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<b>Subject:</b>	Madingley Road 'Quick-Win' Options Outline		

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## 1 Summary

The Cambourne to Cambridge Better Transport Project (C2C) proposes a new public transport link and Park & Ride facility to tackle worsening congestion for those travelling in to the city and meet growing demand for existing and new communities to the west of Cambridge to access jobs, services, places of education and other opportunities in the city.

In response to stakeholder feedback, this Technical Note reports on the evaluation of any 'quick win' interventions along the worst site of congestion, from Madingley Mulch Roundabout to Grange Road, that could facilitate easier and quicker journeys and alleviate congestion.

In order to deliver notable benefits in advance of the C2C scheme's planned delivery in 2024, viable projects would avoid land take and significant environmental impact and minimise input from, or impact on, third parties. In this context, proposed available options are restricted to a short section of public transport lane, potential extension of cycling improvements and a review of signal timings.

Further assessment would be required to model traffic flows and further evaluate costs and benefits of progressing with smaller scale, independent schemes, within the context of the project's objectives.

## 2 Introduction

Mott MacDonald (MM) has been asked to prepare a Technical Note (TN) outlining the potential 'quick-win' on-road interventions for Phase 1 of the A428 Cambourne to Cambridge (C2C) scheme, between Madingley Mulch Roundabout and junction 13 of the M11.

The Greater Cambridge Partnership (GCP) are interested in any potential 'quick-win' schemes which can be implemented on the existing carriageway between Madingley Mulch Roundabout and junction 13 of the M11 whilst the final proposals for the C2C scheme are being developed.

In the context of this TN 'quick-wins' are ideally schemes which:

- Lie within the highway boundary (i.e. require no land take);
- Have no significant vegetation loss;

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- Require no input from and have no significant impact upon third parties;
- Have no significant impact upon heritage or environmental assets.

These criteria have been set to identify interventions which could have some benefit to the immediate congestion problems and which could be implemented in a faster timescale, potentially in the next 1-2 years, so that they could deliver benefits in advance of the full C2C scheme, not act as an alternative to the C2C scheme. They would not, on their own, achieve the connectivity to existing and proposed local communities, or support future growth so could not fulfil the objectives of the C2C scheme.

## 2.1 Background

Optioneering work for the Cambourne to Cambridge scheme has been ongoing since 2014. In 2017, two on-road options were presented as part of a public consultation on Phase 1 (consultation leaflet: <https://citydeal-live.storage.googleapis.com/upload/www.greatercambridge.org.uk/transport/transport-projects/C2C%20P1%20Leaflet.pdf>).

Responses to this consultation were considered alongside a Multi Criteria Framework Assessment (MCAF) of the options within Options Appraisal Report Part 1 (OAR1: <https://citydeal-live.storage.googleapis.com/upload/www.greatercambridge.org.uk/transport/transport-projects/Option%20Appraisal%20Report%20Part%201.pdf>). OAR1 also provides a summary of optioneering work to date and assesses the two on-road options to conclude with a recommended on-road route that was taken forward to be assessed against the recommended off-road route in Option Appraisal Report Part 2 (OAR2: <https://citydeal-live.storage.googleapis.com/upload/www.greatercambridge.org.uk/transport/transport-projects/Option%20Appraisal%20Report%20Part%202.pdf>).

OAR1 assessed Option A (inbound public transport lane) against Option B (tidal public transport lane). The need for signage gantries above the road causing visual impacts and safety concerns was a major reason Option B was discounted.

In order to try and include some of the benefits of Option B within the on-road route, and to take on board consultation responses, Option A was taken through an "optimisation" process to explore if additional benefits were identified by making minor changes to the scheme. This is detailed in OAR1, and those changes that generated a benefit are discussed below. This resulted in Option A being amended to include a short section of outbound bus lane at Madingley Mulch Roundabout and the removal of the inbound public transport lane between High Cross and the City Centre.

The "Optimised" on-road route was then taken forward to OAR2 where it was assessed and modelled, alongside the off-road route. OAR2 concludes that the off-road route between Madingley Mulch Roundabout and Grange Road should be taken forward as the recommended option and was presented to the GCP Executive Board in December 2018. Following the Executive Board meeting, the potential for "Quick Wins" along the A1303 was agreed to be investigated.

## 3 Potential 'Quick Win' Schemes

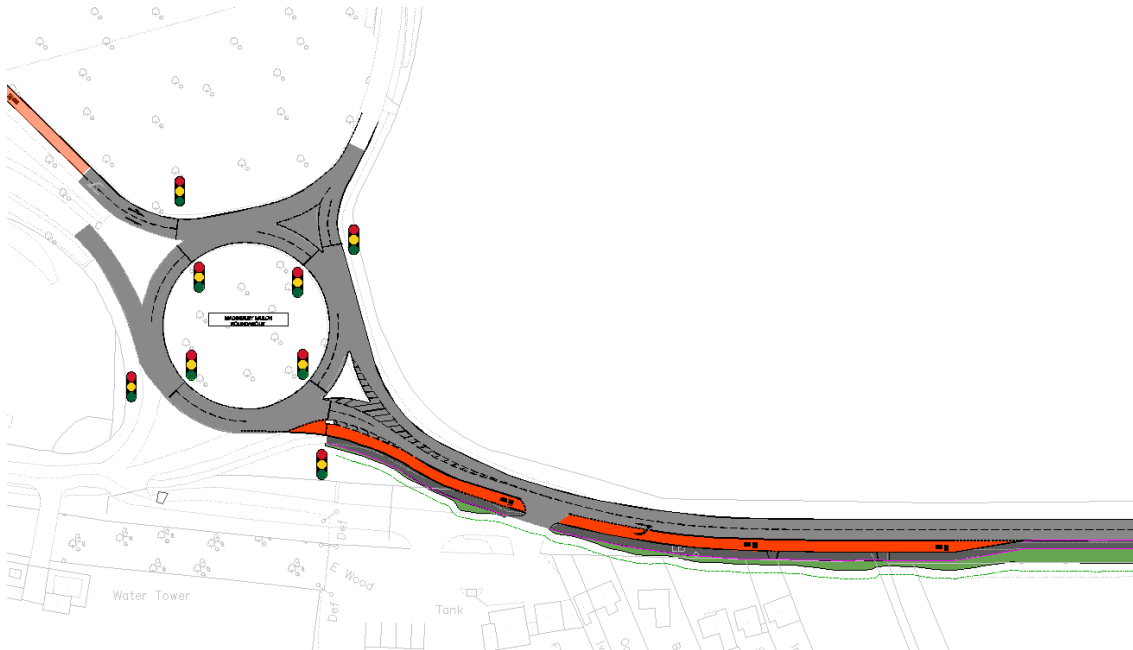
### 3.1 Madingley Mulch Roundabout

The scheme at Madingley Mulch Roundabout consists of:

- A short section of outbound public transport lane leading up to the roundabout
- Potential signalisation of the roundabout

Figure 1 illustrates the 'quick win' option at Madingley Mulch Roundabout where the outbound public transport lane is shown in orange leading up to the roundabout. This is one element of the schemes named "Low Cost a & b" that were assessed within Option Appraisal Report Part 2 (OAR2, <https://citydeal-live.storage.googleapis.com/upload/www.greatercambridge.org.uk/transport/transport-projects/Option%20Appraisal%20Report%20Part%202.pdf>) but could be constructed as a standalone solution.

**Figure 1: Madingley Mulch Roundabout**



Source: Mott MacDonald

The outbound public transport lane would give priority to public transport on the approach to Madingley Mulch Roundabout and therefore could add some benefit in terms of journey times, especially in the PM peak. However, due to the land available limiting the length of the public transport lane, it is likely that any benefit to public transport vehicles would be relatively small.

Signalisation of all or part of the roundabout could also be considered to better manage traffic flow and could provide a benefit to public transport vehicles by using vehicle detection to ensure a green light is provided when required. Detailed traffic modelling would be required to assess any benefits and indicate if there was any disbenefit created to general traffic as a result of any proposed changes.

### 3.2 Cycle Improvements

As part of Options Appraisal Report Part 1 (OAR1, <https://citydeal-live.storage.googleapis.com/upload/www.greatercambridge.org.uk/transport/transport-projects/Option%20Appraisal%20Report%20Part%201.pdf>), the on-road schemes were assessed in order to arrive at an "optimised" on-road scheme. Part of this assessment related to consultation responses that had indicated residents were in support of cycling improvements on Madingley Road, along the section between High Cross and Lady Margaret Road, instead of the proposal to provide a section of inbound public transport lane.

OAR1 concluded that the public transport lane appeared to offer minimal benefit following traffic modelling and as such suggested it be removed from the optimised scheme and cycling improvements promoted in its place. This conclusion formed the basis for the off-road schemes assessed in OAR2.

### 3.3 Signal Timings

Given that there will be a requirement to undertake traffic modelling on the above options to test the benefit that they could have, the opportunity should be taken to review signal timings along the routes to investigate whether improvements could be made. As the majority of major junctions are already signalised and available carriageway space is limited, it is not expected that this would have significant benefits that would fully resolve issues for road users given the expected increases in future traffic associated with development along the A428. Nevertheless, there is benefit in reviewing the layout of signal controlled interchanges to reflect the changes in travel patterns associated with new development, especially at Eddington.

Work of this nature that would not require any physical changes to be made could likely be implemented in approximately 3-6 months, subject to agreement with the Highway Authority traffic team.

### 3.4 Discounted options

There are several elements of the on-road scheme option which was presented and appraised in OAR2 which fit some of the 'quick-win' criteria outlined above. It is however acknowledged that in order to achieve any benefit, some of the on road elements do require input from third parties and small amounts of land may be required.

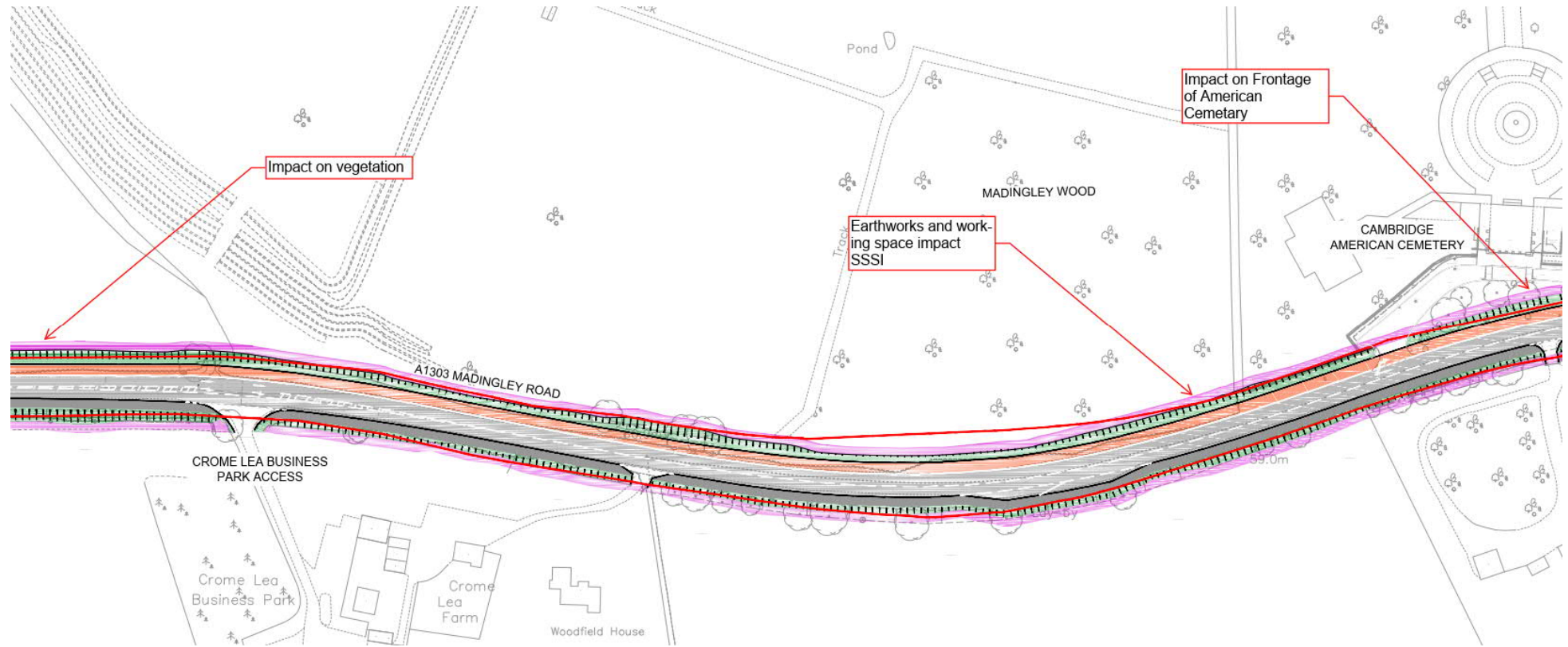
This section sets out the elements of the on-road scheme that are not considered to be a 'quick-win' with explanations as to the issues these solutions face.

#### 3.4.1 Inbound Public Transport Lane from Madingley Mulch to M11

The in-bound public transport lane that was part of the On-road options consulted in 2017 / 2018 is not being proposed as a 'quick win' as it stretches from Madingley Mulch roundabout up to the M11 junction and a significant proportion of the work would require earthworks or working areas that fall outside of the highway boundary. This would have a large impact upon existing vegetation that runs alongside the A1307, including that which forms part of Madingley Wood, a site of Special Scientific Interest (SSSI). It would also require works to realign the highway at the entrance to the American Cemetery, impacting the existing frontage layout. This has been identified as having the potential to impact on the heritage setting of the Cemetery and was considered a disbenefit of the on-road schemes during the assessment process. Also, implementing non-continuous, short sections of public transport lane wherever possible in this area would not be considered to add significant benefit to journey times and capacity.

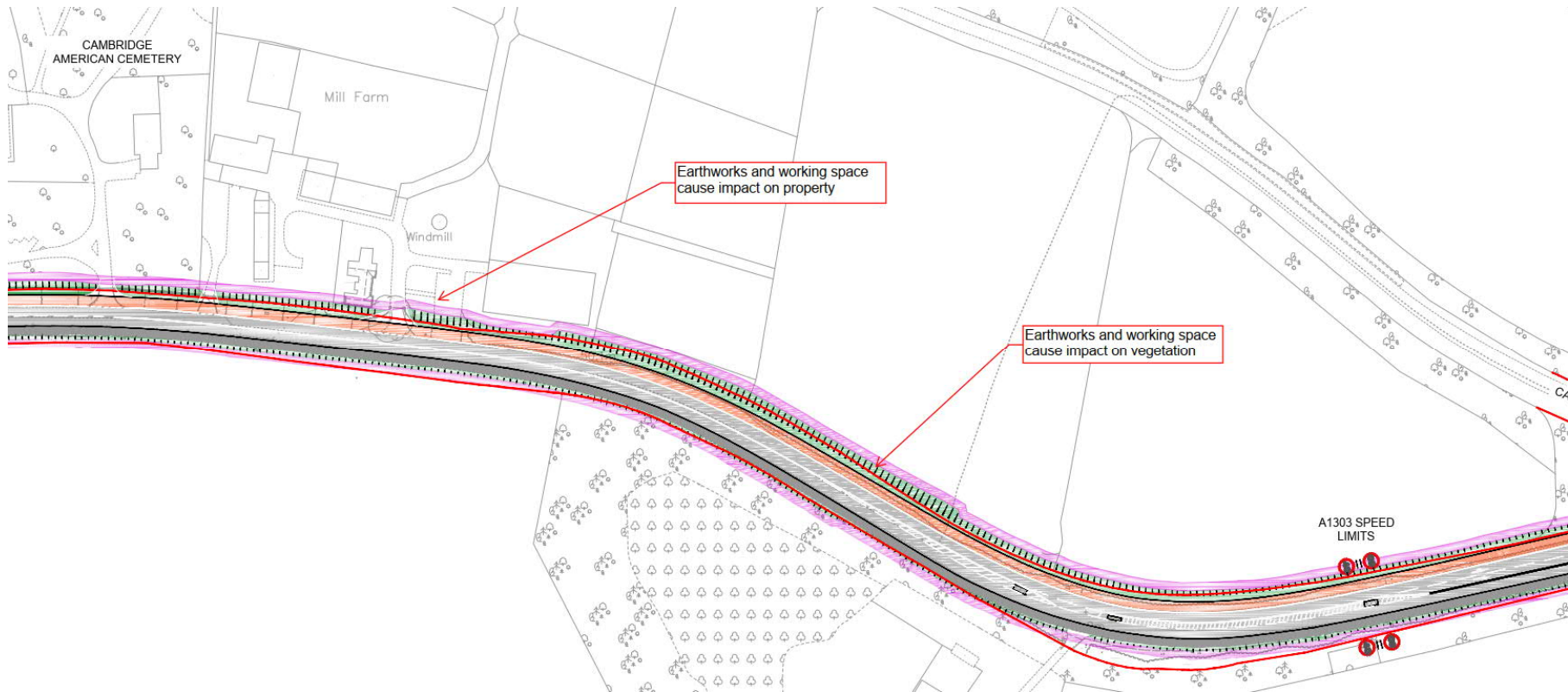
The figures below show the inbound public transport lane and where it would impact on the various features outlined above. If both inbound and outbound public transport lanes were constructed, these impacts and landtake requirements would become more significant with the overall width increasing by a further 3.5-4m to accommodate an extra lane (potentially more depending on earthwork requirements):

Figure 2: Inbound Public Transport Lane Extract 1



Source: Skanska

**Figure 3: Inbound Public Transport Lane Extract 2**



Source: Skanska

Following discussion with the Local Liaison Forum Technical Group, it was questioned whether the alignment could be revised to provide a more comprehensive on-line scheme whilst avoiding taking land from the SSSI and American Cemetery, by shifting the route to the south. The alignment could be changed to accommodate this and it would likely reduce the impact on the SSSI and Cemetery. However, it would also require significant landtake and tree removal from residential properties opposite the American Cemetery and would still be considered as having an impact on the setting of the cemetery itself because of the road widening to provide the additional lane. As such it would still not be considered a "quick win".

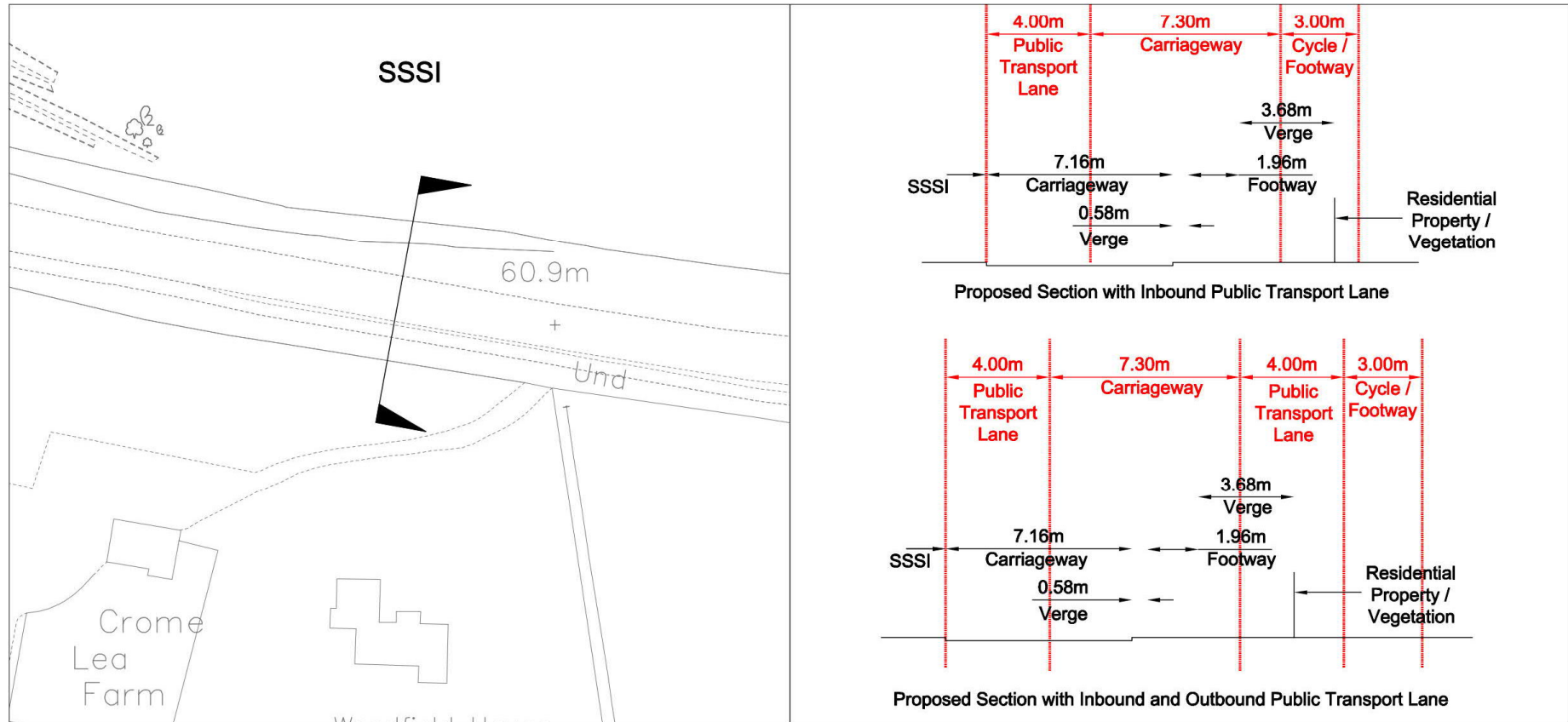
Figures 4 and 5 below show a cross section at each of two points along the A1303 adjacent to the SSSI and American Cemetery highlighting the potential landtake from adjacent property due to widening for public transport lanes if this were located entirely on the southern side of the A1303. The figures assume a proposed road width of 7.3m and do not include for any earthworks or working areas that may be required which could further impact on the residential properties and vegetation.

Figure 4 shows at a point adjacent to the SSSI, taking land only to the southern side of the A1303, that a single inbound public transport lane would require a 1m strip of land from the property to the south, whilst providing both inbound and outbound lanes would require a 5m strip of land.

Figure 5 shows at a point adjacent to the American Cemetery, taking land only to the southern side of the A1303, that a single inbound public transport lane would require a 2m strip of land from the property to the south, whilst providing both inbound and outbound lanes would require a 6m strip of land.

Acquiring this land would likely require a Compulsory Purchase Order which would be difficult to justify while GCP has recommended an off-road route for the Board to consider for decision in October 2019.

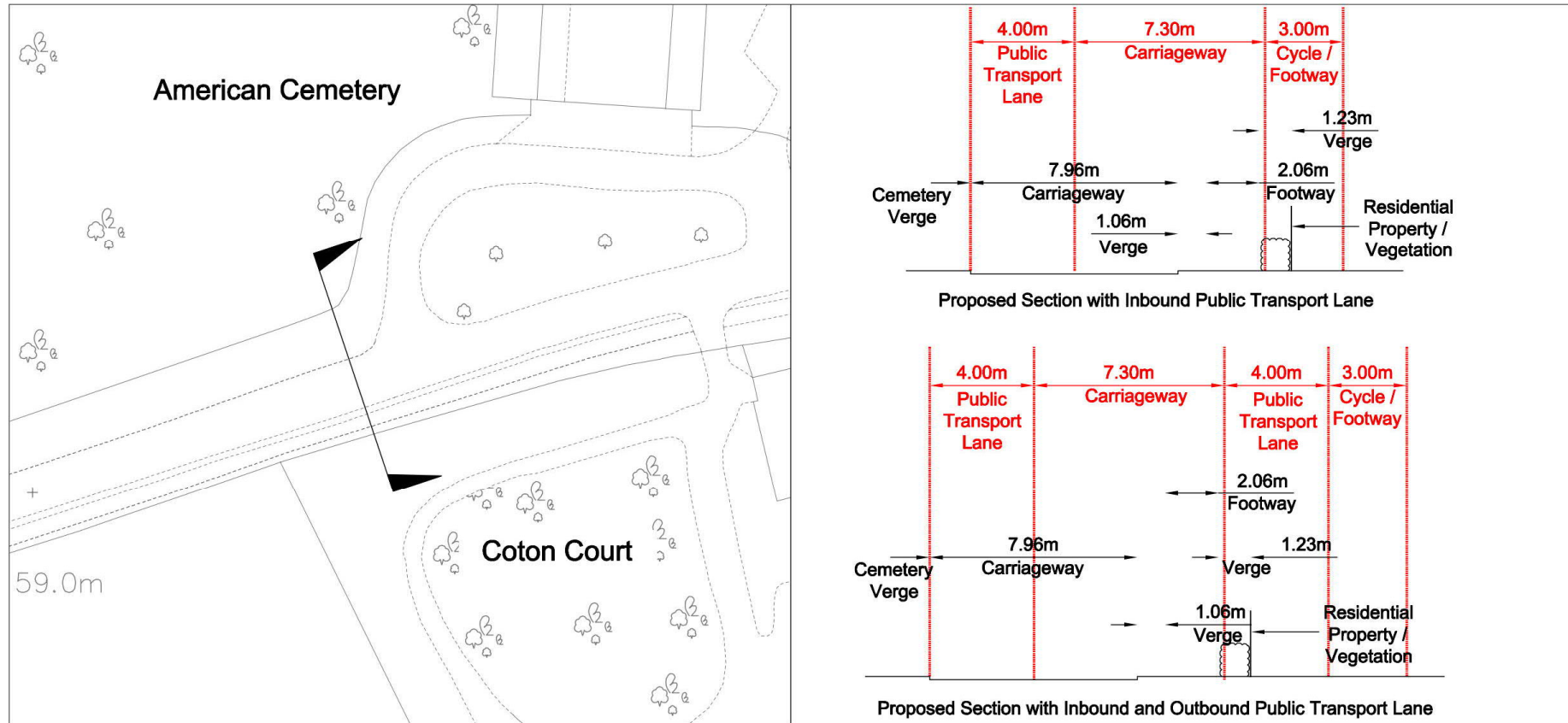
Figure 4: Section at SSSI



Source: Mott MacDonald



Figure 5: Section at American Cemetery



Source: Mott MacDonald

### 3.4.2 M11 Junction 13

Changes to the Junction of the A1303 and the M11 could potentially provide significant benefits to general traffic, as well as public transport vehicles. However, this will need input, including consents and land, from third parties (Highways England) which would impact the timescale in which it is possible to implement this option. As such it is not considered a 'quick-win' option.

The M11 Junction 13 scheme could consist of:

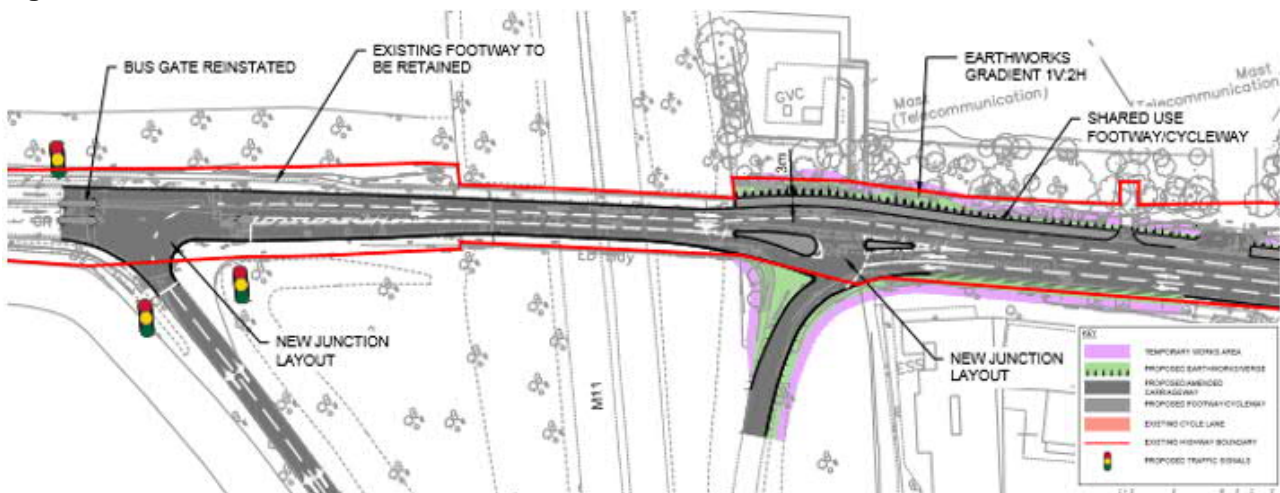
- New junction layout for both slip roads
- Public transport priority measures
- Shared use footway / cycleway

Figure 6 shows a potential layout that allows both lanes to turn right from the off-slip, with two corresponding ahead lanes provided on the inbound A1303. The junction will be signalised with public transport priority maintained from the existing section of public transport lane at the inbound A1303 signals.

The junction layout for the southbound on slip of the M11 has been altered to take into consideration the new lane heading inbound towards Cambridge. It is proposed that the outbound traffic on the A1303 gives way to right turns from the inbound lane, avoiding inbound traffic becoming blocked by right turning traffic, as happens in the current situation. Modelling would be required to ensure that the layout would not cause a disbenefit to outbound traffic, particularly in the PM peak.

Following discussion with the Local Liaison Forum technical group, it was suggested that the southbound slip junction could be signalised, with inbound ahead traffic effectively given a permanent green signal with right turning traffic controlled. This layout could be investigated if this scheme is taken forward but the need for provision of traffic splitter islands for signals would need to be considered in the context of the space available.

**Figure 6: M11 Junction**



Source: Skanska

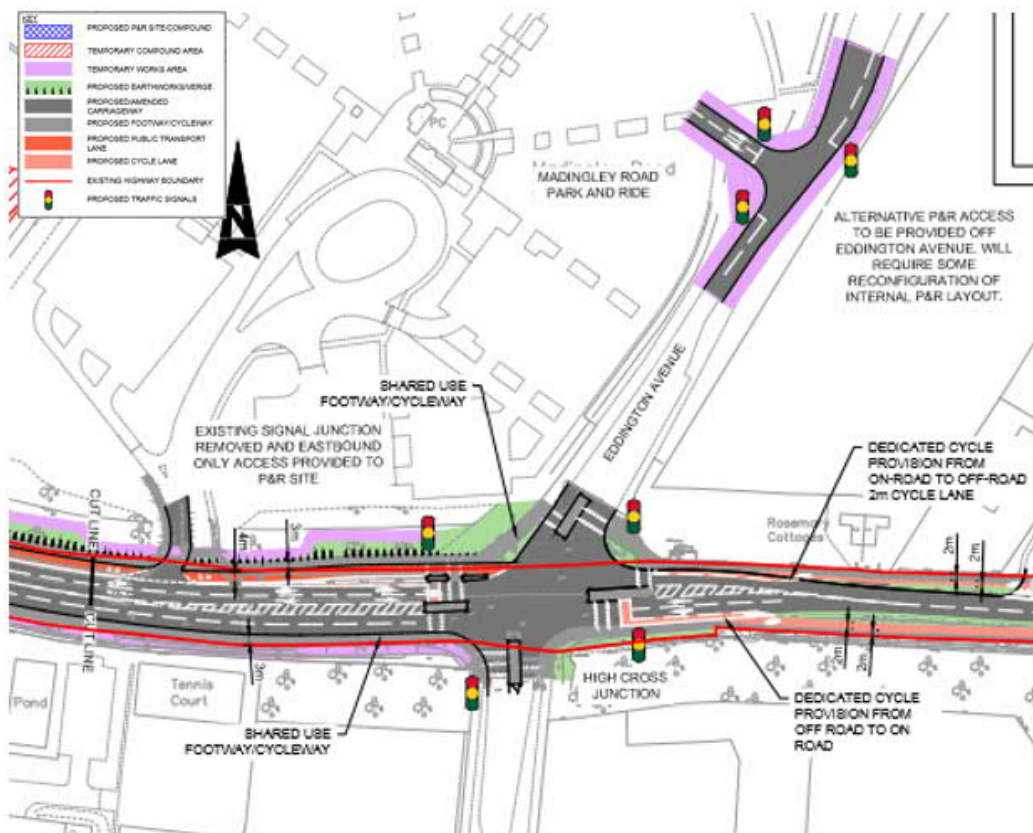
### 3.4.3 Madingley Park and Ride Entrance

Alterations to the existing Park and Ride (P&R) at Madingley Road are not considered 'quick-wins' as they require input from third parties and there would be some private land required. The potential scheme is illustrated in Figure 7.

The proposed alterations consist of:

- Removing the signalised entrance to the P&R and making the P&R entrance only from the A1303
- Providing a new exit for vehicles off Eddington Avenue
- Inbound public transport priority on the A1303 signalised junction

Figure 7: Madingley Park and Ride



Source: Skanska

Turning the current junction into an entry only junction removes one set of signals from a busy section of highway and could have positive benefits. An alternative exit is proposed for vehicular egress off Eddington Avenue. Eddington Avenue is not a part of the public highway and so permissions would need to be sought from the land owner and some land purchased to accommodate the exit. The internal layout of the P&R would also need some alteration and could require the loss of some parking spaces.

### 3.5 Conclusions and Next Steps

Due to the limited amount of space available along the corridor, there is not considered to be a significant range of available “quick win” schemes that could be implemented along this section of road without the need for the purchase of private land, negotiation of 3<sup>rd</sup> party land, or impacting on vegetation and other significant features such as the American Cemetery or the SSSI.

In order to proceed with the delivery of the ‘quick wins’ outlined in this document, we would recommend GCP consider taking the following actions:

- Traffic modelling of the outbound public transport lane at Madingley Mulch to assess potential benefits and identify any disbenefits caused to general traffic.
- Traffic modelling to assess if reviewing and amending traffic signal timings along the route could present any benefit to public transport and general traffic.

Calculate the costs associated with each of the schemes being modelled in order to better assess the various options.