated as required; and
- Trees to be planted at regular intervals along the corridors where footway width allows.

### MILTON ROAD DO MAXIMUM: KEY MEASURES

7.2.5 Table 7-1 provides a summary of the main design components that make up the sections and junctions for the Milton Road Do Maximum scenario. The key measures are described as follows.

- **Buses:** The highway width along Milton Road is relatively consistent, with an average of approximately 20m. As such, it has been possible to introduce bus lanes along the majority of the corridor. These continue up to the stopline/give-way line at junction 1 (southbound), junction 3 (northbound), junction 6 (northbound) and junction 7 (northbound). To facilitate this, left-turns were banned at junctions 3 and 6.

7.2.6 As there is insufficient width to run the southbound bus lane to the stop line at junction 2 and because there are significant delays on both approaches, bus gates are proposed. A bus priority measure is proposed at junction 1 to hold vehicles at the nearby pedestrian crossing.

7.2.7 Junction capacity for corridor bus routes has been increased at junction 4 by closing off the southern arm into Union Lane for motor vehicles and by banning the right turn into Arbury Road. In addition, bus delays will be reduced on the northbound approach to the Kings Hedges Road junction as the left-turn has been banned which has enabled the bus lane to be extended to the stopline.

- **Cyclists:** raised cycleways are proposed for the length of the corridor, apart from in the southbound direction across junctions 7 & 8 where there is already a cycle path through the subway. The zebras near junction 1 have been upgraded to Tiger crossings and a cycle bypass is included at junction 3 to avoid delays at the signals.

7.2.8 Union Lane has a relatively high flow of cyclists and as such an on-demand signal stage is proposed to enable cyclists to access Arbury Road and Milton Lane (north) under control but also to minimise the impact on junction capacity to limit delays for buses. Cyclists turning left into Milton Lane (south) will be able to bypass the signals. An example of an on-demand signal stage is shown opposite.



- **Land-take:** In Section 1, to introduce a 1.8m footway on the northbound approach to junction 2 then land would need to be acquired from the Cambridge Manor Care Home and the adjacent green space. In section 6, some land may be needed along a 150m length of road in order to introduce the two-way cycle path. Further assessment of the highway design requirements will need to be undertaken to determine if this is necessary or not;
- **Public realm:** the large diameter roundabout at Elizabeth Way has been converted to a signalised junction, which has enabled the geometry of the junction to be tightened. This, along with the closure of the Highworth Avenue arm, creates a significant area of new land within which a new public space can be created and where planting/trees can be introduced.



Example of new public space created through conversion of roundabout to signalised junction – Princes Street, Ipswich

Table 7-1 Milton Road – Do Maximum Scenario Design Components

Milton Road - Do Maximum											
	Northbound bus lane	Southbound bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossing	New/upgraded signals
Junction 1											
Section 1	Present along entire length		Present along entire length	Present along entire length			Present along entire length	Present along entire length	Present along entire length	Present along entire length	
Junction 2			Present along entire length	Present along entire length				Present along entire length			Present along entire length
Section 2	Present along entire length		Present along entire length	Present along entire length			Present along entire length	Present along entire length	Present along entire length	Present along entire length	
Junction 3			Present along entire length	Present along entire length				Present along entire length			Present along entire length
Section 3		Present along part length	Present along entire length	Present along entire length			Present along entire length	Present along entire length	Present along entire length	Present along entire length	
Junction 4			Present along entire length	Present along entire length				Present along entire length			Present along entire length
Section 4			Present along entire length	Present along entire length			Present along entire length	Present along entire length	Present along entire length	Present along entire length	
Junction 5			Present along entire length	Present along entire length				Present along entire length			Present along entire length
Section 5			Present along entire length	Present along entire length			Present along entire length	Present along entire length	Present along entire length	Present along entire length	
Junction 6			Present along entire length	Present along entire length				Present along entire length			Present along entire length
Section 6	Present along entire length	Present along part length	Present along entire length	Present along entire length			Present along entire length	Present along entire length	Present along entire length	Present along entire length	
Junction 7			Present along entire length	Present along entire length				Present along entire length			Present along entire length
Junction 8			Present along entire length	Present along entire length				Present along entire length			Present along entire length

Not applicable   
  Present along part length   
  Present along entire length

### MILTON ROAD DO SOMETHING: KEY MEASURES

7.2.9 Table 7-2 provides a summary of the main design components that make up the sections and junctions for the Milton Road Do Something scenario. The key measures are described as follows.

→ **Buses:** several of the bus lanes in the Do Maximum scenario have been replaced with sections of extended footway, which provides space to accommodate the current demand for footway parking and minimises the quantity of trees that will need to be removed in the Do Maximum scenario.

7.2.10 Bus priority measures and interventions to increase junction capacity are as per the Do Maximum scenario. The measures/requirements for cyclists, land-take and public realm are as per the Do Maximum scenario.

Table 7-2 Milton Road – Do Something Scenario Design Components

Milton Road - Do Something											
	Northbound bus lane	Southbound bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossing	New/upgraded signals
Junction 1											
Section 1	Present along entire length										
Junction 2											
Section 2	Present along entire length										
Junction 3											
Section 3		Present along part length									
Junction 4											
Section 4											
Junction 5											
Section 5											
Junction 6											
Section 6	Present along entire length	Present along part length									
Junction 7											
Junction 8											

Not applicable Present along part length Present along entire length

### HISTON ROAD DO MAXIMUM: KEY MEASURES

- 7.2.11 Table 8-3 provides a summary of the main design components that make up the sections and junctions for the Histon Road Do Maximum scenario. The key measures are described further as follows.
  - **Buses:** the width of the highway along Histon Road is narrower and less consistent than Milton Road, reducing in width from 17m at the northern extent, to 14m in section 2 and 12m in section 1. As such, in order to provide a continuous cycleway of the requisite width it has only been possible to introduce bus lanes in section 4 (southbound) and junction 4 (southbound).
- 7.2.12 The right-turn into Warwick Road at junction 3 has been banned which will increase capacity for Histon Road buses. The proposed blanket restriction on parking/loading and relocation of some bus stops will remove traffic pinch points along the route.
- 7.2.13 At junction 4, the proposed bus lane and cycle lanes will need to tie in with the design which has been developed by SKM for the Darwin Green NIAB development.

7.2.14 At junction 5, consideration was given to introducing a bus bypass through the signals from the Kings Hedges Road arm to the Histon Road arm. However, there is a high likelihood that this measure would be abused by other vehicles and this would introduce a road safety issue with the uncontrolled exit onto Histon Road across a stream of approaching southbound traffic. As the volume of left-turning traffic from Kings Hedges Road is relatively low then current delays to buses are not likely to be substantial and are likely to be comparable to those that would be introduced by the difficulty in exiting the bypass into Histon Road. A bus bypass will also require acquisition of approximately 400m<sup>2</sup> of land.

→ **Cyclists:** the designs include raised cycleways in both directions along the entire length of the Histon Road corridor, except the initial northbound section up to Rackham Close. This section is not wide enough to accommodate a northbound lane, and as such the centreline has been offset to provide additional width in the northbound lane for vehicles to pass cyclists.

7.2.15 Cycle early release signals are proposed for the Warwick Road junction.

→ **Land-take:** A relatively short section of additional land is required from a tree lined area bordering an allotment in Section 3 to take out a localised pinch-point which would result in the need to split the bus lane.

Table 7-3 Histon Road – Do Maximum Scenario Design Components

Histon Road - Do Maximum											
	Northbound bus lane	Southbound bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossing	New/upgraded signals
Junction 1											
Section 1			Present along part length	Present along part length			Present along entire length			Present along entire length	
Junction 2			Present along part length	Present along part length					Present along entire length		
Section 2			Present along part length	Present along part length			Present along entire length			Present along entire length	
Junction 3			Present along part length	Present along part length							Present along entire length
Section 3		Present along part length	Present along part length	Present along part length			Present along entire length	Present along entire length		Present along entire length	
Junction 4			Present along part length	Present along part length							Present along entire length
Junction 5											

Not applicable Present along part length Present along entire length

### HISTON ROAD DO SOMETHING: KEY MEASURES

7.2.16 Table 8-4 provides a summary of the main design components that make up the sections and junctions for the Histon Road Do Something scenario. The key measures are described further as follows.

→ **Buses:** the bus lanes proposed in the Do Maximum scenario have been omitted from the Do Something in order to avoid the need to undertake carriageway widening and footway reconstruction along a significant length of road and so that trees do not need to be removed within section 3. Some bus stops have been relocated to remove pinchpoints.



→ **Cyclists:** from the Do Maximum scenario, raised cycleways are retained in section 2 and junction 2, as this is a busy stretch of road where cyclists need greater priority and also because this does not impact on trees or parking.

7.2.17 Given the relatively high demand for on-street parking in section 1 and because the road is at its narrowest here, the Do Something scenario includes advisory cycles lanes in both directions, which vehicles would not be permitted to park in during peak hours. In section 3, the current 1.2m mandatory lanes have been retained to avoid the need to undertake footway reconstruction along a significant length of road.

7.2.18 Cycle early release signals are proposed for the Warwick Road junction.

**Table 7-4 Histon Road – Do Something Scenario Design Components**

Histon Road - Do Something											
	Northbound bus lane	Southbound bus lane	Northbound raised cycleway	Southbound raised cycle way	Northbound cycle lane	Southbound cycle lane	Shared-use areas	Land-take required	New space for public realm	New/upgraded crossing	New/upgraded signals
Junction 1											
Section 1											
Junction 2											
Section 2											
Junction 3											
Section 3											
Junction 4											
Junction 5											

Not applicable
  Present along part length
  Present along entire length

### 7.3 TRAFFIC SIGNAL IMPROVEMENTS

#### MILTON ROAD

7.3.1 The following traffic signal improvements are proposed for the Milton Road Corridor, following discussions with the CCC traffic signalling team:

- Corridor wide improvements
  - Install Mesh network along the corridor and re-configure each controller to be UTC compatible. This will allow strategic plans to be developed for the corridor and introduced by pre-determined triggers; and
  - Reliable bus detection to be installed at each site along the corridor. This will require a suitable detection method to be identified, correct infrastructure to be installed and controllers to be re-configured.
- Milton Interchange

- Detector loop locations to be investigated and re-cut as necessary;
  - MOVA to be revalidated following site traffic survey; and
  - Lane marking to be adjusted to improve lane discipline/driver behaviour.
- Cowley Road/Science Park/Business Park Junction
- Close access from Milton Road to Cowley Road enabling removal of the right turn movement and simplification of staging. The controller would require reconfiguration;
  - Damaged SCOOT loops to be identified and re-cut. Site to be put on SCOOT if stages can be rationalised; and
  - Equipment at this site is 16 years old and will require replacing in the near future.
- King's Hedges Road
- Site survey to identify location for MOVA loops to be cut at this site. MOVA to become primary mode of operation at this site. All other infrastructure is already in place for MOVA; and
  - Equipment at this site is 22 years old and will require replacing in the near future.
- Kendall Way
- Upgrade crossing to nearside Toucan and reconfigure controller for bus priority.
- Arbury Road
- Replacement of existing junction and site re-configured for bus priority. The site is 19 years old and in need of replacement in the near future.
  - Assessment of existing cycle/pedestrian facilities. Areas for improvement to be identified.
- Ascham Road
- Site was recently upgraded. No further requirements identified at this time.
- Gilbert Road
- Equipment at this site is 23 years old and will need replacing in the near future.
- Mitcham's corner
- Equipment at site is old and will need replacing in the near future.

## 7.4 HISTON ROAD

7.4.1 The following traffic signal improvements are proposed for the Histon Road Corridor, following discussions with the CCC traffic signalling team:

- Corridor wide improvements
- Install Mesh network along the corridor and re-configure each controller to be UTC compatible. This will allow strategic plans to be developed for the corridor and introduced by pre-determined triggers ;and
  - Reliable bus detection to be installed at each site along the corridor. This will require a suitable detection method to be identified, correct infrastructure to be installed and controllers to be re-configured.
- Histon Interchange
- Extend second lane into Cambridge on Southbound approach of B1049 where hatching is currently present; and

- Re-evaluate controller operation and re-configure the site to run more efficiently this will also allow MOVA to operate as a preferred method of control which should improve capacity.
- King's Hedges Road
  - Provide linking to Histon Interchange. This could be achieved through a mesh network or wired link.
- Hazelwood Close
  - Upgrade crossing to nearside Puffin and reconfigure controller for bus priority.
- Gilbert Road
  - Lanes to be adjusted and reallocated to improve driver behaviour at this site.
- Windsor Road
  - Site is relatively new nothing else noted at this time.
- Linden Close
  - Upgrade crossing to nearside Puffin and reconfigure controller for bus priority.
- Victoria Road/Huntingdon Road/Castle Street
  - Site was relatively recently reconfigured; and
  - Signals equipment is 16 years old and will need replacing in the near future.

DRAFT

# 8

## DESIGN APPRAISAL & IMPACTS

### 8.1 OVERVIEW

8.1.1 An assessment has been undertaken of the impacts of the proposals in the Do Maximum and Do Something scenarios for the Milton Road and Histon Road corridors. The impacts are shown as a positive or negative change compared to the current performance (shown in the tables that following in this chapter), where 2 = a major positive impact, 1 = a minor positive impact, 0 = no change, -1 = a minor negative impact and -2 = a major negative impact. Where an objective was rated as red in the current performance table and changes to green in the Do Maximum or Do Something scenario, then this would be given a score of +2.

8.1.2 The assessment tables use a weighting to reflect the relative importance of the objectives. Bus service delays have been given the highest weighting, followed by cycle priority measures.

### 8.2 MILTON ROAD APPRAISAL

Tables 8-1 and 8-2 show the impact of the proposals for the Do Maximum and Do Something scenarios for Milton Road.

Figure 8-1 Milton Road Scheme Impact Assessment (1)

SCHEME IMPACT		Section 1		Junction 2				Section 2				Junction 3				Section 3				Junction 4				
		Do som		Do max		Do som		Do max		Do som		Do max		Do som		Do max		Do som		Do max				
		Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting			
Study Objectives	- Traffic delays	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
	- Road safety	7	7	1	7	1	7	2	7	2	7	2	7	2	7	7	7	7	7	2	7	2	7	
Buses	- Bus service delays	2	10	2	10	2	10	2	10	1	10	2	10	1	10	1	10	2	10	1	10	1	10	
	- Bus stop provision/quality	7	7	7	7	7	7	1	7	1	7	7	7	7	7	1	7	1	7	7	7	7	7	
Pedestrians	- Pedestrian crossing facilities	7	7	7	7	7	7	1	7	1	7	2	7	2	7	1	7	1	7	7	7	7	7	
Cyclists	- Cycle priority measures	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1	9	2	9	
	- Cyclist crossing facilities	1	7	1	7	1	7	7	7	7	7	2	7	2	7	7	7	7	7	2	7	2	7	
Public Realm	- Quality of the public realm	1	7	1	7	7	7	7	7	7	1	7	1	7	1	7	1	7	1	7	1	7	1	7
	- Provision of trees/planting	1	7	1	7	1	7	1	7	7	7	7	7	1	7	1	7	1	7	1	7	1	7	
Parking	- Parking provision	-1	7	-1	7	7	7	7	7	-1	7	-2	7	7	7	7	7	-1	7	-2	7	7	7	
	- Servicing provision	-1	6	-1	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Impact / Weighted Impact		4	37	4	37	6	50	6	50	5	40	6	50	10	75	10	75	5	40	5	43	10	76	
Outline Cost (£)																								

Figure 8-2 Milton Road Scheme Impact Assessment (2)

SCHEME IMPACT		Section 4		Junction 5		Section 5		Junction 6		Section 6		Junction 7		Junction 8			
		Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max		
		Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting		
Traffic	- Traffic delays	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
Road Safety	- Road safety	1	7	1	7	1	7	1	7	1	7	1	7	1	7		
Buses	- Bus service delays	1	10	1	10	1	10	1	10	2	10	2	10	2	10		
	- Bus stop provision/quality	1	7	1	7	7	7	7	7	1	7	1	7	7	7		
Pedestrians	- Pedestrian crossing facilities	1	7	1	7	1	7	1	7	1	7	1	7	7	7		
Cyclists	- Cycle priority measures	1	9	1	9	1	9	1	9	1	9	1	9	2	9		
	- Cyclist crossing facilities	7	7	7	7	7	7	7	7	7	7	7	7	7	7		
Public Realm	- Quality of the public realm	7	7	7	7	7	7	7	7	7	1	7	1	7	7		
	- Provision of trees/planting	7	7	1	7	1	7	1	7	1	7	1	7	1	7		
Parking	- Parking provision	1	7	7	7	7	7	1	7	7	7	7	7	7	7		
	- Servicing provision	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
Impact / Weighted Impact		6	47	5	40	4	30	5	40	5	40	6	50	5	43		
Outline Cost (£)																	
Corridor Total:		Do Maximum = 604 weighted, 74 unweighted								Do Something = 578 weighted, 72 unweighted							

- 8.2.1** The assessment shows that junction 3, junction 4, section 5 and section 6 receive the greatest benefits from the Do Maximum scenario proposals. In the case of junctions, this is because, compared to many sections, they do not negatively impact on the availability of parking. Section 5 has more extensive bus lanes than some of the other sections and section 6 also provide more improvement to the quality of the public realm than some sections.
- 8.2.2** The Do Maximum scenario has an overall weighted score of 604, compared to 578 for the Do Something scenario.
- 8.2.3** The most significant (score of +2) and consistent benefits along the corridor in the Do Maximum scenario are for bus service delays and cycle priority measures – provided by the introduction of bus lanes/other bus priority measures and raised cycleways/ASLs/junction improvements respectively.
- 8.2.4** Comparing the Do Maximum and Do Something scenarios – several sections and junctions have the same overall score as the proposals are identical. Where the scores differ, this is largely because the Do Something scenario replaces many northbound bus lanes proposed in the Do Maximum option with extended footway areas for parking and/or retention of trees. This means that this scenario scores lower for improvements to bus service delays but higher for parking improvements.
- 8.3 HISTON ROAD APPRAISAL**
- 8.3.1** Table 8-3 shows the impact of the proposals for the Do Maximum and Do Something scenarios for Histon Road. The table also includes an outline cost for each section and junction. The costs are described in more detail further within this report.
- 8.3.2** As shown in Table 8-3, junction 2 gained the most significant benefits from the corridor proposals, largely because the impacts on parking are relatively minimal and because the junction provides some level of benefit to most of the other objectives.
- 8.3.3** The difference between the Do Maximum and Do Something scenarios is most noticeable in Section 3. This is because the Do Something scenario does not include bus lanes so there are no benefits to bus delays.

Figure 8-3 Histon Road Scheme Impact Assessment

SCHEME IMPACT		Junction 1		Section 1		Junction 2		Section 2		Junction 3		Section 3		Junction 4		Junction 5	
		Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max	Do som	Do max
		Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting
Traffic	- Traffic delays	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Road Safety	- Road safety	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Buses	- Bus service delays	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	- Bus stop provision/quality	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Pedestrians	- Pedestrian crossing facilities	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Cyclists	- Cycle priority measures	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	- Cyclist crossing facilities	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Public Realm	- Quality of the public realm	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	- Provision of trees/planting	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Parking	- Parking provision	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	- Servicing provision	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Impact / Weighted by Zone Priorities				6	47	6	49	7	56	7	56	5	42	5	42	3	23
Outline Cost (£)																	
Corridor Total:		Do Maximum = 236 weighted, 29 unweighted								Do Something = 234 weighted, 29 unweighted							

8.3.4 The Do Maximum scenario has an overall weighted score of 236, compared to 234 for the Do Something scenario.

8.3.5 Overall, for both corridors, the objectives which are affected most by the design proposals are Bus service delays, provision of trees/planting and parking provision – as these are the main measures that differentiate the Do Maximum and Do Something scenario. As such, we have quantified the impacts on parking and trees and this is shown below. Quantification of the bus service delays will be completed as part of the modelling work that is currently being undertaken.

## 8.4 TREE IMPACTS

8.4.1 Tables 8-4 to 8-7 show the number of trees that will need to be removed on Milton Road and Histon Road in the Do Maximum and Do Something scenarios, split by section and junction. A tree survey was undertaken for Milton Road and therefore we have been able to provide a breakdown by category of tree. The categories are defined as follows for the surveys undertaken:

- Category A: Trees of high quality and value capable of making a significant contribution to the area for 40 or more years;
- Category B: Trees of moderate quality or value capable of making a significant contribution to the area for 20 or more years;
- Category C: Trees of low quality, adequate for retention for a minimum of 10 years expecting new planting to take place; or young trees that are less than 15 cms in diameter which should be considered for re-planting where they impinge significantly on the proposed development; and
- Category U: Unknown or dead.

Figure 8-4 Milton Road Do Maximum Tree Survey

Category	Retain	%	Remove	%	Total
A2	3	60%	2	40%	5
B2	10	27%	27	73%	37
C2	11	13%	77	88%	88
U	0	0%	11	100%	11
<b>Total</b>	<b>24</b>	<b>17%</b>	<b>117</b>	<b>83%</b>	<b>141</b>
Area	Retain	%	Remove	%	Total
Junction 1	3	75%	1	25%	4
Junction 2	0	0%	5	100%	5
Junction 3	1	100%	0	0%	1
Junction 4	1	20%	4	80%	5
Junction 5	2	29%	5	71%	7
Junction 6	5	83%	1	17%	6
Section 1	0	0%	6	100%	6
Section 2	4	15%	22	85%	26
Section 3	4	50%	4	50%	8
Section 4	3	6%	51	94%	54
Section 5	1	7%	14	93%	15
Section 6	0	0%	4	100%	4
<b>Total</b>	<b>24</b>	<b>17%</b>	<b>117</b>	<b>83%</b>	<b>141</b>

Table 8-1 Milton Road Do Something Tree Survey

Category	Retain	%	Remove	%	Total
A2	4	80%	1	20%	5
B2	19	51%	18	49%	37
C2	34	39%	54	61%	88
U	1	9%	10	91%	11
<b>Total</b>	<b>58</b>	<b>41%</b>	<b>83</b>	<b>59%</b>	<b>141</b>
Area	Retain	%	Remove	%	Total
Junction 1	3	75%	1	25%	4
Junction 2	0	0%	5	100%	5
Junction 3	1	100%	0	0%	1
Junction 4	2	40%	3	60%	5
Junction 5	7	100%	0	0%	7
Junction 6	6	100%	0	0%	6
Section 1	0	0%	6	100%	6
Section 2	4	15%	22	85%	26
Section 3	6	75%	2	25%	8
Section 4	18	33%	36	67%	54
Section 5	12	80%	3	20%	15
Section 6	0	0%	4	100%	4
<b>Total</b>	<b>59</b>	<b>42%</b>	<b>82</b>	<b>58%</b>	<b>141</b>

**Table 8-2** Histon Road Do Maximum Tree Summary

Area	Retain	%	Remove	%	Total
Junction 1	0	n/a	0	n/a	0
Junction 2	2	100%	0	0%	2
Junction 3	10	100%	0	0%	10
Junction 4	0	n/a	0	n/a	0
Junction 5	0	n/a	0	n/a	0
Section 1	0	n/a	0	n/a	0
Section 2	0	n/a	0	n/a	0
Section 3	4	10%	38	90%	42
<b>Total</b>	<b>16</b>	<b>30%</b>	<b>38</b>	<b>70%</b>	<b>54</b>

**Table 8-3** Histon Road Do Something Tree Summary

Area	Retain	%	Remove	%	Total
Junction 1	0	n/a	0	N/A	0
Junction 2	2	100%	0	0%	2
Junction 3	10	100%	0	0%	10
Junction 4	0	n/a	0	n/a	0
Junction 5	0	n/a	0	n/a	0
Section 1	0	n/a	0	n/a	0
Section 2	0	n/a	0	n/a	0
Section 3	42	100%	0	0%	42
<b>Total</b>	<b>54</b>	<b>100%</b>	<b>0</b>	<b>0%</b>	<b>54</b>

8.4.2 For Milton Road, 83% of trees will need to be removed in the Do Maximum scenario and 58% in the Do Something scenario. Only 2 of the 117 trees that will need to be removed in the Do Maximum scenario are in the most valuable 'A' category.

8.4.3 For Histon Road, 38 trees (70%) need to be removed in the Do Maximum scenario and in the Do Something scenario there will be no loss in trees. All of the 38 trees are in Section 3 clash with the proposed raised cycleway.

## 8.5 WAITING & LOADING IMPACT

8.5.1 Tables 8-8 and 8-9 show the change in parking capacity for Milton Road and Histon Road in the Do maximum and Do Something scenarios. The current capacity is made up of parking bays, kerbside areas with or without single yellow lines and areas where footway parking is possible. A parking survey has not been undertaken, therefore we have derived the capacity simply based on the number of bays and the length of road for which parking is available (divided by 6m to estimate the number of spaces).

8.5.2 With the Do Maximum option for Milton Road there is a loss of 51 parking space and for the Do Something scenario an increase in 122 spaces. This gain in parking is a result of the widening of the footway, where parking is possible. As with the current footway parking, this is calculated simply by dividing the length of these areas by 6m.

8.5.3 For Histon Road, there is no change in parking capacity with the Do Maximum scenario and a loss of 17 space in the Do Something scenario.



Table 8-4 Milton Road – Change in Parking Capacity

Area	Do Maximum			Do Something		
	Existing capacity	Future capacity	Diff	Existing capacity	Future capacity	Diff
Junction 1	0	0	0	0	0	0
Junction 2	0	0	0	0	0	0
Junction 3	0	0	0	0	0	0
Junction 4	0	0	0	0	0	0
Junction 5	0	0	0	0	0	0
Junction 6	0	0	0	0	0	0
Section 1	24	15	-9	24	25	1
Section 2	33	19	-14	33	26	-7
Section 3	31	31	0	31	21	-10
Section 4	37	22	-15	37	158	121
Section 5	27	16	-11	27	48	21
Section 6	6	4	-2	6	2	-4
<b>Total</b>	<b>158</b>	<b>107</b>	<b>-51</b>	<b>158</b>	<b>280</b>	<b>122</b>

Table 8-5 Histon Road – Change in Parking Capacity

Area	Do Maximum			Do Something		
	Existing capacity	Future capacity	Diff	Existing capacity	Future capacity	Diff
Junction 1	7	7	0	7	7	0
Junction 2	0	0	0	0	0	0
Junction 3	6	6	0	6	0	-6
Junction 4	0	0	0	0	0	0
Junction 5	0	0	0	0	0	0
Section 1	119	119	0	119	119	0
Section 2	11	11	0	11	0	-11
Section 3	0	0	0	0	0	0
<b>Total</b>	<b>143</b>	<b>143</b>	<b>0</b>	<b>143</b>	<b>126</b>	<b>-17</b>

# 9

## COSTS & DELIVERY PROGRAMME

### 9.1 OUTLINE COSTS

- 9.1.1 At this very early stage of project development, it is difficult to provide an estimated outturn cost of the proposals, however an initial assessment based on typical engineering costs for this type of work suggests that the costs for the proposed options could be met from the initial project budget estimate.
- 9.1.2 Milton Road ('Do Max' and 'Do Something' options) are estimated to be within the budgetary allocation whilst Histon Road ('Do Max' and 'Do Something' is likely to be approximately twice as high.
- 9.1.3 However, any outturn cost estimate should be treated with caution as it is not possible at this stage to assess the costs associated with items such as land purchase, compensation claims and the potential relocation of utilities which is expected to be substantial.

### 9.2 OUTLINE DELIVERY PROGRAMME

- 9.2.1 An outline delivery programme needs to be established in line with the requirements of the City Deal and the process timescale required by the local authorities. For the purpose of these estimated costs, implementation by 2020 has been assumed which is in line with the first tranche of the City Deal funding.

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# 10 CONCLUSIONS & RECOMMENDATIONS

## 10.1 CONCLUSIONS

### OVERVIEW

10.1.1 From the current available options assessment and development work undertaken for both the Milton Road and Histon Road Corridors undertaken, the following conclusions can be drawn:

10.1.2 The key conclusion of this report is that both the Milton Road and Histon Road corridors require significant infrastructure interventions to support the future growth and aspirations of Cambridgeshire County Council within Cambridge and the greater area. With the transport network already constrained, particularly at peak times, the need to for investment in public transport, cycling and pedestrian infrastructure for the substantial future growth aspirations of the Local Plan through to 2031 is substantial.

### EMERGING KEY ISSUES

10.1.3 There are a number of key emerging issues across both corridors from the measures proposed which need to be considered further. These key issues are spread across a number of issues as follows:

- **Highway Trees and Verges** – all measures will have an impact on highway trees and verges with substantial tree and verge loss taking place;
- **Waiting and Loading** – the measures will have an impact on current highway waiting and loading. Consideration will need to be given to how displaced vehicles might be managed. This also applies to the servicing and deliveries for local businesses affected by this issue;
- **Traffic Displacement** - The potential displacement of traffic onto other routes as a result of restricted turns and entry restrictions will need to be considered and this is being modelled to assess the change in traffic patterns. It may prove necessary to widen the scope of the scheme to provide mitigation measures on some side roads, where appropriate;
- **Bus Stops** - Whilst the use of floating bus stops to avoid cyclists needing to overtake buses is not explicit on the plans, calls for their inclusion are expected. Further development will be required;
- **Land Acquisition** - Some of the measures would require the acquisition of land although the areas are relatively modest. This could become a significant issue depending on the attitude of the land owners but the designs could be considered for amendment to avoid this if required, albeit at the expense of the benefits likely to be achieved;
- **Elizabeth Way Roundabout (Milton Road)** - Removal of the roundabout with the installation of traffic signals to improve cycle safety and to allow the prioritisation of bus movements is one of the most significant changes being proposed. The public realm would change significantly but the current central island landscaping could be replaced by other areas of landscaping around the new junction;
- **Science Park / Cowley Road Area (Milton Road)** – with the current work on the A14 and future work on the A10, this key junction, the congestion it experiences, will require further consideration beyond the scope of this study;
- **Victoria Road/Huntingdon Road junction** - Much of the delay caused to buses on Histon Road stems from this junction and changes here are crucial to improving bus service performance. Whilst not currently shown on the accompanying plans (work in progress), it is proposed to restrict access to Victoria Road except for buses and cycling. Egress from

Victoria Road to Huntingdon Road would be maintained but the turn from Victoria Road into Histon Road would also be prohibited except for buses and cycling. These changes will simplify the junction operation, freeing up more green time for Histon Road to improve bus reliability. As a result, some traffic would be displaced with Castle Street and Chesterton Lane likely to be the most attractive alternative route. As previously mentioned, mitigation measures may be required as a result. Modelling work is progressing to assess the impacts so that they can be considered as part of public consultation

## MODELLING AND APPRAISAL LIMITATIONS

- 10.1.4 The modelling and appraisal work is still being undertaken for both corridors and will be completed for the final options report. The stage of scheme development should also be borne in mind, given that the proposals will change through this process and the subsequent public consultation process.

## 10.2 RECOMMENDATIONS

- 10.2.1 There are a number of potential options that have emerged from this study. We need to firstly consider the overall strategic objectives of the study to identify and appraise measures that support the City Deal priority of achieving efficient and reliable movement between key existing and future housing and employment sites within the Cambridge area. Secondly, we need to physically identify and appraise the measures relating to these objectives.
- 10.2.2 The key measures for the assessment of the measure proposed for Milton Road and Histon Road are:
- Travel time indicators: the average travel time from origin to destination for both buses and general traffic. For the options presented, it is expected that bus service journey times will decrease along with increased reliability. General traffic travel times are expected to stay at the same levels;
  - Patronage: public transport patronage is expected to increase;
  - Environmental: additional physical infrastructure for cyclists and pedestrians along with environment enhancement, streetscape and air quality improvements.
- 10.2.3 Changes to the journey times will be set out in the scheme assessments once completed. Ahead of putting forward the proposals for public consultation, further work will be undertaken to build on the technical work undertaken to date. This will provide some indication of the expected effects and outcomes of the various measures, particularly in terms of any traffic / parking displacement and journey times. More detailed work will be required following the selection of a 'preferred scheme' to facilitate an outline business case assessment.
- 10.2.4 It is therefore recommended that the four options presented here, namely the 'Do Maximum' and 'Do Something' for both the Milton Road and Histon Road corridors are taken forward for further technical development to support future public consultation events in 2016 and subsequent outline business case development.

## BIBLIOGRAPHY

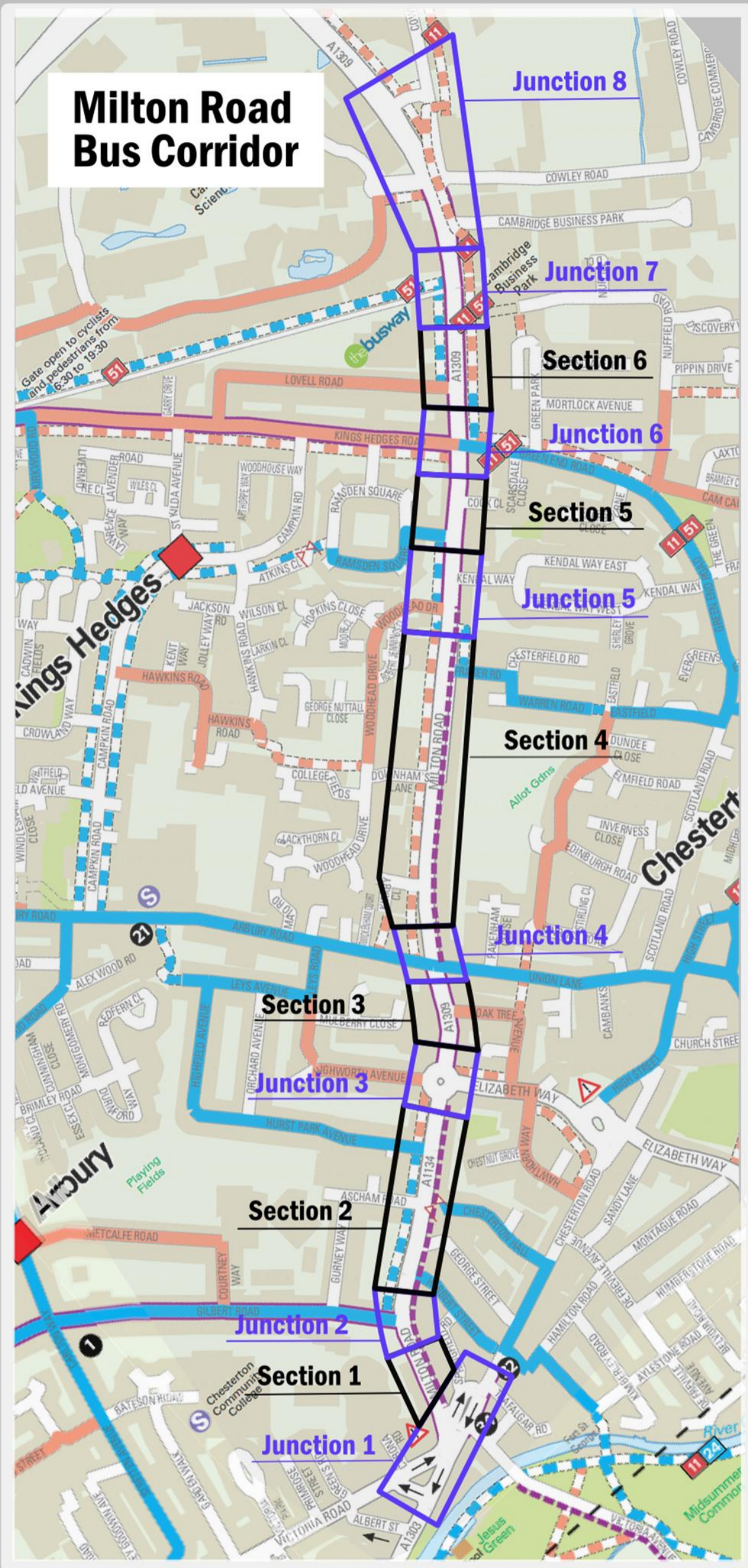
- Cambridgeshire Local Transport Plan 2011 – 2031;
- Transport Strategy for Cambridge and South Cambridgeshire (2014)
- Greater Cambridge City Deal (2014)

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# Appendix A

**LONG LIST OF OPTIONS AND ISSUES**





**Key:**

- Buses
- Cyclists
- Pedestrians
- Road safety
- Traffic movement
- Parking
- Public realm
- Section/junction-wide issues
- Location specific issues

Three different levels of option are being considered for each Junction and each Section:

- 'Do Minimum' Option
- 'Do Something' Option (which also includes the measures listed for option above)
- 'Do Maximum' Option (which also includes the measures listed for option above)

Additionally three different levels of Corridor-Wide measures are being considered:

Issues:

- Lack of continuity of bus priority measures along corridor
- Lack of continuity of cycle priority measures along corridor

'Do Minimum' Option:

- Bus stop improvements including shelters, kerb height, printed and real time information
- ASLs for cyclists

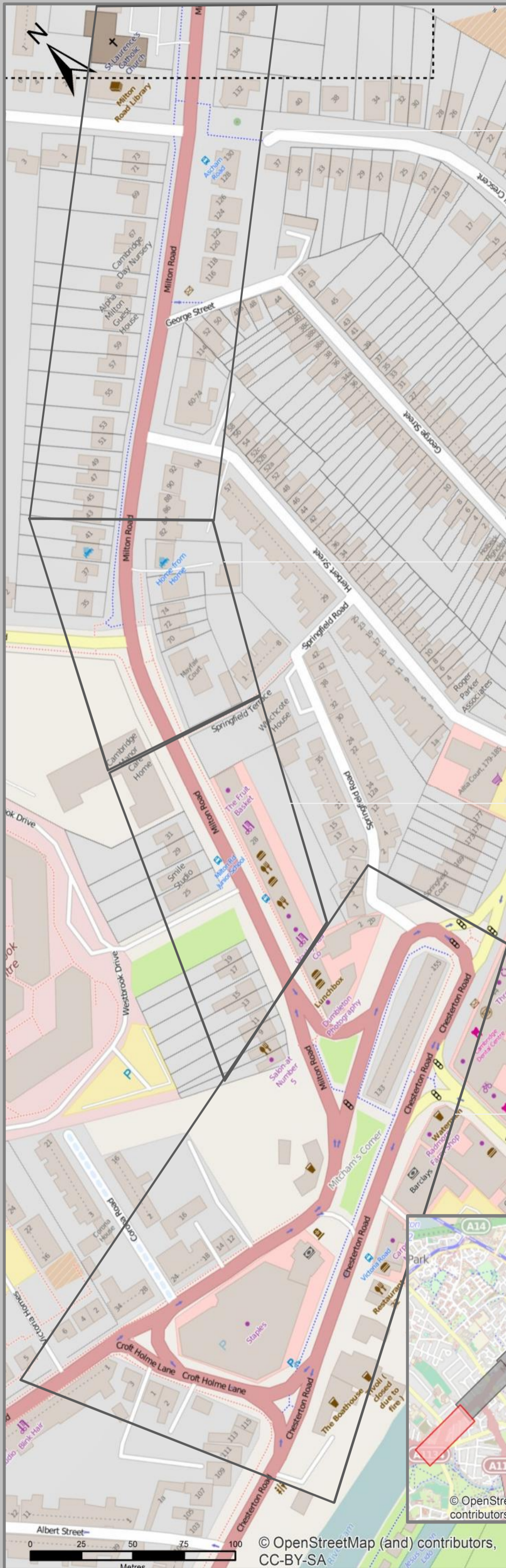
'Do Something' Option:

- Bus SVD at signals where appropriate
- Early start signals for cyclists where appropriate
- ■ Raised entry treatments at side roads

'Do Maximum' Option:

- ■ 4.5m wide bus & cycle lanes where possible
- Bus lay-bys or floating bus stops where possible to allow cyclists to overtake
- Segregated cycle lanes where possible





## Section 2

### Issues:

- Narrow bus lane
- ■ Lack of priority for northbound cyclists at side road junctions is hazardous
- Northbound shared use footway cycling is not delineated
- Toucan crossing does not align with popular Chesterton Hall Crescent cycle route
- ■ East footway is narrow adjacent to a small number of parking spaces

### 'Do Minimum' Option:

- Minor widening of southbound bus lane
- ■ Removed southbound footway parking at footway pinchpoints

### 'Do Something' Option:

- ■ Give northbound cyclists priority at side road junctions by creating raised cycle lanes on the approaches
- Make Atcham Road cycle only or entry only. Move toucan crossing to align with Chesterton Hall Crescent.

### 'Do Maximum' Option:

- Remove northbound footway parking to release width
- Create continuous northbound raised cycle lane
- Widen southbound bus lane

## Junction 2: Gilbert Road signalled t-junction

### Issues:

- Southbound bus lane does not reach junction due to width constraints

### 'Do Minimum' Option:

- Signal timing adjustments

### 'Do Something' Option:

- Create 'bus gate' at end of southbound bus lane

### 'Do Maximum' Option:

- Or extend southbound bus lane to junction

## Section 1

### Issues:

- Southbound narrow bus lane is easily obstructed by parking / loading vehicles

### 'Do Minimum' Option:

- Rationalise southbound parking / loading locations and hours
- Increase parking / loading enforcement

### 'Do Something' Option:

- Same as above

### 'Do Maximum' Option:

- Remove northbound parking to release width
- Create northbound raised cycle lane
- Widen southbound bus lane

## Junction 1: Mitcham's Corner Gyratory

### Issues:

- N-S bus routing is indirect
- ■ Gyratory is hazardous for cyclists
- Poor quality public realm

### 'Do Minimum' Option:

- Decluttering and other minor public realm improvements

### 'Do Something' Option:

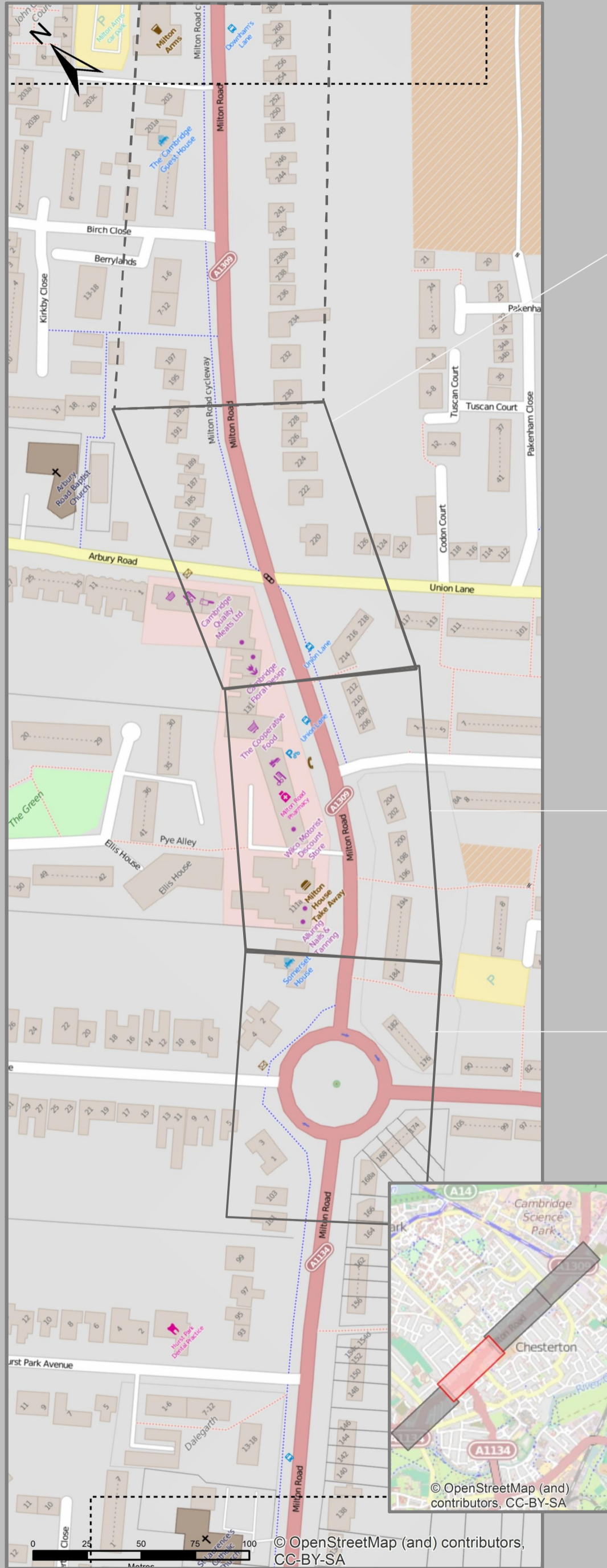
- Create a northbound bus cut-through
- Extend southbound bus lane to junction

### 'Do Maximum' Option:

- ■ ■ Re-configure gyratory, including more direct N-S bus routing
- Substantial public realm improvements

### Key:

- |                                  |                    |                |
|----------------------------------|--------------------|----------------|
| ■ Buses                          | ■ Road safety      | ■ Public realm |
| ■ Cyclists                       | ■ Traffic movement |                |
| ■ Pedestrians                    | ■ Parking          |                |
| —●— Section/junction-wide issues |                    |                |
| —→— Location specific issues     |                    |                |



### Junction 4: Arbury Road / Union Lane signalled crossroads

#### Issues:

- Northbound left turn only lane is hazardous for cyclists
- No northbound bus priority
- Southbound bus lane does not reach junction

#### 'Do Minimum' Option:

- Re-designate northbound 'left turn only' lane as 'ahead and left'

#### 'Do Something' Option:

- Close Union Lane to motor vehicles
- Create northbound cycle lane to junction
- Create 'bus gate' at end of southbound bus lane

#### 'Do Maximum' Option:

- Extend southbound bus lane to junction

### Section 3

#### Issues:

- No bus lanes
- Shop off-street parking / service road has poor layout and is unattractive
- Northbound on-road cycling is inconsistent with adjacent sections

#### 'Do Minimum' Option:

- No specific measures (beyond the corridor-wide measures)

#### 'Do Something' Option:

- Remove parking on one side of the road to release width
- Create northbound raised cycle lane

#### 'Do Maximum' Option:

- Rationalise forecourt parking to improve layout and public realm
- Remove northbound and southbound parking / loading lay-bys to release width
- Create southbound bus lane

### Junction 3: Highworth Avenue / Elizabeth Way priority roundabout

#### Issues:

- Queuing back from Arbury Road through roundabout to Elizabeth Way. Blocks other movements.
- No cyclist segregation lane on the roundabout. Cyclists are vulnerable to 'left hook' collisions.

#### 'Do Minimum' Option:

- Retain roundabout, improve signing and road markings

#### 'Do Something' Option:

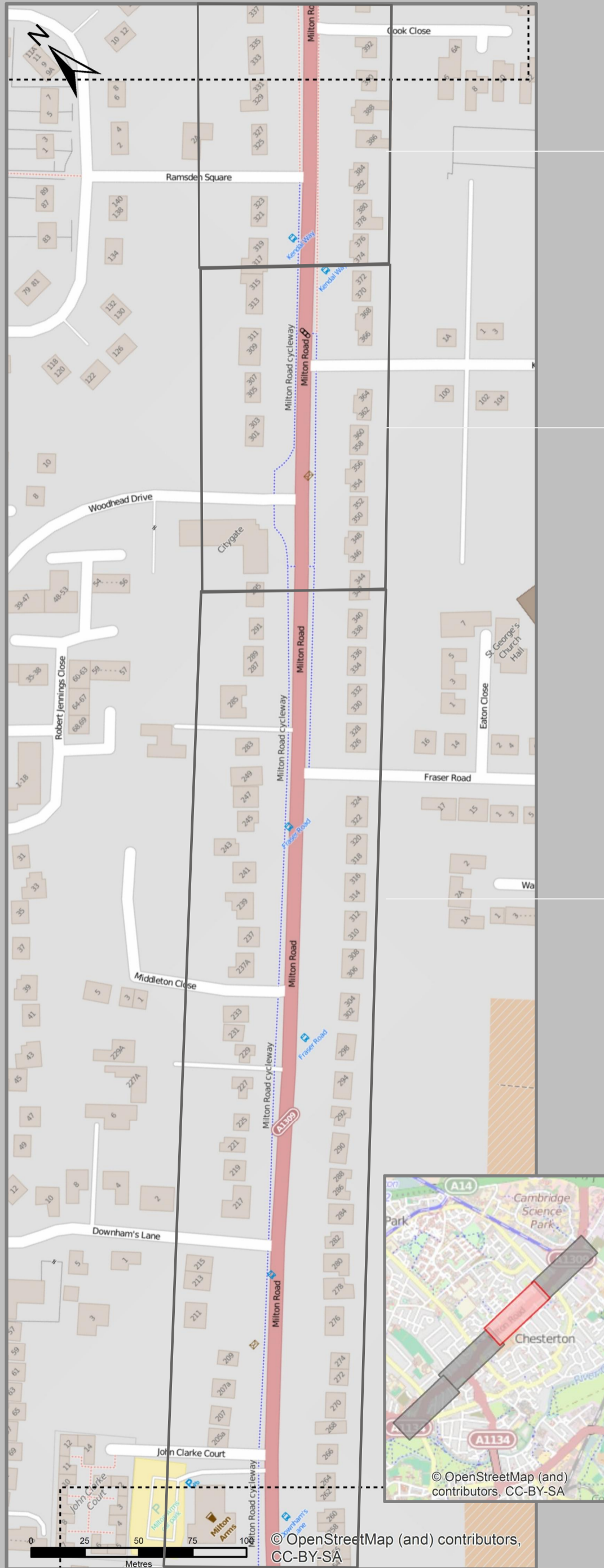
- Retain roundabout with various improvements such as traffic signals and cycle facilities

#### 'Do Maximum' Option:

- Or replace roundabout with signalled crossroads
- Improve public realm

#### Key:

- |                                 |                    |                |
|---------------------------------|--------------------|----------------|
| ■ Buses                         | ■ Road safety      | ■ Public realm |
| ■ Cyclists                      | ■ Traffic movement |                |
| ■ Pedestrians                   | ■ Parking          |                |
| —● Section/junction-wide issues |                    |                |
| —→ Location specific issues     |                    |                |



## Section 5

### Issues:

- No bus lanes
- The transition from northbound footway cycling to on-road mandatory cycle lane is unclear. There are also examples on the southbound side of Milton Road where this is unclear.

### 'Do Minimum' Option:

- Improve transition from northbound footway cycling to on-road cycling

### 'Do Something' Option:

- Same as above

### 'Do Maximum' Option:

- Create northbound bus lane

## Junction 5: Woodhead Drive and Kendal Way priority t-junctions

### Issues:

- No bus lanes / bus priority
- Woodhead Drive junction excessively wide

### 'Do Minimum' Option:

- Tighten corner radii

### 'Do Something' Option:

- Same as above

### 'Do Maximum' Option:

- Create a bus lane (direction subject to traffic count / delay analysis)
- Create continuous northbound raised cycle lane
- Create an improved crossing for cyclists

## Section 4

### Issues:

- Narrow southbound bus lane
- Lack of priority for northbound cyclists at side road junctions is hazardous

### 'Do Minimum' Option:

- Minor widening of southbound bus lane

### 'Do Something' Option:

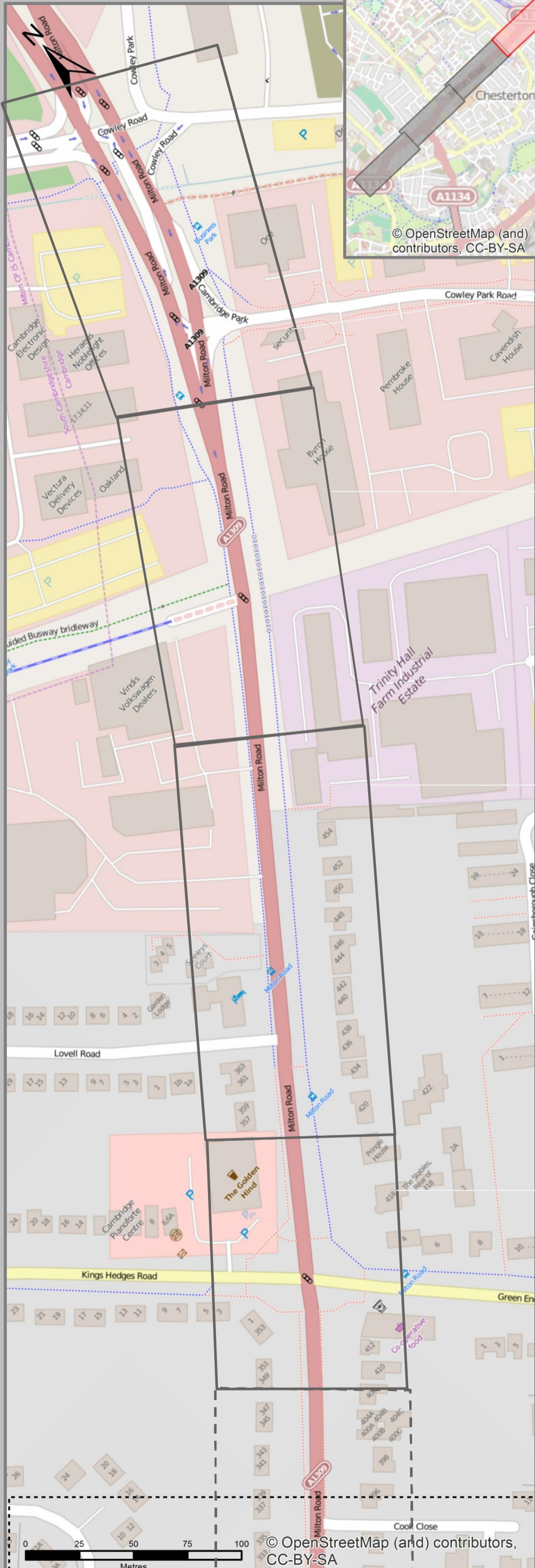
- Give northbound cyclists priority at side road junctions by creating raised cycle lanes on side road junction approaches

### 'Do Maximum' Option:

- Remove northbound footway parking to release width
- Create continuous northbound raised cycle lane
- Widen southbound bus lane
- Floating bus stops to benefit cyclists

### Key:

- |                                 |                    |                |
|---------------------------------|--------------------|----------------|
| ■ Buses                         | ■ Road safety      | ■ Public realm |
| ■ Cyclists                      | ■ Traffic movement |                |
| ■ Pedestrians                   | ■ Parking          |                |
| —● Section/junction-wide issues |                    |                |
| —→ Location specific issues     |                    |                |



**Junction 8: Science Park signalled junctions**

Issues:

- Southbound buses share single southbound lane with general traffic
- The recommended crossing for northbound cyclists to cross to the east side is poor quality
- Need to understand how this junction links with any Highways England A14 junction changes

'Do Minimum' Option:

- No specific measures (beyond the corridor-wide measures)

'Do Something' Option:

- ■ Allow southbound buses to jump the queue, perhaps by using one of the current right turn only lanes into Cambridge Science Park

- Explore improved links to Cowley Road cycle bridge

'Do Maximum' Option:

- As above

**Junction 7: Existing and new busway signalled crossroads**

Issues:

- Currently under construction. To review options based on new busway junction layout.
- As Milton Road approaches the A14, the cyclist desire line is on the east side for the Cowley Road cycle bridge
- Consider demand and location for crossings for cyclists
- Consider whether east footway can accommodate cycling

**Section 6**

Issues:

- Currently affected by construction work. To review options based on new busway junction layout.

**Junction 6: Kings Hedges Road / Green End Road signalled crossroads**

Issues:

- No bus lanes
- Shared use footway cycling is narrow on southbound approach, yet two National Cycle Network routes use this footway to turn left into Green End Road
- ■ Junction is very expansive. Kings Hedges Road stop line is very set back due to pub access.

'Do Minimum' Option:

- Improve signing and road markings

'Do Something' Option:

- ■ Tighten junction geometry. Amend pub access and move Kings Hedges Road stop line forwards.

- Change pedestrian to toucan crossings, where appropriate for transition to / from shared use footway cycling.

- Move carriageway westwards to widen shared use footway cycling on southbound approach

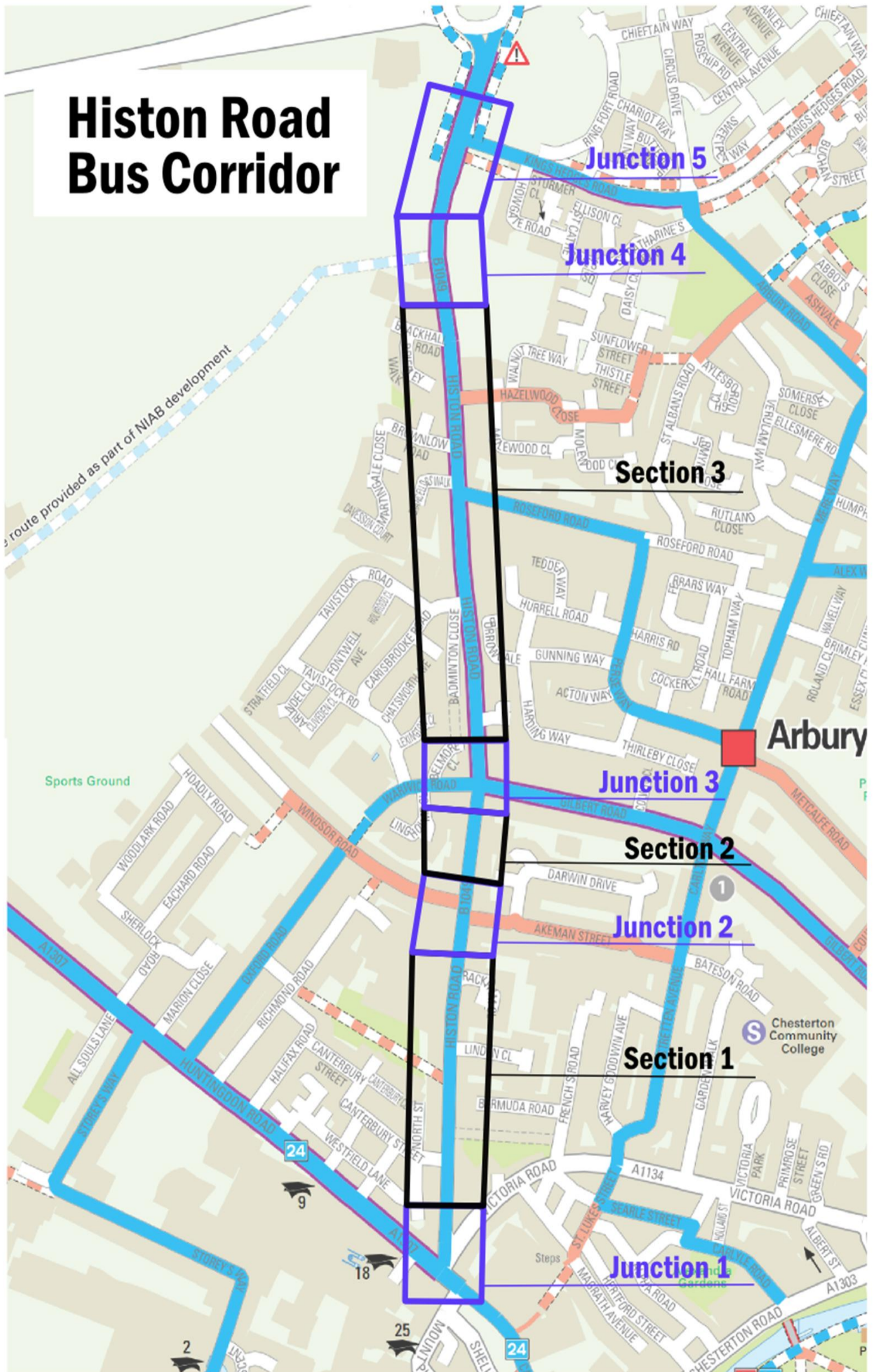
'Do Maximum' Option:

- Create southbound bus lane

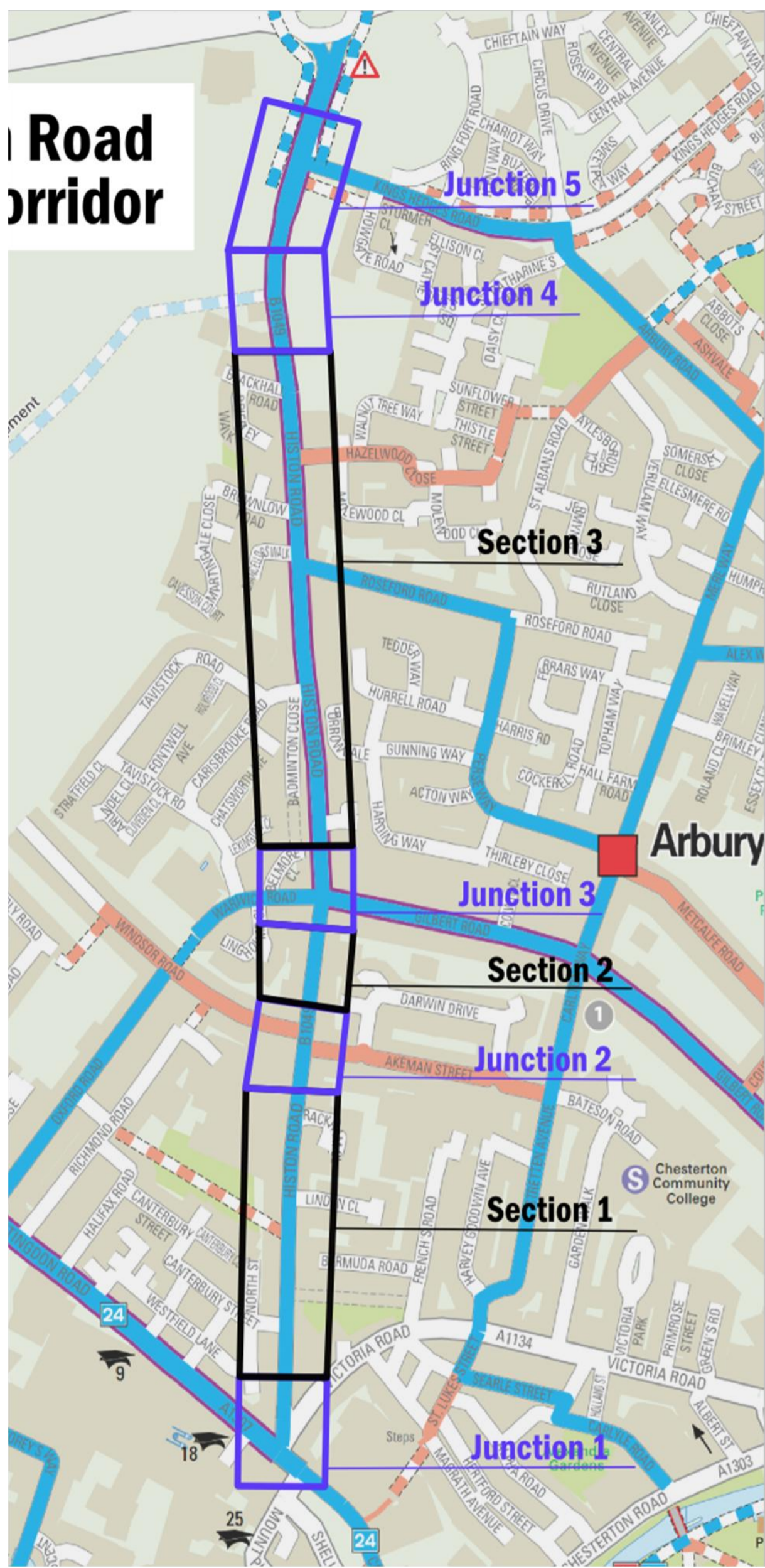
**Key:**

- Buses
- Cyclists
- Pedestrians
- Road safety
- Traffic movement
- Parking
- Public realm
- Section/junction-wide issues
- Location specific issues

# Histon Road Bus Corridor



# Road Corridor



Three different levels of option are being considered for each Junction and each Section:

- 'Do Minimum' Option
- 'Do Something' Option (which also includes the measures listed for option above)
- 'Do Maximum' Option (which also includes the measures listed for option above)

Additionally three different levels of Corridor-Wide measures are being considered:

Issues:

- Lack of bus priority measures
- Lack of cycle priority measures

'Do Minimum' Option:

- Bus stop improvements including shelters, kerb height, printed and real time information
- ASLs for cyclists
- Cycle symbol road markings across side road junctions

'Do Something' Option:

- Bus SVD at signals where appropriate
- Early start signals for cyclists where appropriate

- Raised entry treatments at side roads

'Do Maximum' Option:

- As above.

## Key:

- |                                |                    |                |
|--------------------------------|--------------------|----------------|
| ■ Buses                        | ■ Road safety      | ■ Public realm |
| ■ Cyclists                     | ■ Traffic movement |                |
| ■ Pedestrians                  | ■ Parking          |                |
| — Section/junction-wide issues |                    |                |
| → Location specific issues     |                    |                |



### Junction 2: Akeman Street and Windsor Road priority t-junctions

#### Issues:

- ■ Pair of bus stop cages opposite each other can cause traffic congestion
- ■ Shop off-street parking / service road has poor layout and public realm

#### 'Do Minimum' Option:

- ■ Separate adjacent bus stops to remove pinch-point

#### 'Do Something' Option:

- ■ Improve layout/public realm in front of shops/through side roads

#### 'Do Maximum' Option:

- ■ ■ Close Akeman Street junction or make it cycle only. Move southbound bus stop to current position of Akeman Street junction, with improved public realm.

### Section 1

#### Issues:

- Any southbound parking / loading quickly causes traffic queues due to the limited road width

- No bus priority

- No cycle lanes

#### 'Do Minimum' Option:

- No specific measures (beyond the corridor-wide measures)

#### 'Do Something' Option:

- Increase southbound parking / loading restrictions

#### 'Do Maximum' Option:

- Create on-road advisory or mandatory cycle lanes

### Junction 1: Castle Street / Huntingdon Road and Victoria Road signalled t-junctions

#### Issues:

- The close proximity of these two junctions means that queues at Castle Road junction block back to create southbound queues on Histon Road

- There is only one southbound lane on the approach to the junction, making bus priority measure such as bus lanes or bus gates impossible

- ■ ■ The junctions are large and uninviting for cyclists, for example there are two northbound routes into Histon Road. Public realm is poor.

- On-street parking / loading space on the approach creates pinch-point

#### 'Do Minimum' Option:

- Signal timing adjustments

- Remove southbound parking / loading on the approach

#### 'Do Something' Option:

- ■ ■ Combine the two northbound routes into Histon Road

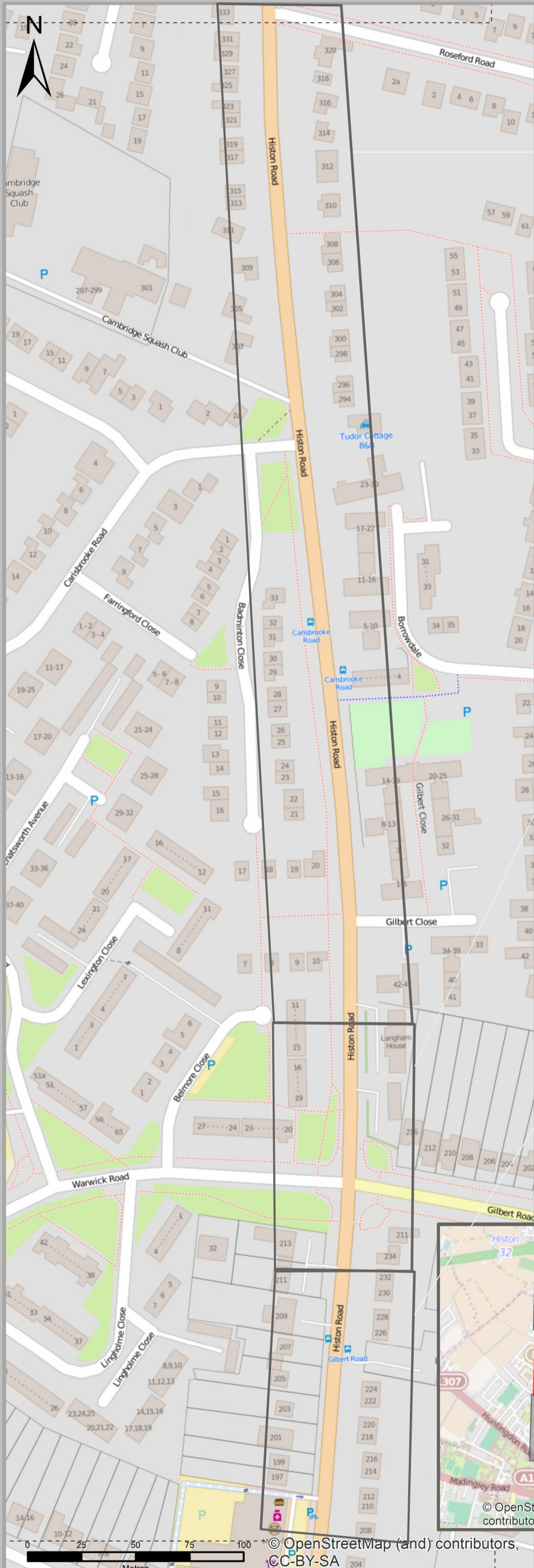
#### 'Do Maximum' Option:

- Options to be reviewed upon receipt of traffic surveys, but may include:

- Ban some movements to simplify the junctions and reduce delays

#### Key:

- Buses
- Cyclists
- Pedestrians
- Road safety
- Traffic movement
- Parking
- Public realm
- Section/junction-wide issues
- Location specific issues



### Section 3

#### Issues:

- Mandatory cycle lanes are narrow

#### 'Do Minimum' Option:

- No specific measures (beyond the corridor-wide measures)

#### 'Do Something' Option:

- Use existing grass verge(s) to widen on-road mandatory cycle lanes

#### 'Do Maximum' Option:

- Convert to raised cycle lanes

### Junction 3: Warwick Road / Gilbert Road signalled crossroads

#### Issues:

- No bus priority
- Southbound mandatory cycle lane does not reach junction

#### 'Do Minimum' Option:

- No specific measures (beyond the corridor-wide measures)

#### 'Do Something' Option:

- Extend southbound mandatory cycle lane to junction
- Create northbound on-road mandatory or advisory cycle lane

- ■ Ban certain turning movements to reduce queue and bus delays

#### 'Do Maximum' Option:

- Create southbound bus lane

### Section 2

#### Issues:

- ■ Southbound unrestricted parking / loading may cause congestion
- Width constraints may limit options for on-road cycle lanes

#### 'Do Minimum' Option:

- ■ Restrict southbound parking / loading?

#### 'Do Something' Option:

- Create on-road mandatory or advisory cycle lanes

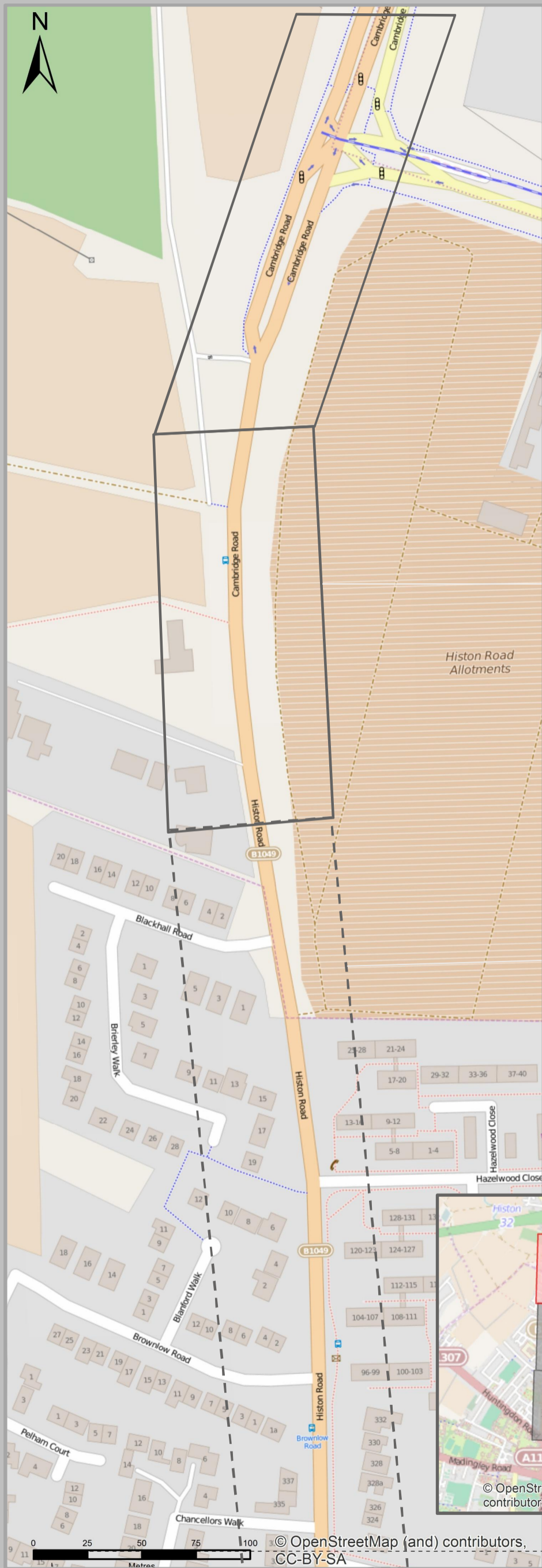
#### 'Do Maximum' Option:

- Same as above

#### Key:

- Buses
- Cyclists
- Pedestrians
- Road safety
- Traffic movement
- Parking
- Public realm
- Section/junction-wide issues
- Location specific issues





**Junction 5: Kings Hedge Road signalled t-junction**

Issues:

- Need to understand bus routings and frequencies beyond this junction
- ■ Need to understand the additional bus and cycle demand created by new development

'Do Minimum' Option:

- Cycling appears to be best accommodated by shared use footways beyond this point. Need to ensure that transition physical measures and signage are good, including toucan crossings where appropriate.

'Do Something' Option:

- Same as above

'Do Maximum' Option:

- Same as above

**Junction 4: NIAB development new road t-junction**  
Issues:

- Currently proposed but will require review of plans
- ■ Need to understand the additional bus and cycle demand created by new development

'Do Minimum' Option:

- No specific measures (beyond the corridor-wide measures)

'Do Something' Option:

- TBC based on proposed junction layout

'Do Maximum' Option:

- TBC based on proposed junction layout

**Section 3** - see previous drawing

**Key:**

- |                                 |                    |                |
|---------------------------------|--------------------|----------------|
| ■ Buses                         | ■ Road safety      | ■ Public realm |
| ■ Cyclists                      | ■ Traffic movement |                |
| ■ Pedestrians                   | ■ Parking          |                |
| —● Section/junction-wide issues |                    |                |
| —→ Location specific issues     |                    |                |

# Appendix B

**DESIGN EXAMPLES**

# MILTON ROAD HISTON ROAD CORRIDOR IMPROVEMENT SCHEME – DESIGN PRECEDENTS



## 'Tiger' crossing

Location – Hackney, London

- Combines a pedestrian zebra with a crossing for cyclists.
- Minimises driver confusion over giving way to cyclists.
- Minimises delay where ped/cycle/vehicle flow relatively low.



## Raised cycleway

Location – Old Shoreham Road, Brighton

- 2.0m one-way raised cycleway alongside busy A-road., with raised entries at side roads.
- Early-release signals for cyclists at junctions, 5sec head start.
- Minimum width = 1.5m. adjacent carriageway lanes = 3.1m
- Shared-use areas through bus stops and crossings.



## Shared Use Bus Stop

Location – Old Shoreham Road, Brighton

- Tactile paving indicates extent of area, within which pedestrians & cyclists should take greater care.



### Bus Gate

Location –Walworth Road, London

- Bus lane on approach to bus gate
- Vehicles held back in adjacent lane by signals when bus approaches bus gate.
- Bus movement through bus gate unrestricted (no signals), albeit give-way exit from bus gate to merged bus/traffic lane.
- Reduces delays for buses.



### Two Stage Right Turn

Location –Whitechapel Road, London

- Cyclist completes right turn in two stages; cyclists travel ahead and then wait in front of ASL on adjacent arm. When get green light then continues through exit arm.



### Early Release for Cyclists

Location –Cambridge Heath Road, London

- An early release gives cyclists arriving at a red signal their own green signal before other traffic. This allows them to move more safely through the junction. When traffic has a green signal, cyclists would proceed with traffic.



## On-Demand Cycle Signal Stage

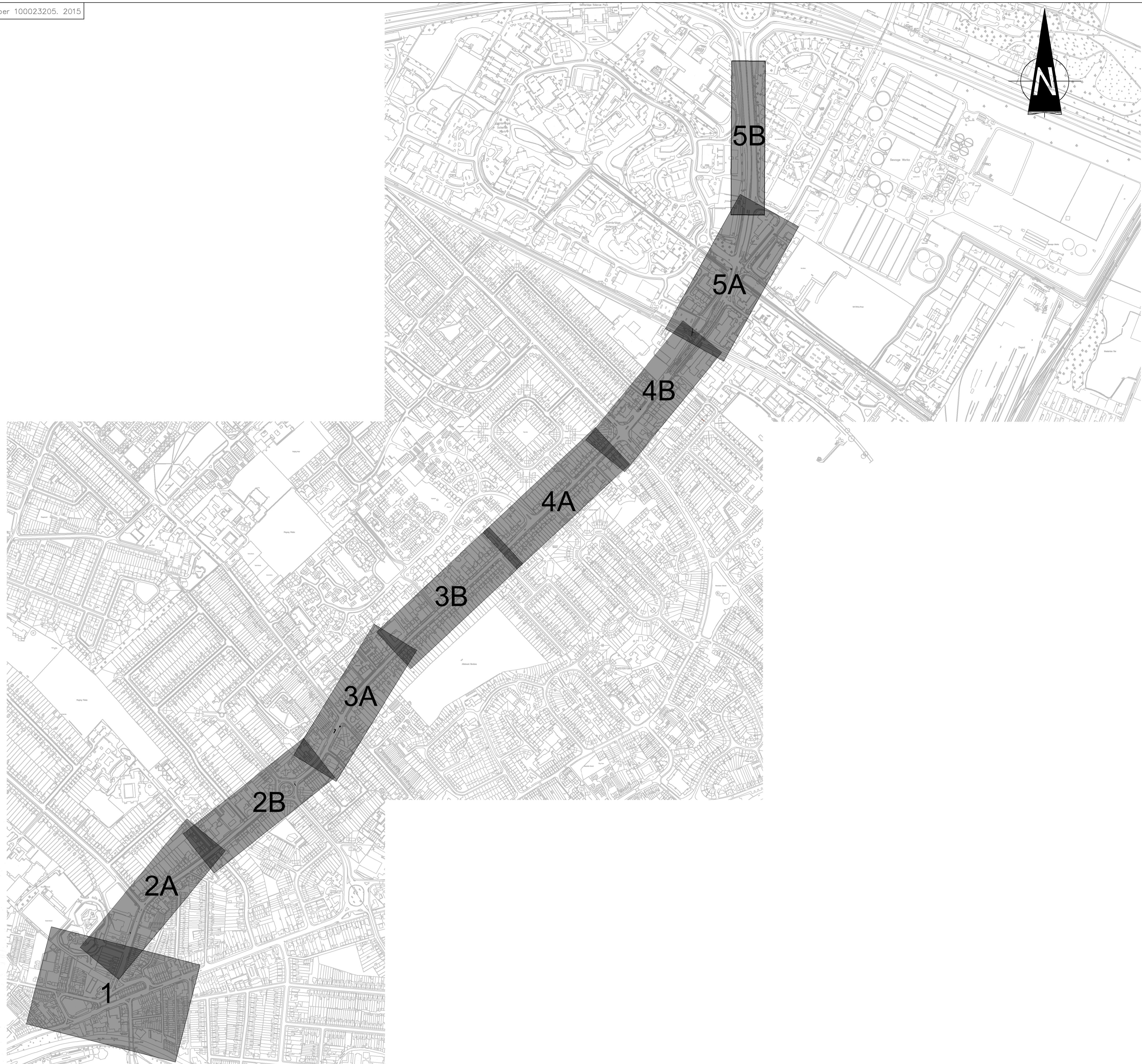
Location – Clapham Common, London

- Cyclist approaches the junction and presses the control button to activate the cycle signal stage.
- Minimises impact on junction capacity as stage may not be called every cycle and/or can be programmed to skip a cycle.

# Appendix C

**OUTLINE DESIGNS (MILTON ROAD)**

File Name: \\easlon\m\04\Transportation Planning\PTL\3514238A-PTL\Milton Road\Histon Road Bus Corridors\05 Incoming\01\_CAD\02 Drawings\_in\_Preparation\01\_Milton Road\3514238A-PTL-Milton-Do\_Maximum.dwg  
 Log: Lonsdale, Billy  
 Plot Date: 10/09/2015 17:32:49



Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	BL	HS	GH

Notes:

6 Devonshire Square  
London  
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Client:

Site/Project:  
MILTON ROAD  
CORRIDOR  
IMPROVEMENT SCHEME

Title:  
DO-MAXIMUM  
OPTION-OUTLINE  
DESIGN

DRAFT					
Drawn: SH	Checked: GH				
Designed: TH	Approved: GH				
Date: 28/08/2015	Scale: NTS	A1	Sheet: Overview		
Project Number: 3514238A-PTL		Drawing Number: 3514238A-PTL-200		Revision: A	
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**LEGEND:**

RAISED CYCLEWAY	UNALLOCATED LAND WITHIN HIGHWAY BOUNDARY
BUS LANE	RAISED ACCESS JUNCTION
FOOTWAY	SHARED USE AREA AT BUS STOP/CROSSING
LAND TO BE ACQUIRED	BUS STOP CAGE
INFORMAL PARKING AREAS	BUS SHELTER
PUBLIC REALM /PLANTING	HIGHWAY BOUNDARY



**LEGEND:**

TREE - TYPE A2	TREE - TYPE C2
TREE - TYPE B2	TREE - TYPE U

**DRAFT**

Drawn: SH	Checked: GH
Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Drawing Number: 3514238A-PTL-201
Sheet: 1 OF 5	Revision: A

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- Notes:**
- ASLs to be 4m deep
  - All bus stops to be fully accessible
  - Unallocated land within highways boundary: indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
  - Refer to Stage 2 report for precedent examples:
    - Two-stage right-turn
    - Shared-use areas
    - Bus gate
    - Tiger crossing
    - On-demand cycle signal stage
    - Raised cycleway

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Client: **MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

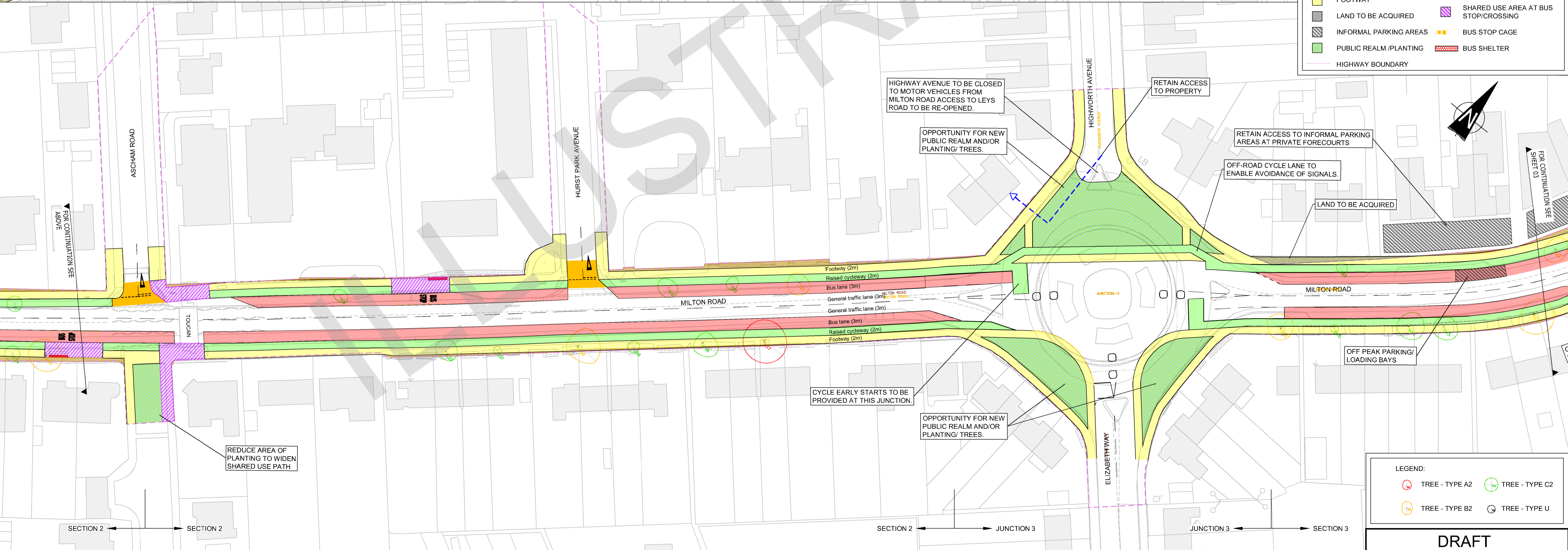
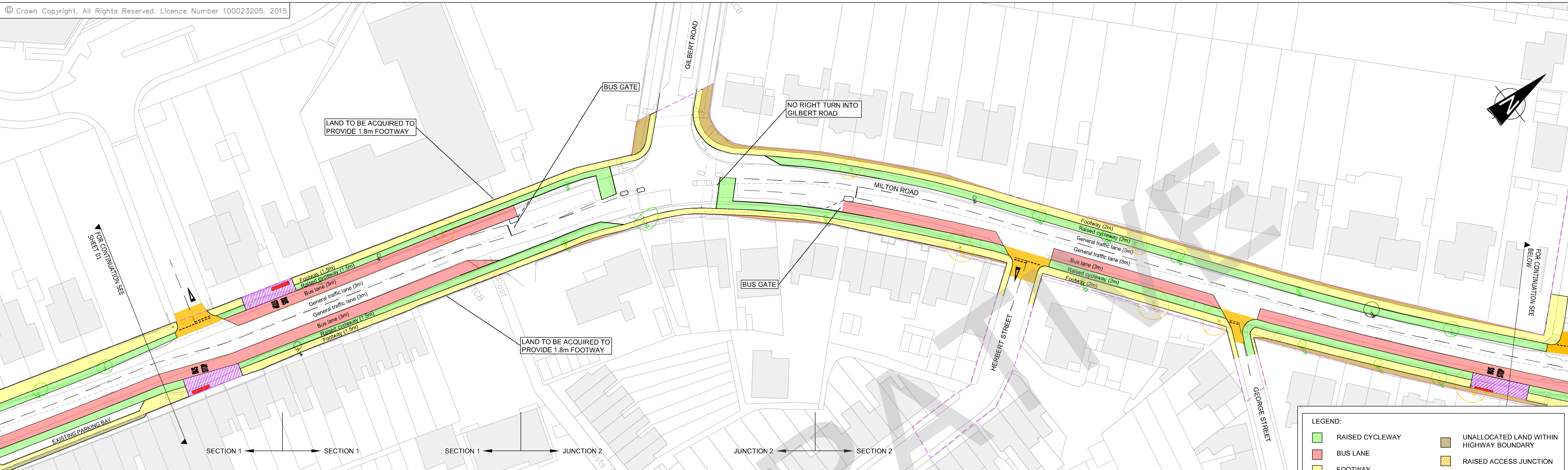
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Rev	Date	Description	By	Chk	App
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Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	BL	HS	GH

Notes:

- ASLs to be 4m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary' indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
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  - a) Two-stage right-turn
  - b) Shared-use areas
  - c) Bus gate
  - d) Tiger crossing
  - e) On-demand cycle signal stage
  - f) Raised cycleway

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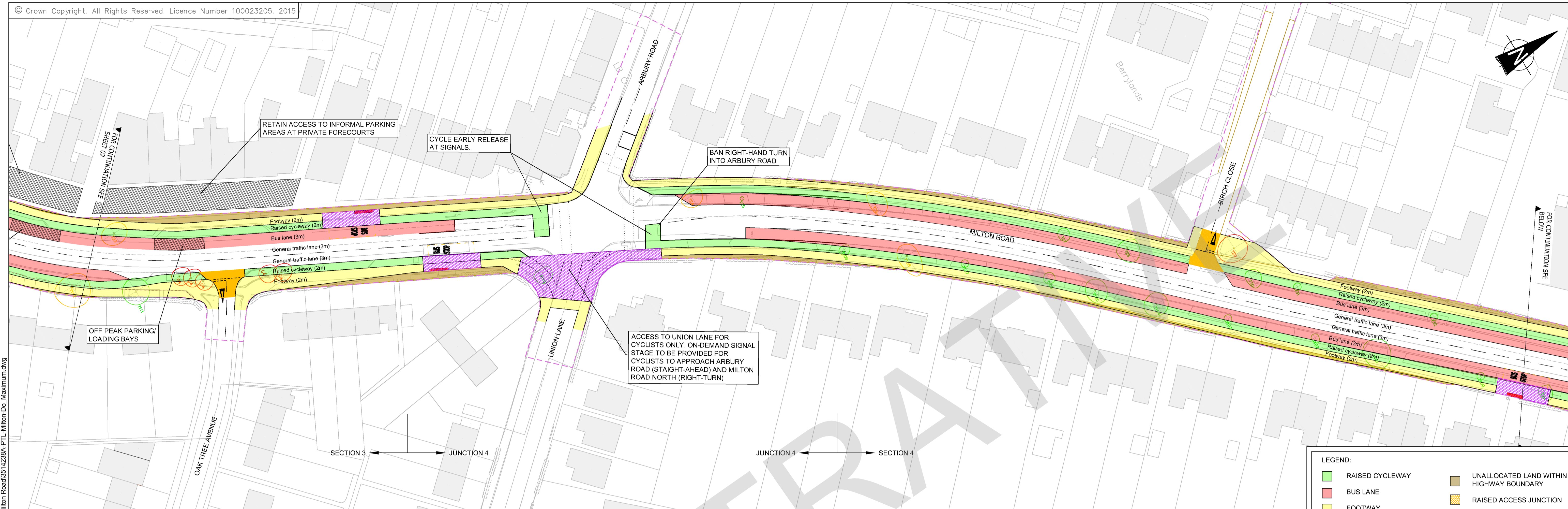
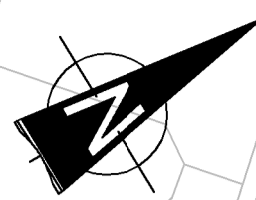
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Title: **DO-MAXIMUM OPTION-OUTLINE DESIGN**

**DRAFT**

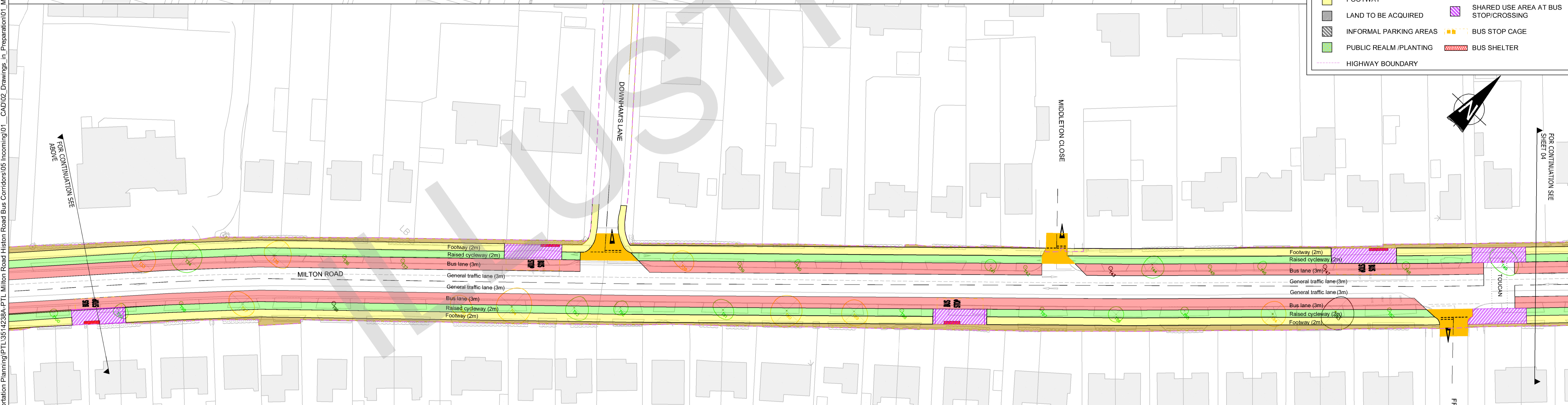
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Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Sheet: 2 OF 5
Drawing Number: 3514238A-PTL-202	Revision: A

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**LEGEND:**

	RAISED CYCLEWAY		UNALLOCATED LAND WITHIN HIGHWAY BOUNDARY
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	LAND TO BE ACQUIRED		BUS STOP CAGE
	INFORMAL PARKING AREAS		BUS SHELTER
	PUBLIC REALM /PLANTING		HIGHWAY BOUNDARY



**LEGEND:**

	TREE - TYPE A2		TREE - TYPE C2
	TREE - TYPE B2		TREE - TYPE U

**DRAFT**

Drawn: SH	Checked: GH
Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Sheet: 3 OF 5
3514238A-PTL	3514238A-PTL-203
	A

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Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	BL	HS	GH

**Notes:**

- ASLs to be 4m deep
- All bus stops to be fully accessible
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  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

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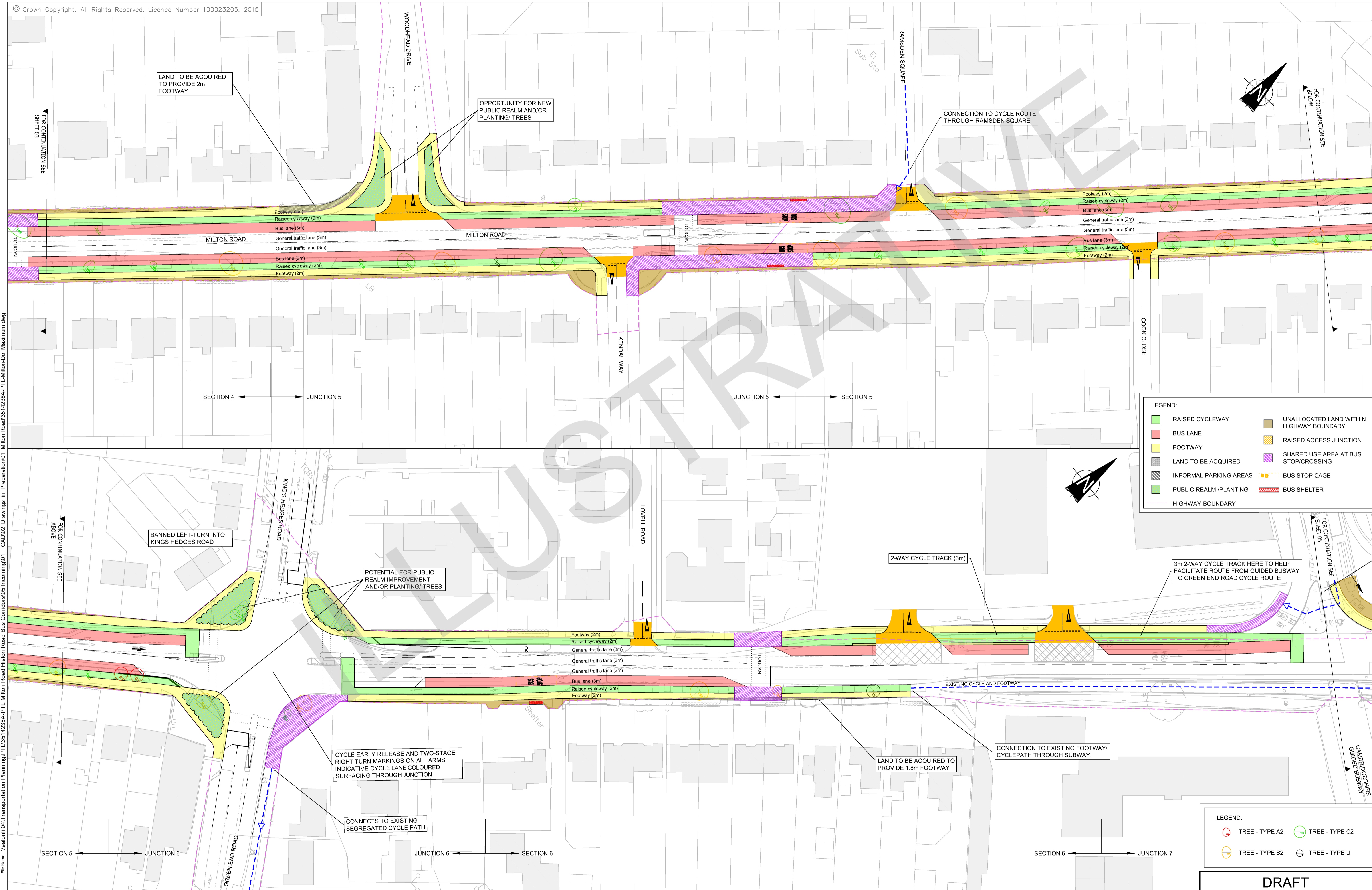
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Site/Project:  
**MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title:  
**DO-MAXIMUM OPTION-OUTLINE DESIGN**



**LEGEND:**

	RAISED CYCLEWAY		UNALLOCATED LAND WITHIN HIGHWAY BOUNDARY
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	LAND TO BE ACQUIRED		BUS STOP CAGE
	INFORMAL PARKING AREAS		BUS SHELTER
	PUBLIC REALM / PLANTING		BUS STOP CAGE
	HIGHWAY BOUNDARY		

**LEGEND:**

	TREE - TYPE A2		TREE - TYPE C2
	TREE - TYPE B2		TREE - TYPE U

**DRAFT**

Drawn: SH	Checked: GH
Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Sheet: 4 OF 5
3514238A-PTL	3514238A-PTL-204
	Revision: A

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 Rev: 09/09/15 ISSUED FOR REVIEW  
 Logon: Halpin, Shane  
 Plot Date: 28/09/2015 13:37:15

- Notes:**
- ASLs to be 4m deep
  - All bus stops to be fully accessible
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  - Widths as per standard section profile unless otherwise stated
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    - Shared-use areas
    - Bus gate
    - Tiger crossing
    - On-demand cycle signal stage
    - Raised cycleway

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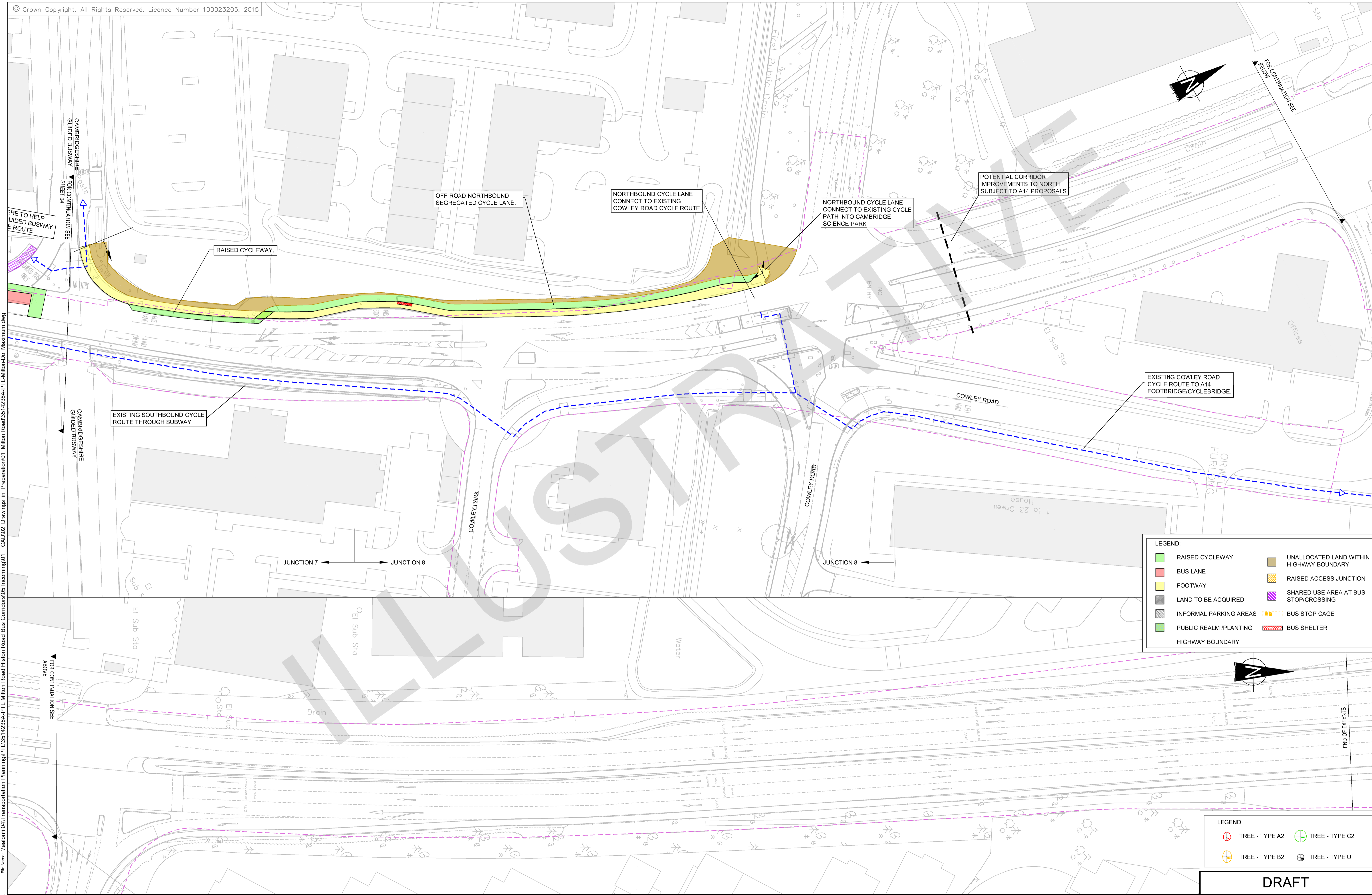
Cambridgeshire  
County Council

Client:  
 Site/Project:  
**MILTON ROAD  
CORRIDOR  
IMPROVEMENT SCHEME**

Title:  
**DO-MAXIMUM  
OPTION-OUTLINE  
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Log: Halpin, Shane  
Plot Date: 28/08/2015 11:33:13



Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	BL	HS	GH

**Notes:**

- ASLs to be 4m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
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  - Raised cycleway

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Fax: 44-(0)20-7337-1701

Client:

Site/Project: **MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **DO-MAXIMUM OPTION-OUTLINE DESIGN**

Drawn: SH  
Designed: TH  
Date: 28/08/2015  
Project Number: 3514238A-PTL

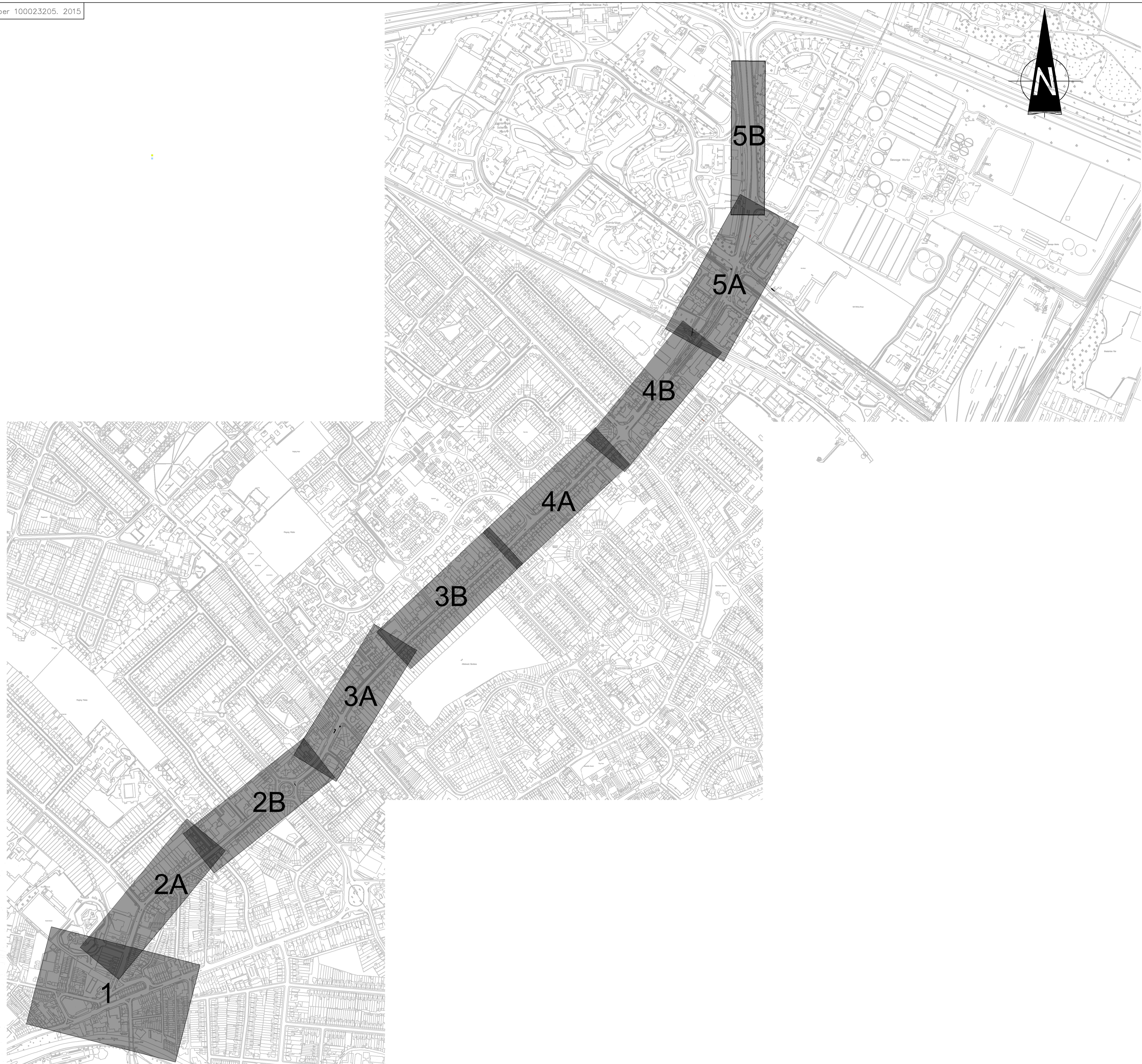
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Drawing Number: 3514238A-PTL-205  
Revision: A

**DRAFT**

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Log: Lonsdale, Billy  
Plot Date: 11/09/2015 16:11:32



Rev	Date	Description	By	Chk	App
A	11/09/15	ISSUED FOR REVIEW	BL	HS	GH

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Site/Project:  
**MILTON ROAD  
 CORRIDOR  
 IMPROVEMENT SCHEME**

Title:  
**DO-SOMETHING  
 OPTION-OUTLINE  
 DESIGN**

DRAFT					
Drawn: BL	Checked: GH				
Designed: TH	Approved: GH				
Date: 28/08/2015	Scale: NTS	A1	Sheet: Overview		
Project Number: 3514238A-PTL		Drawing Number: 3514238A-PTL-210		Revision: A	
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LEGEND:	
	RAISED CYCLEWAY
	BUS LANE
	FOOTWAY
	LAND TO BE ACQUIRED
	PUBLIC REALM / PLANTING
	PLANTING OR PARKING
	HIGHWAY BOUNDARY
	UNALLOCATED LAND WITH HIGHWAY BOUNDARY
	RAISED ACCESS JUNCTION
	SHARED USE AREA AT BUS STOP/CROSSING
	BUS STOP CAGE
	BUS SHELTER



File Name: \\vision\041\Transportation Planning\PTL\3514238A-PTL\Milton Road\3514238A-PTL-Milton-Do\_Something.dwg

Rev	Date	Description	By	Chk	App
A	11/09/15	ISSUED FOR REVIEW	BL	HS	GH

- Notes:
- ASLs to be 4m deep
  - All bus stops to be fully accessible
  - Unallocated land within highways boundary: indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
  - Refer to Stage 2 report for precedent examples:
    - Two-stage right-turn
    - Shared-use areas
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    - Tiger crossing
    - On-demand cycle signal stage
    - Raised cycleway

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Site/Project: MILTON ROAD CORRIDOR IMPROVEMENT SCHEME

Title: DO-SOMETHING OPTION-OUTLINE DESIGN

<b>DRAFT</b>			
Drawn: BL	Checked: GH		
Designed: TH	Approved: GH		
Date: 28/08/2015	Scale: 1:500 @ A1	Sheet: 1 OF 5	
Project Number: 3514238A-PTL	Drawing Number: 3514238A-PTL-211	Revision: A	
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Log: Halpin, Shane  
Plot Date: 28/08/2015 11:44:18

Rev	Date	Description	By	Chk	App
A	11/09/15	ISSUED FOR REVIEW	BL	HS	GH

- Notes:**
- ASLs to be 4m deep
  - All bus stops to be fully accessible
  - Unallocated land within highways boundary: indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
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  - Refer to Stage 2 report for precedent examples:
    - a) Two-stage right-turn
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    - c) Bus gate
    - d) Tiger crossing
    - e) On-demand cycle signal stage
    - f) Raised cycleway

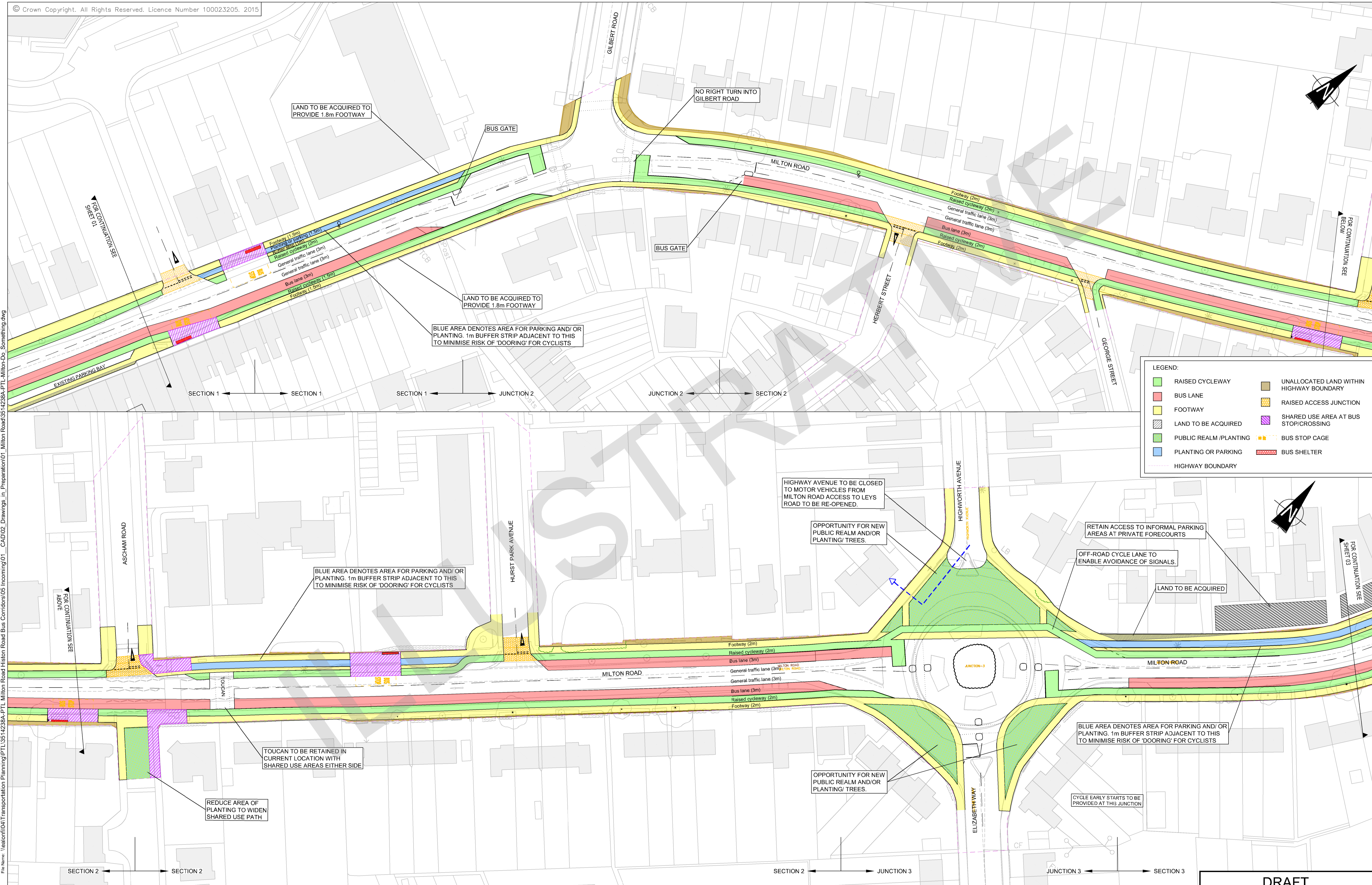
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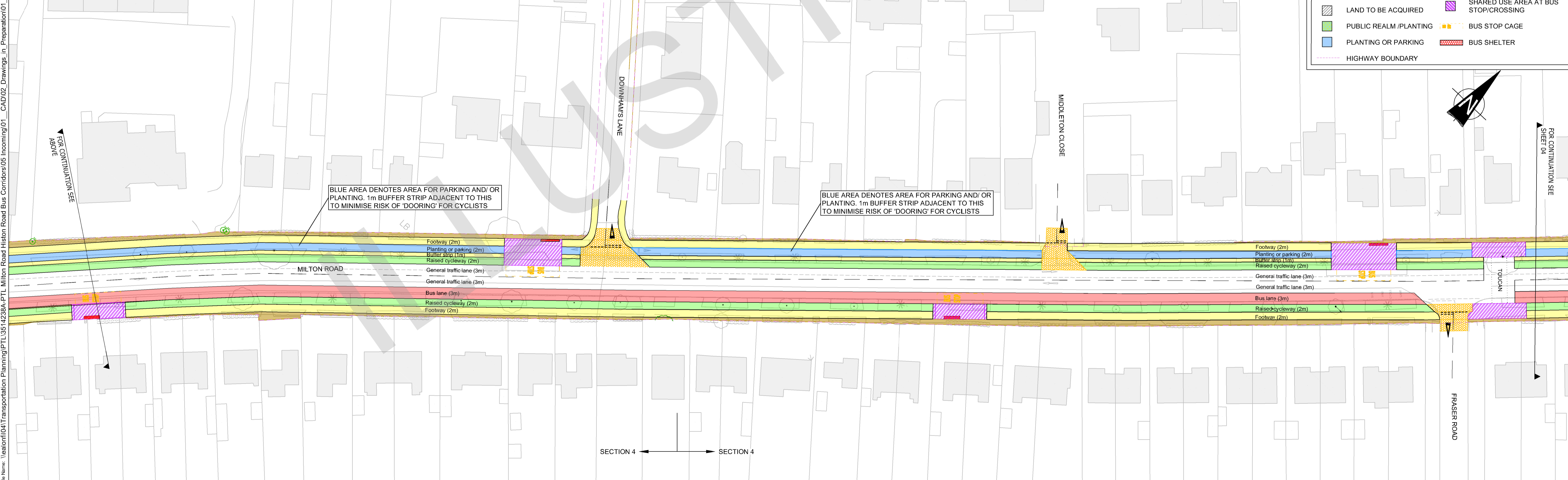
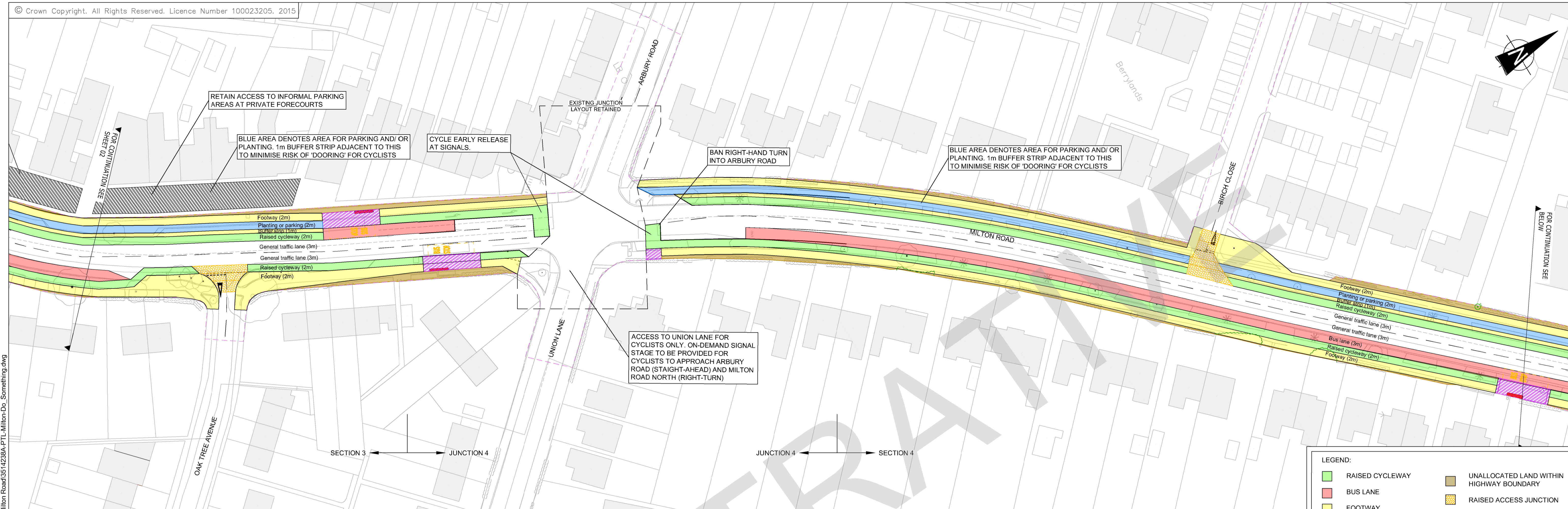
Client: MILTON ROAD CORRIDOR IMPROVEMENT SCHEME

Title: DO-SOMETHING OPTION-OUTLINE DESIGN

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Date: 28/08/2015	Scale: 1:500 @ A1	Sheet: 2 OF 5	Revision:
Project Number: 3514238A-PTL	Drawing Number: 3514238A-PTL-212	Revision: A	
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Rev	Date	Description	By	Chk	App
A	11/09/15	ISSUED FOR REVIEW	BL	HS	GH

- Notes:**
- ASLs to be 4m deep
  - All bus stops to be fully accessible
  - Unallocated land within highways boundary: indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
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    - Raised cycleway

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**MILTON ROAD  
CORRIDOR  
IMPROVEMENT SCHEME**

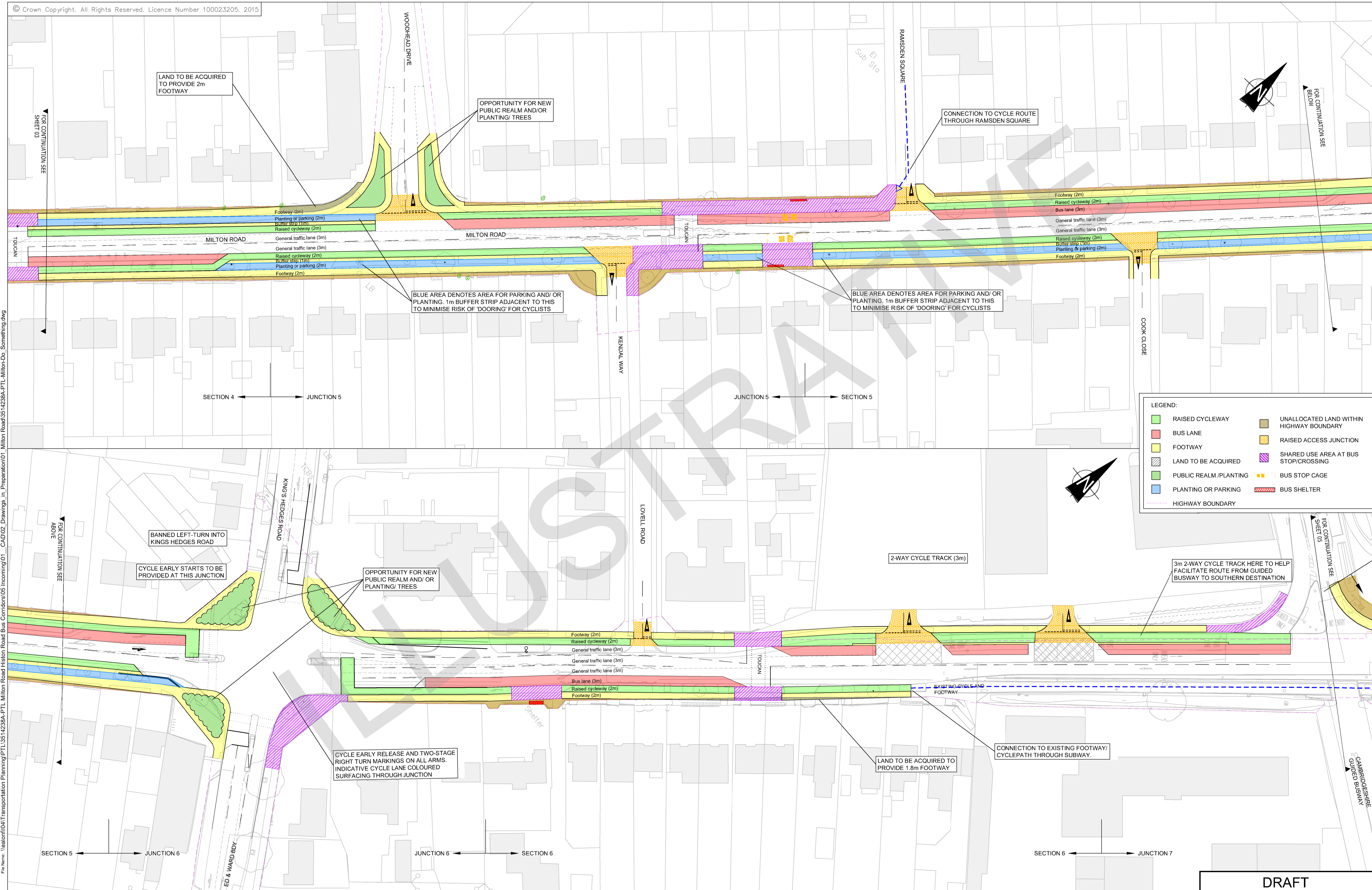
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OPTION-OUTLINE  
DESIGN**

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Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Sheet: 3 OF 5
3514238A-PTL	3514238A-PTL-213
	A

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LAND TO BE ACQUIRED TO PROVIDE 2m FOOTWAY

OPPORTUNITY FOR NEW PUBLIC REALM AND/OR PLANTING/ TREES

CONNECTION TO CYCLE ROUTE THROUGH RAMSDEN SQUARE

BLUE AREA DENOTES AREA FOR PARKING AND/OR PLANTING. 1m BUFFER STRIP ADJACENT TO THIS TO MINIMISE RISK OF 'DOORING' FOR CYCLISTS

BLUE AREA DENOTES AREA FOR PARKING AND/OR PLANTING. 1m BUFFER STRIP ADJACENT TO THIS TO MINIMISE RISK OF 'DOORING' FOR CYCLISTS

LEGEND:

	RAISED CYCLEWAY		UNALLOCATED LAND WITHIN HIGHWAY BOUNDARY
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	LAND TO BE ACQUIRED		BUS STOP CAGE
	PUBLIC REALM /PLANTING		BUS SHELTER
	PLANTING OR PARKING		
	HIGHWAY BOUNDARY		

BANNED LEFT-TURN INTO KINGS HEDGES ROAD

CYCLE EARLY STARTS TO BE PROVIDED AT THIS JUNCTION

OPPORTUNITY FOR NEW PUBLIC REALM AND/OR PLANTING/ TREES

2-WAY CYCLE TRACK (3m)

3m 2-WAY CYCLE TRACK HERE TO HELP FACILITATE ROUTE FROM GUIDED BUSWAY TO SOUTHERN DESTINATION

CYCLE EARLY RELEASE AND TWO-STAGE RIGHT TURN MARKINGS ON ALL ARMS. INDICATIVE CYCLE LANE COLOURED SURFACING THROUGH JUNCTION

LAND TO BE ACQUIRED TO PROVIDE 1.8m FOOTWAY

CONNECTION TO EXISTING FOOTWAY/ CYCLEPATH THROUGH SUBWAY.

Rev	Date	Description	By	Chk	App
A	11/09/15	ISSUED FOR REVIEW	BL	HS	GH

Notes:

- ASLs to be 4m deep
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- Refer to Stage 2 report for precedent examples:
  - Two-stage right-turn
  - Shared-use areas
  - Bus gate
  - Tiger crossing
  - On-demand cycle signal stage
  - Raised cycleway

Client:

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Client:

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Client:

Cambridgeshire County Council

Project:

MILTON ROAD CORRIDOR IMPROVEMENT SCHEME

Title:

DO-SOMETHING OPTION-OUTLINE DESIGN

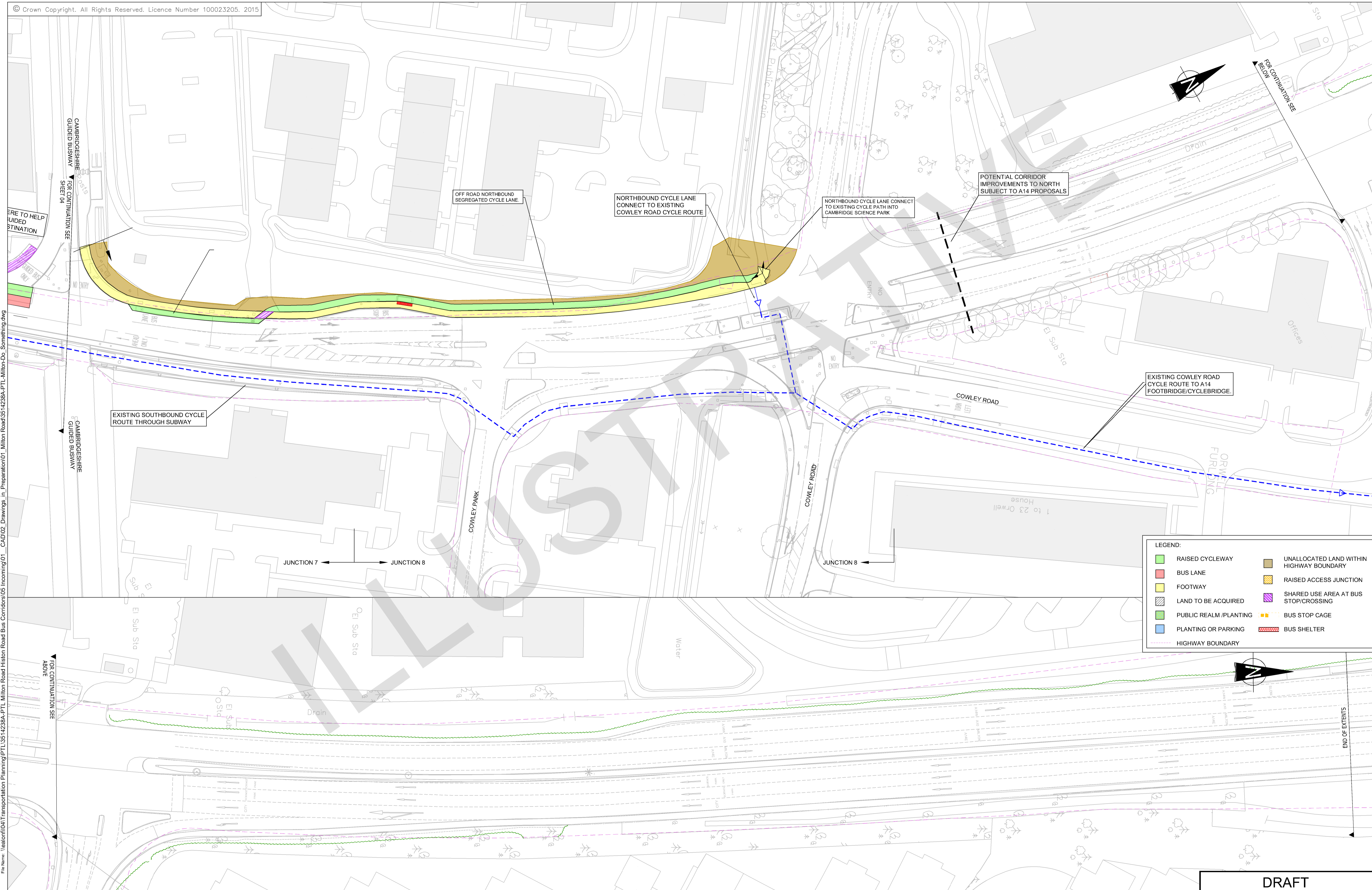
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Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Sheet: 4 OF 5
3514238A-PTL	3514238A-PTL-214
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Log: Halpin, Shane  
Plot Date: 28/08/2015 11:45:54



**LEGEND:**

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<span style="color: red;">█</span>	BUS LANE	<span style="border: 1px solid black; background-color: #ffff00;">█</span>	RAISED ACCESS JUNCTION
<span style="color: yellow;">█</span>	FOOTWAY	<span style="border: 1px solid black; background-color: #cccccc;">█</span>	SHARED USE AREA AT BUS STOP/CROSSING
<span style="border: 1px solid black; background-color: #cccccc;">█</span>	LAND TO BE ACQUIRED	<span style="border: 1px solid black; background-color: #ffff00;">█</span>	BUS STOP CAGE
<span style="color: green;">█</span>	PUBLIC REALM / PLANTING	<span style="border: 1px solid black; background-color: #cccccc;">█</span>	BUS SHELTER
<span style="color: blue;">█</span>	PLANTING OR PARKING	<span style="border: 1px solid black; background-color: #cccccc;">█</span>	
<span style="border: 1px dashed black;">█</span>	HIGHWAY BOUNDARY		

Rev	Date	Description	By	Chk	App
A	11/09/15	ISSUED FOR REVIEW	BL	HS	GH

**Notes:**

- ASLs to be 4m deep
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Client: **Cambridgeshire County Council**

Site/Project: **MILTON ROAD CORRIDOR IMPROVEMENT SCHEME**

Title: **DO-SOMETHING OPTION-OUTLINE DESIGN**

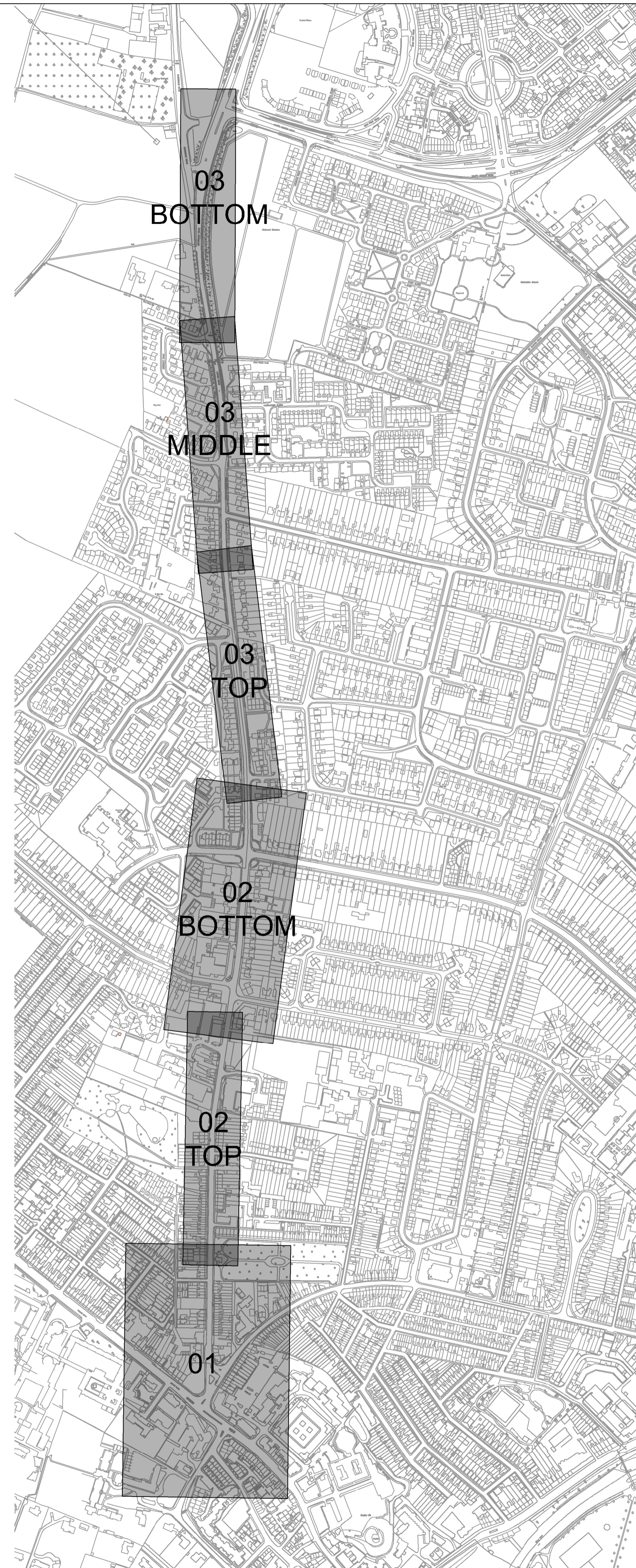
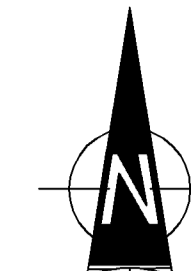
**DRAFT**

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Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Sheet: 5 OF 5
Drawing Number: 3514238A-PTL-215	Revision: A

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# Appendix D

**OUTLINE DESIGNS (HISTON ROAD)**



Login: Lonsdale, Billy  
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Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	SH	HS	GH
B	15/09/15	ISSUED FOR REVIEW	BL	HS	GH

Notes:




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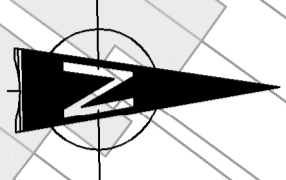
Cambridgeshire  
County Council

Client: HISTON ROAD  
BUS CORRIDOR  
IMPROVEMENT

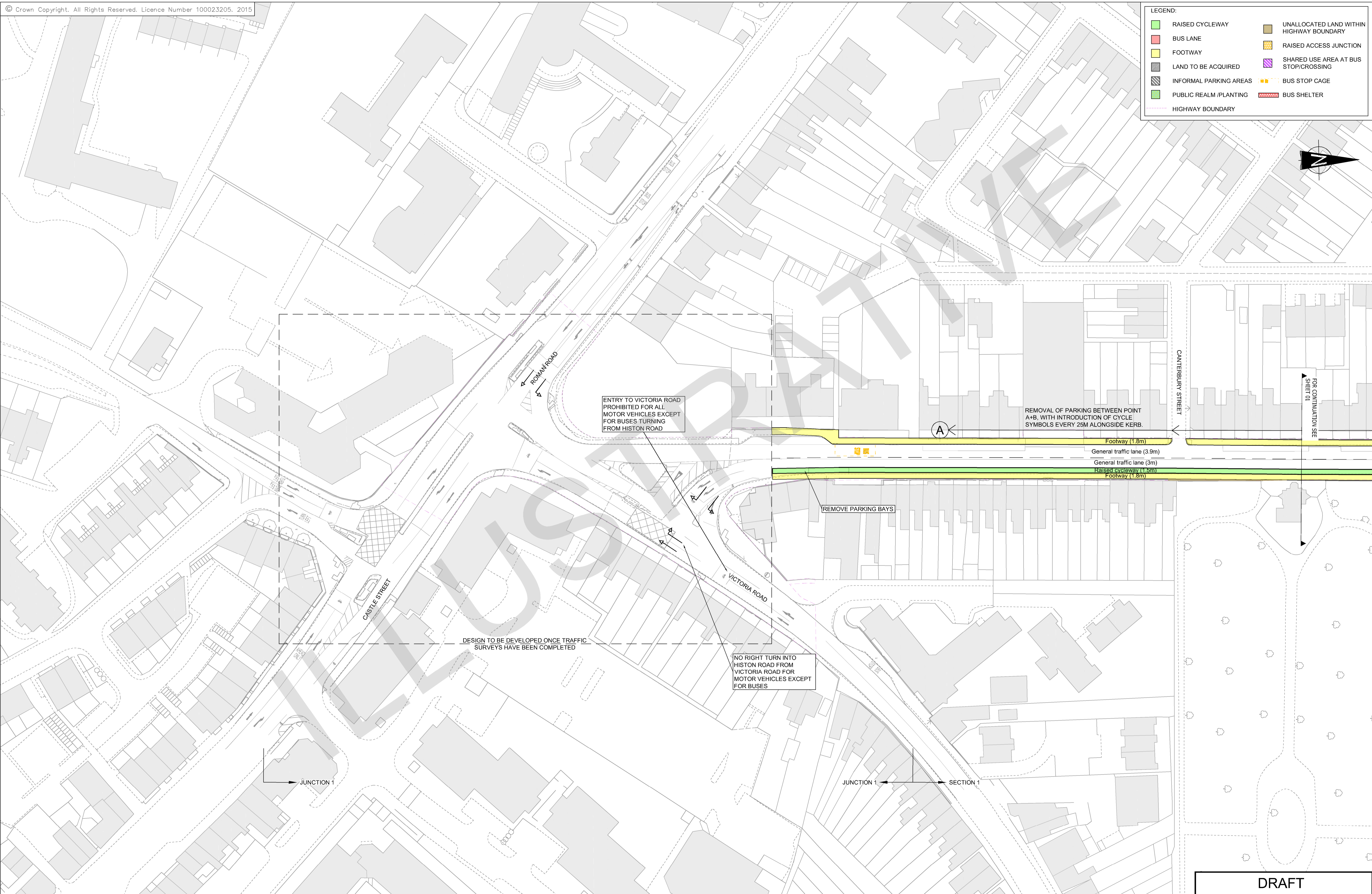
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OPTION-OUTLINE  
DESIGN

DRAFT			
Drawn: BL	Checked: GH		
Designed: TH	Approved: GH		
Date: 28/08/2015	Scale: 1:500 @	A1	Sheet: Overview
Project Number:	Drawing Number:	Revision:	
3514238A-PTL	35124238A-PTL-100	B	
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LEGEND:			
	RAISED CYCLEWAY		UNALLOCATED LAND WITHIN HIGHWAY BOUNDARY
	BUS LANE		RAISED ACCESS JUNCTION
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	LAND TO BE ACQUIRED		BUS STOP CAGE
	INFORMAL PARKING AREAS		BUS SHELTER
	PUBLIC REALM /PLANTING		BUS SHELTER
	HIGHWAY BOUNDARY		



File Name: \\sion\m\1\Transportation Planning\PTL\3514238A-PTL Milton Road\Histon Road Bus Corridor\05 Incoming\01\_CAD\02 Drawings in Preparation\02\_Histon Road\3514238A-PTL-Histon-Do-Maximum.dwg



ENTRY TO VICTORIA ROAD PROHIBITED FOR ALL MOTOR VEHICLES EXCEPT FOR BUSES TURNING FROM HISTON ROAD

REMOVAL OF PARKING BETWEEN POINT A+B, WITH INTRODUCTION OF CYCLE SYMBOLS EVERY 25M ALONGSIDE KERB.

DESIGN TO BE DEVELOPED ONCE TRAFFIC SURVEYS HAVE BEEN COMPLETED

NO RIGHT TURN INTO HISTON ROAD FROM VICTORIA ROAD FOR MOTOR VEHICLES EXCEPT FOR BUSES

Footway (1.8m)  
General traffic lane (3.9m)  
General traffic lane (3m)  
Raised cycleway (1.5m)  
Footway (1.8m)

REMOVE PARKING BAYS

JUNCTION 1

JUNCTION 1

SECTION 1

FOR CONTINUATION SEE SHEET 01

Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	SH	HS	GH
B	15/09/15	ISSUED FOR REVIEW	BL	HS	GH

- Notes:
- ASLs to be 4m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
  - Widths as per standard section profile unless otherwise stated
  - No parking permitted on Histon Road, unless otherwise stated
  - Refer to 'Draft Options' report for precedent examples:
    - Shared-use areas
    - Raised cycleway

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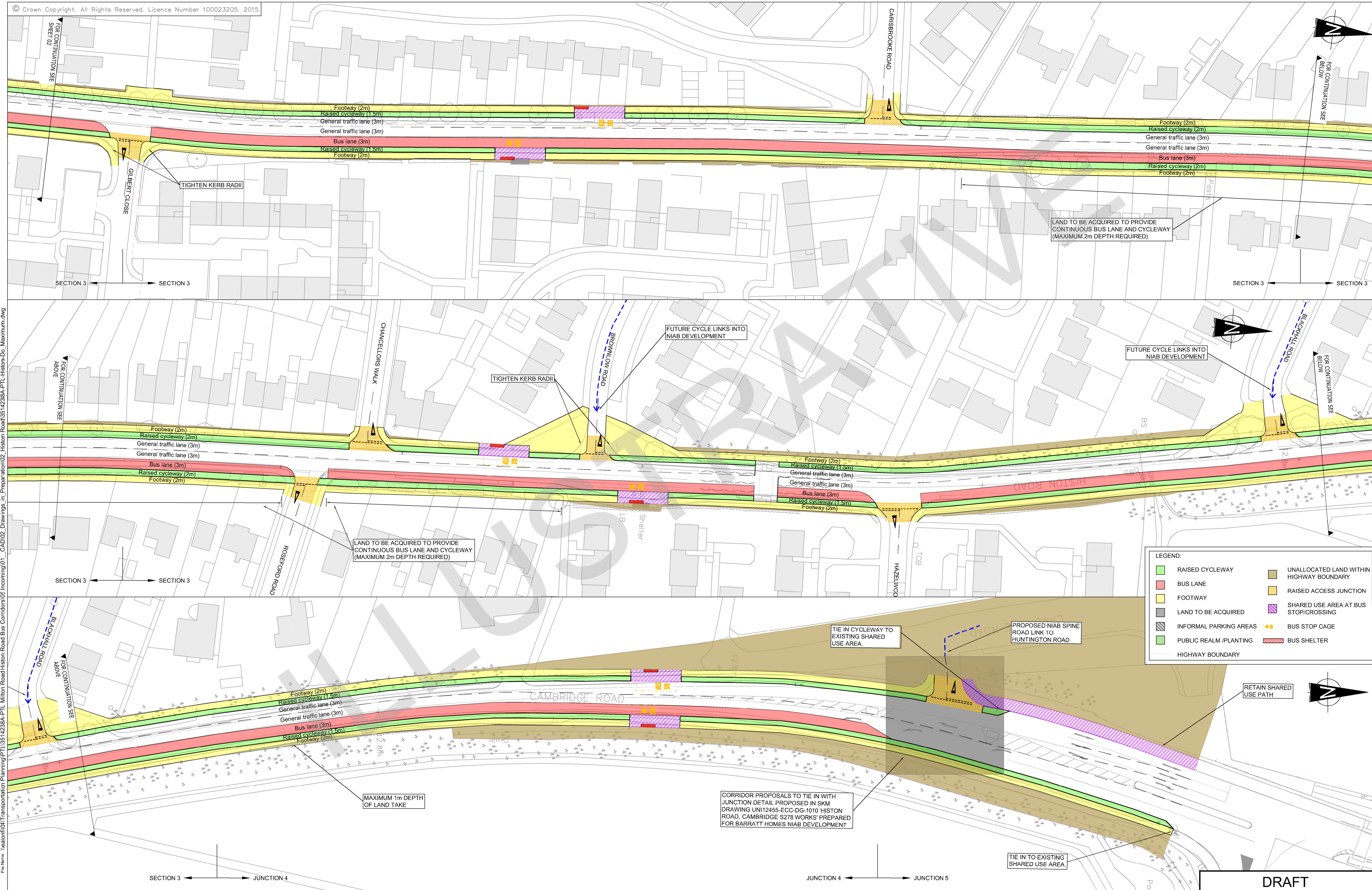
Cambridgeshire  
County Council

Client:  
Site/Project:  
**HISTON ROAD  
CORRIDOR  
IMPROVEMENT  
SCHEME**

Title:  
**DO-MAXIMUM  
OPTION-OUTLINE  
DESIGN**

DRAFT		
Drawn: BL	Checked: GH	
Designed: TH	Approved: GH	
Date: 28/08/2015	Scale: 1:500 @ A1	Sheet: 1 OF 3
Project Number:	Drawing Number:	Revision:
3514238A-PTL	3514238A-PTL-101	B
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**LEGEND:**

[Green Box]	RAISED CYCLEWAY	[Brown Box]	UNALLOCATED LAND WITHIN HIGHWAY BOUNDARY
[Red Box]	BUS LANE	[Yellow Box]	RAISED ACCESS JUNCTION
[Yellow Box]	FOOTWAY	[Purple Box]	SHARED USE AREA AT BUS STOP/CROSSING
[Grey Box]	LAND TO BE ACQUIRED	[Yellow Box with Dots]	BUS STOP CAGE
[Blue Box]	INFORMAL PARKING AREAS	[Red Box with Dots]	BUS SHELTER
[Green Box with Dots]	PUBLIC REALM / PLANTING	[Red Box with Dots]	BUS SHELTER
[Black Line]	HIGHWAY BOUNDARY		

File Name: \\sion\01\Transportation Planning\PTL\3514238A-PTL\Milton Road\Histon Road Bus Corridor\05 Incoming\01\_CAD\02 Drawings\_in\_Preparation\02\_Histon Road\3514238A-PTL-Histon-Do-Maximum.dwg  
 Date: 28/08/2015 11:41:0  
 User: Habin, Shane

- Notes:**
- ASLs to be 4m deep
  - All bus stops to be fully accessible
  - 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
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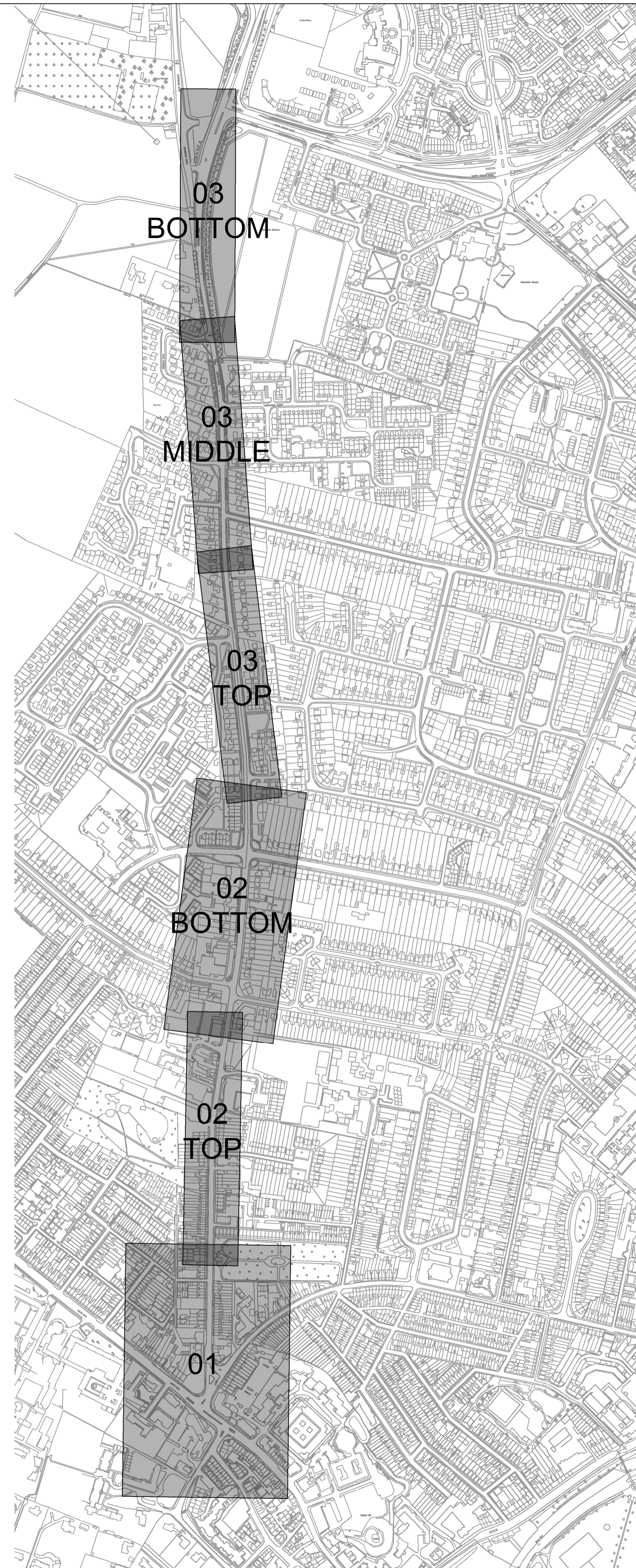
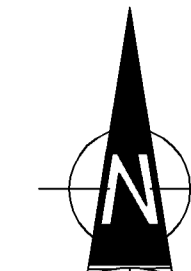
Site/Project:  
**HISTON ROAD  
 CORRIDOR  
 IMPROVEMENT  
 SCHEME**

Title:  
**DO-MAXIMUM  
 OPTION-OUTLINE  
 DESIGN**

**DRAFT**

Drawn: BL	Checked: GH
Designed: TH	Approved: GH
Date: 28/08/2015	Scale: 1:500 @ A1
Project Number: 35124238A-PTL	Sheet: 3 OF 3
35124238A-PTL	35124238A-PTL-103
	B

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Login: Lonsdale, Billy  
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Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	MB	GH	GH
B	15/09/15	ISSUED FOR REVIEW	BL	GH	GH

Notes:



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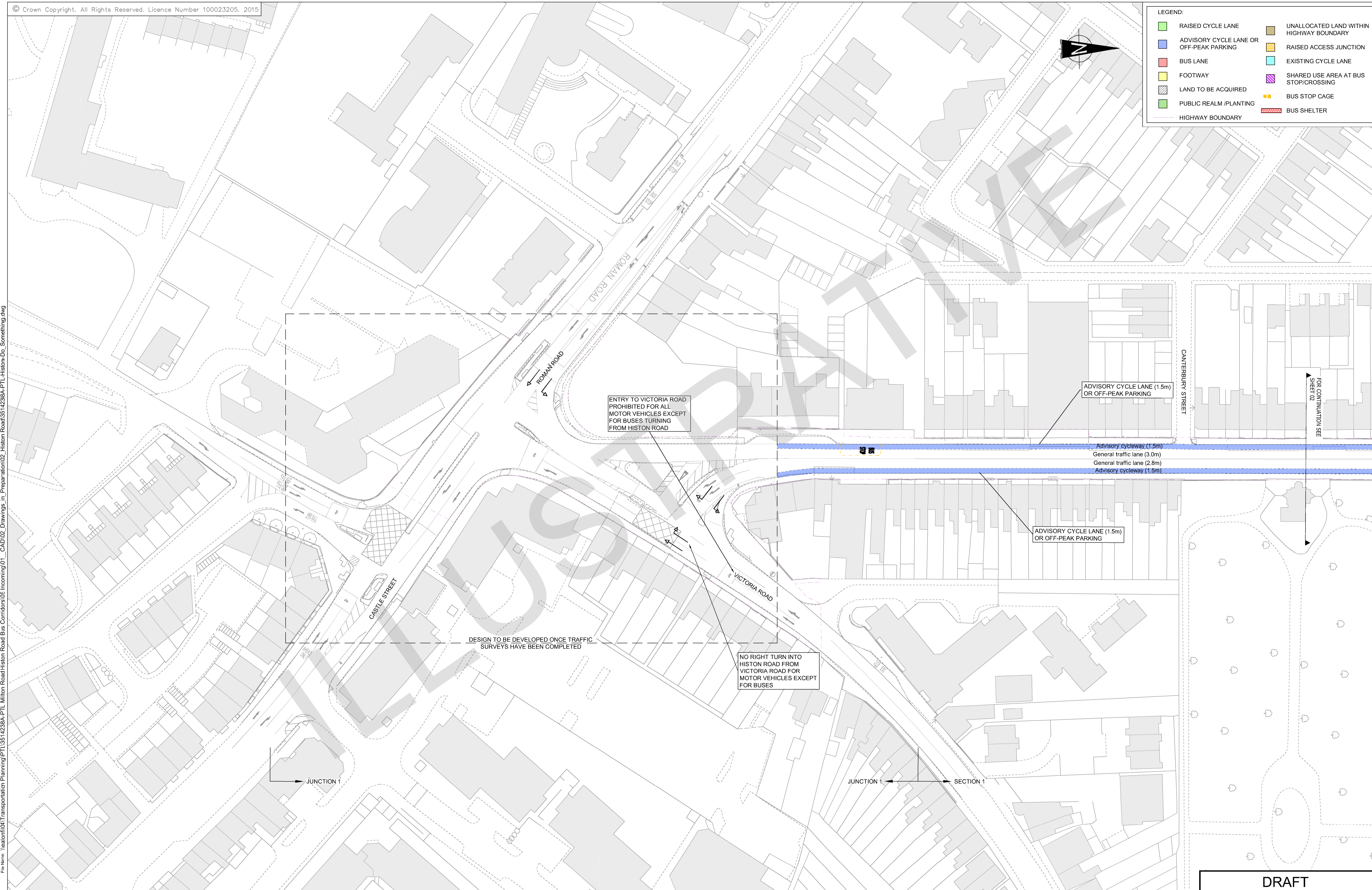
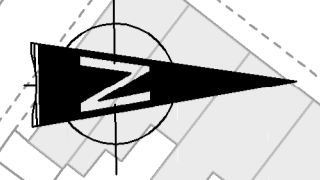
Client: HISTON ROAD

Site/Project: DO SOMETHING OPTION  
OUTLINE DESIGN

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Designed: TH	Approved: GH		
Date: 09/09/2015	Scale: N.T.S @	A1	Sheet: Overview
Project Number:	Drawing Number:	Revision:	
3514238A-PTL	35124238A-PTL-110	B	
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LEGEND:			
	RAISED CYCLE LANE		UNALLOCATED LAND WITHIN HIGHWAY BOUNDARY
	ADVISORY CYCLE LANE OR OFF-PEAK PARKING		RAISED ACCESS JUNCTION
	BUS LANE		EXISTING CYCLE LANE
	FOOTWAY		SHARED USE AREA AT BUS STOP/CROSSING
	LAND TO BE ACQUIRED		BUS STOP CAGE
	PUBLIC REALM /PLANTING		BUS SHELTER
	HIGHWAY BOUNDARY		



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 Logon: Habin, Shane  
 Plot Date: 28/09/2015 11:04:08

Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	MB	GH	GH
B	15/09/15	ISSUED FOR REVIEW	BL	GH	GH

Notes:

- ASLs to be 4m deep
- All bus stops to be fully accessible
- 'Unallocated land within highways boundary': indicates additional width beyond standard section profile - opportunity to widen footway/retain existing verge, where applicable
- Widths as per standard section profile unless otherwise stated
- No parking permitted on Histon Road, unless otherwise stated
- Refer to 'Draft Options' report for precedent examples:
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  - Raised cycleway

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Client: **Cambridgeshire County Council**

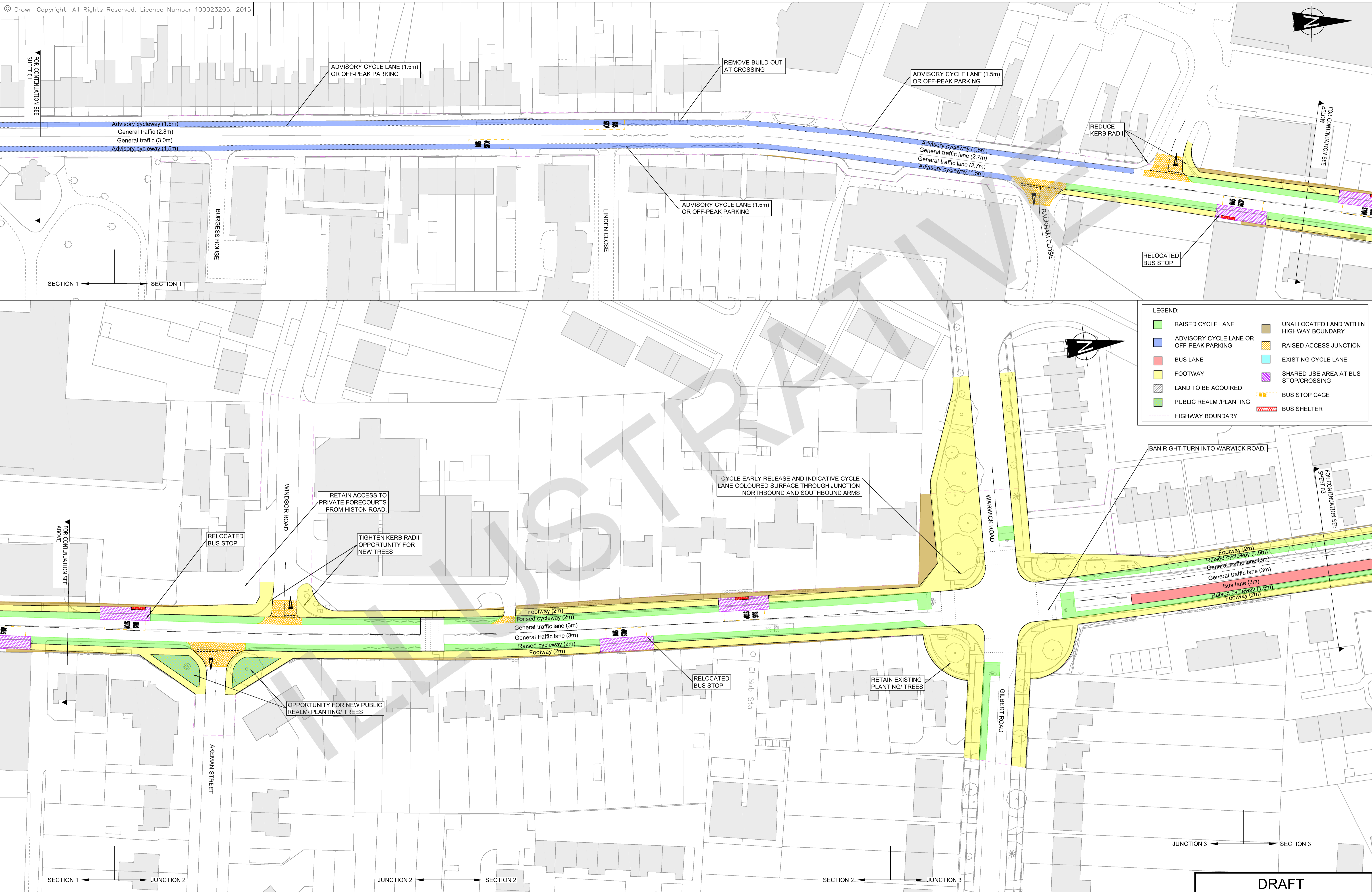
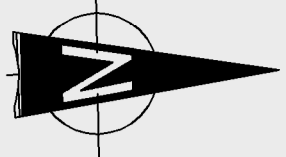
Site/Project: **HISTON ROAD**

Title: **DO SOMETHING OPTION OUTLINE DESIGN**

Drawn: MB	Checked: GH
Designed: TH	Approved: GH
Date: 09/09/2015	Scale: 1:500 @ A1
Project Number: 3514238A-PTL	Sheet: 1 OF 3
Drawing Number: 35124238A-PTL-111	Revision: B

DRAFT

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File Name: \\sdr\m\01\Transportation Planning\PTL\3514238A-PTL\_Milton Road\Histn Road Bus Corridors\05 Incoming\01\_CAD\02 Drawings\_in\_Preparation\02\_Histon Road\3514238A-PTL-Histon-Do\_Something.dwg  
 Logon: Habin, Shane  
 Pldate: 28/09/2015 11:05:43

Rev	Date	Description	By	Chk	App
A	09/09/15	ISSUED FOR REVIEW	MB	GH	GH
B	15/09/15	ISSUED FOR REVIEW	BL	GH	GH

- Notes:
- ASLs to be 4m deep
  - All bus stops to be fully accessible
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Client:  
Site/Project:  
**HISTON ROAD**

Title:  
**DO SOMETHING OPTION  
OUTLINE DESIGN**

<b>DRAFT</b>			
Drawn: MB	Checked: GH		
Designed: TH	Approved: GH		
Date: 09/09/2015	Scale: 1:500 @ A1	Sheet: 2 OF 3	Revision:
Project Number: 3514238A-PTL		Drawing Number: 3514238A-PTL-112	Revision: B
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