Technical note

Project:	A428 Study - Phase 2	**To:**	Adrian Shepherd
Subject:	Analysis of Consultation Proposals	**From:**	Atkins
Date:	1 Feb 2016	**cc:**	Ashley Heller

1. Aim

The aim of this technical note is to provide an initial analysis of the alternative proposals received as part of the public consultation on the A428 Cambourne to Cambridge Better Bus Journeys scheme. This technical note is a supporting document as part of the report to the City Deal Partnership on the outcome of the public consultation undertaken in the autumn of 2015. The written representations considered within this technical note will, as required be assessed as part of the appraisal of options and feasibility for the scheme

2. Background

The public consultation for the A428/A1303 Cambourne Cambridge project was carried out in autumn 2015 and presented 6 options for the two funding tranches specified by the City Deal Board. The tranche 1 section comprises the area from Madingley Mulch roundabout towards the City, and tranche 2 covers from the west of Madingley Mulch to the Caxton Gibbet roundabout. Three options were presented for each tranche, labelled North, Central and South. Respondents submitted a number of alternatives and modifications to the 6 options presented. A quantitative analysis of the public consultation is provided in a report on behalf of The City Deal Partnership by Cambridge Research Group.

As noted in the June 2015 A428/A1303 Cambourne - Cambridge Interim Report, public consultation and stakeholder engagement forms an integral part of the ongoing assessment of the options and their feasibility, a process consistent with the Department of Transport's method for appraising transport projects and proposals. This work identifies the constraints and scope of investment requirements to inform an outline business case that forms the basis of the recommendations presented to the City Deal Partnership later this year.

Written representations have been received from statutory consultees, developers, interest groups and individuals. The level of detail of alternative proposals ranged from one line descriptions to annotated maps with qualitative assessments of benefits.

3. List of alternative proposals

The following comments and proposals have been raised as a result of the public consultation:

- Substituting proposed P&R at Madingley Mulch with a P&R at Scotland Farm
- Route north of Cambridge Road and bridge across M11
- Alternative route alignments east of J13 M11
- Tidal bus lane for Option 1 Central
- Option 1 Central/1 North with a route through West Cambridge
- Smart Traffic Management
- Transport Hubs at Cambourne, Bourn and between Highfields and Caldecote

- Additional P&R north of Cambourne
- Closing Madingley Hill to through-traffic
- *A428 Upgrade and connection to A14*
- *Development of cloverleaf at Girton*
- *Construction of Park and Ride sites at Barton and Bar Hill*
- *Construction of Park and Ride site at Girton*
- *Relocate Madingley Road P&R to north west of J13*
- *Include Northampton Street in the Core Traffic Scheme, limiting through traffic*
- *Madingley Village Road Closures / Traffic Management*
- *Development closer to the City*
- *Congestion charge*

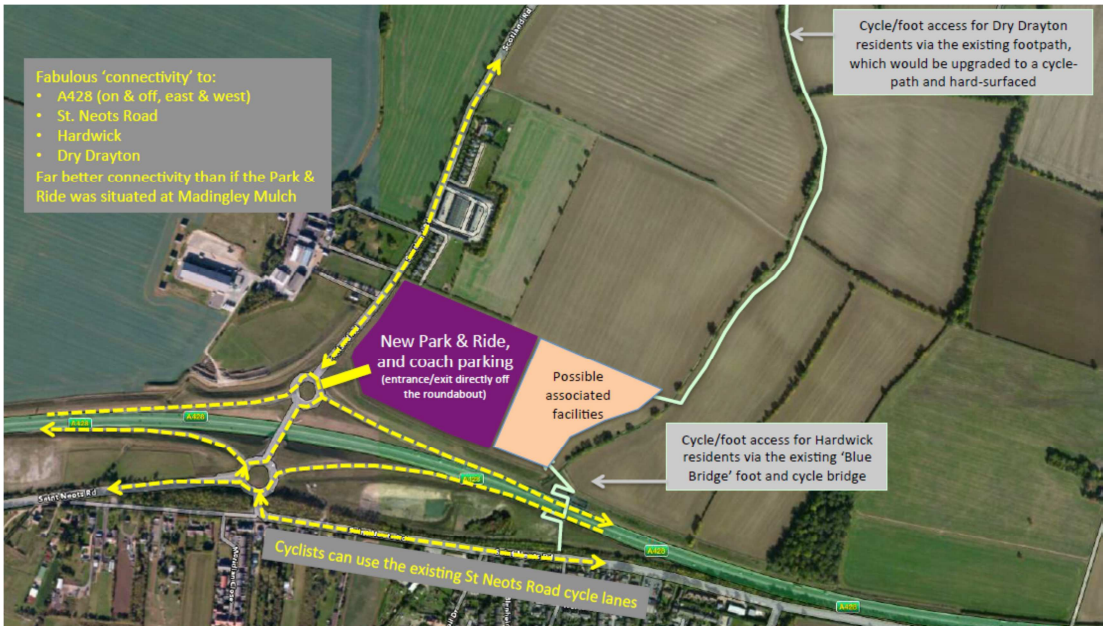
Proposals in italics are considered outside the scope of the defined scheme or measures which could be delivered outside the terms of the existing project and are therefore not considered further. Appendix A contains further commentary as to why they are considered out of scope.

The remaining comments and proposals have been analysed in the sections below though a qualitative assessment of potential benefits.

4. Analysis of alternative proposals

4.1. Substitution of Madingley Mulch P&R with one at Scotland Farm

4.1.1. Proposal



The proposal involves locating a P&R at Scotland Farm (Hardwick Junction of the A428), rather than at Madingley Mulch Roundabout.

Benefits suggested include: earlier interception of traffic, better connectivity than at Madingley Mulch, better cycle and foot access for residents of Hardwick and Dry Drayton, being on the edge of the green belt, option for buses to serve Cambridge by continuing on A428.

4.1.2. Analysis

Congestion

Locating the proposed Park and Ride at Scotland Farm would offer the possibility of intercepting car users at a location further from the City Centre. If successful interception occurs this may help ease congestion at Madingley Mulch roundabout, as the proposer suggests. However driver behaviour should also be taken into account, as it is unlikely that many vehicles would choose to stop at Scotland Farm if they cannot see a queue or congestion on the A428. Locating the Park and Ride at the location where congestion begins (i.e. after Madingley Mulch roundabout) is therefore likely to offer greater incentives for modal switch.

Survey data[1] and TrafficMaster data do not indicate the presence of queues or congestion at the A428 slip road (although we acknowledge these may be present on occasion). This data shows queueing typically starts at or just beyond the roundabout, as a result of queues stretching back from the M11 junction. However, to regulate traffic flows at Madingley Mulch, all the proposed A428 options include signalisation of Madingley Mulch roundabout.

Patronage

Locating the proposed P&R at Scotland Farm has the potential of increasing walk-and-ride patronage from Hardwick. The figure below illustrates the residences which would be within a 400m walking distance[2] from a P&R at this location. The sketch also shows similar plots for the proposed A428 Options 2 Central and 2 South, which are also likely to capture walking patronage from Hardwick if bus stops are provided at this location (the exact location of stops will need to be determined during subsequent scheme development).

[1] The latest survey for this location was conducted in June 2014.

[2] As per WebTAG Unit 4.2.

Users from the southern section of Hardwick are likely to need to use bicycle or car to access the P&R, and may therefore be less likely to switch from their current mode of transport. The shuttle service proposed would need to be privately operated (and hence commercially viable) as revenue funding streams are not available for this project. It is also worth noting that users from Dry Drayton are unlikely to travel by foot, as the distance to the stop is around 2 miles.

In summary, a greater increase in walk-and-ride patronage from Hardwick is likely to be achieved by placing bus stops closer to the village, rather than having a P&R site north of the A428. Locating the Park and Ride here would also be to the detriment of patronage from other locations such as Madingley, which could be captured if the P&R were further east.

Other considerations

Another advantage suggested by respondents for locating the P&R at Scotland Farm is that this is at the edge of the Green Belt. While this may perceptually be more desirable, the planning process will not be affected by this consideration.

One proposer indicated Scotland Farm is more versatile as it would allow buses to serve Cambridge via the A1303 or the A428. Serving Cambridge via the A428 provides an orbital route, which is desirable as it can be used to link housing and employment locations on the fringe of the City. However, providing such an orbital route east of the M11 (as is being considered as part of the Western Orbital study) would have the advantage of linking developments at West Cambridge, North West Cambridge and Darwin Green, which could not be achieved by using the A428/A14.

Bus operation costs should also be considered as part of the location selection, as these will have an impact on bus fares and therefore on the desirability of the P&R. Locating the P&R further from the City Centre is likely to incur higher operation costs, as more buses will be required to operate the same route, and result in economic dis-benefits when compared to a closer location. The magnitude of this effect cannot be quantitatively assessed without further analysis.

4.2. Removal of P&R at Madingley Mulch

4.2.1. Proposal

The proposal is dependent on the relocation of the proposed Park and Ride to Scotland Farm, as detailed above. However, removal of the P&R at Madingley Mulch has been considered separately as the following concerns have been raised regarding the Madingley Mulch location:

- the roundabout is very busy, with a difficult layout,
- it is too close to Madingley Hill, a traffic congestion hot-spot we are all trying to avoid
- it is too far from the largest centre of population in the immediate area, i.e. Hardwick
- long-distance traffic coming along the A428 from the west (e.g. from Milton Keynes, Bedford or St Neots) exits the A428 unnecessarily late; it would be better if such traffic could be captured earlier
- long-distance traffic coming along the A14 from the east (e.g. from Newmarket, Bury St Edmunds, Felixstowe etc.) can't exit to Madingley Mulch; but it can continue on the A428 and exit at Scotland Road
- Madingley Mulch is too small an area to become a true public transport 'hub' (i.e. not enough room for a hotel, petrol station, shop, public toilets etc.)
- the area is very sensitive, being at the top of Madingley Hill, with its important views and location
- we worry about the effect of car emissions, as they enter/exit a Park & Ride and park their cars, on the ecology of Madingley Old Wood, a Site of Special Scientific Interest (SSSI)
- there would be too much harmful impact on the nearby villages of Madingley and Coton

4.2.2. Analysis

Original rationale for location at Madingley Mulch

Three factors underpin the rationale for locating the Park and Ride at Madingley Mulch:

- Interception of car users at the point where congestion starts: drivers are more likely to park and continue their journey on the bus if the Park and Ride is at the location where congestion begins and is visible. If bus infrastructure providing uncongested bus travel (and bypassing traffic) is also available at this location this will provide a further incentive to switch modes. Therefore, the Park and Ride should be located where congestion starts (so there is a deterrent to continuing the journey by car), but ideally travel up until the entrance of the Park and Ride should be congestion-free.

- Patronage capture: locating the Park and Ride as far east as feasible will make it accessible to the greatest number of users. The location at Madingley Mulch is easily accessible to both trunk road and local road traffic from the A428 (w), Church Lane and Long Road. If it were located further west (e.g. at Scotland Farm), traffic from Long Road and Church Lane would need to travel to the existing Madingley Road Park and Ride, therefore continuing to add to the congestion on Madingley Hill.

- Bus Fleet Operating costs: the number of buses required to serve the route from the Park and Ride to the City will depend on the service frequency and on the distance between the Park and Ride and the end of the route in the City Centre. Assuming frequency remains constant, a greater distance between the Park and Ride stop and the City will require more buses to serve the route, therefore increasing operating costs. For this reason, operating costs will be lower if the Park and Ride is located as far east as feasible.

In summary, the Park and Ride location was proposed at Madingley Mulch roundabout as this was the eastern-most location which gave the best balance between congestion-free access, high capture of patronage and lower operating costs.

The sections below discuss the proponent's reasons for not locating the Park and Ride at this location.

Congestion

- the roundabout is very busy, with a difficult layout

- it is too close to Madingley Hill, a traffic congestion hot-spot we are all trying to avoid

There is some congestion at the roundabout at peak times, and the proposed signalisation will help regulate traffic flow at this location. Having visible congestion at the location of the Park and Ride entry is more likely to encourage P&R usage than having the P&R at an uncongested location.

Accessibility

- it is too far from the largest centre of population in the immediate area, i.e. Hardwick
- long-distance traffic coming along the A428 from the west (e.g. from Milton Keynes, Bedford or St Neots) exits the A428 unnecessarily late; it would be better if such traffic could be captured earlier
- long-distance traffic coming along the A14 from the east (e.g. from Newmarket, Bury St Edmunds, Felixstowe etc.) can't exit to Madingley Mulch; but it can continue on the A428 and exit at Scotland Road

Being located close to a population centre may benefit walk-and-ride patronage, but a similar or greater effect can be obtained by locating one or more bus stops at convenient locations in these population centres (e.g. Hardwick).

Accessibility considerations for long-distance traffic are not dissimilar to those for short- or medium-distance traffic. If long-distance drivers observe the A428 is still uncongested, there is little evidence to suggest that they would switch modes earlier than short-distance traffic.

Park and Ride accessibility from the east should be considered but is likely to be less significant in terms of traffic volume, as there are other P&R sites located in the north of Cambridge which could intercept this traffic sooner. Should this traffic require usage of the A428 P&R, the location at Scotland Farm offers no significant advantage over the location at Madingley Mulch. Traffic wishing to access a P&R in this corridor would have to use the A428 Scotland Farm Junction to U-turn. At this point, the choice of parking versus continuing on the A428 to Madingley Mulch is subject to the same considerations as discussed earlier.

Size

- Madingley Mulch roundabout is too small an area to become a true public transport 'hub' (i.e. not enough room for a hotel, petrol station, shop, public toilets etc.)

The potential locations being considered at Madingley Mulch Roundabout vary in size from 120,000 to 360,000 square metres. For comparison purposes, the size of the current P&R at Madingley Road is under 50,000 square meters. Accommodation of the required parking spaces and suitable facilities should be achievable at the locations being considered around the Madingley Mulch roundabout.

Environmental and traffic impacts

- the area is very sensitive, being at the top of Madingley Hill, with its important views and location
- we worry about the effect of car emissions, as they enter/exit a Park & Ride and park their cars, on the ecology of Madingley Old Wood, a Site of Special Scientific Interest (SSSI)
- there would be too much harmful impact on the nearby villages of Madingley and Coton

The landscape character of the area will be considered when assessing the potential locations of a Park and Ride at Madingley Mulch roundabout. Should visual character be affected, mitigation measures such as screening will be considered.

The effect of vehicle emissions on the Madingley Wood SSSI will be included as part of the air quality assessment of the P&R, if the SSSI is within 200 m of the P&R itself or the access roads (hence this is likely to be a consideration for the NE and SE sites). The assessment would consist of calculating annual average NOx concentrations in the SSSI both with and without the P&R. The NOx concentrations would be compared with the criterion for vegetation and ecosystems to see if it is being exceeded, and to determine the change in NOx concentrations in the SSSI. In addition, nitrogen deposition would be calculated within the SSSI and compared with the relevant critical load. The results would be evaluated and consideration

given to potential impact on the SSSI. If there was a significant risk of an adverse effect, then mitigation measures should be undertaken to minimise the impact.

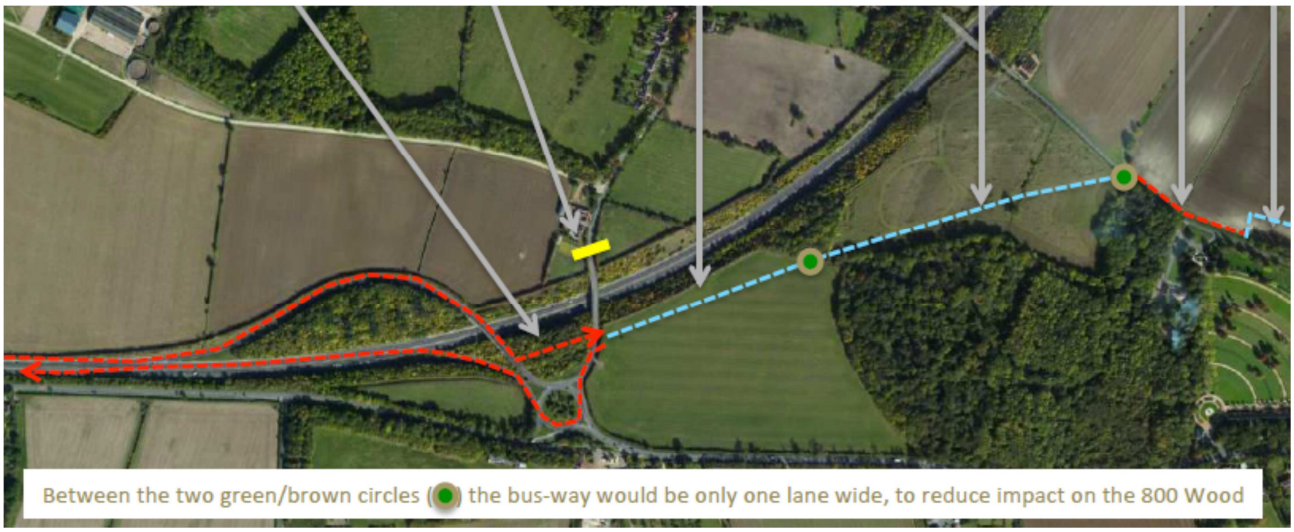
Traffic impacts on the surrounding area from the introduction of a Park and Ride at Madingley Mulch roundabout will be assessed in full as part of the ongoing analysis. Initial considerations indicate that there may be some changes in traffic flows in Church Lane to the north, the north of the villages of Barton and Comberton and the slip from the M11 onto the A1303 as traffic may transfer from the existing Park and Ride to the new one. It is acknowledged that any new Park and Ride has the potential to attract vehicle trips from other radial routes, as any new site in this location combined with bus priority measures will provide a strong alternative to the existing site in the corridor (as well as other Park and Ride sites). However, it is anticipated that the majority of trips would be undertaken by those already utilising the corridor. While those who may switch to using this corridor over another may cause some localised dis-benefits in the immediate surrounding area, it is likely that there would be consequential improvements elsewhere across the network. Options to mitigate traffic impacts could be considered as part of the scheme.

4.3. North of Cambridge Road and bridge across M11

4.3.1. Proposal

The respondents' proposed route is depicted on their maps below, and includes a bus-only shortcut before the Madingley Mulch roundabout, routing along the top of the A428 embankment and just south of the 800 wood, and then continuing north of Cambridge Road, across the M11 using a new structure and into the existing Madingley Road Park and Ride.

Benefits listed by the consultee include: high reliability due to offline route, minimising environmental impact by placing route between 800 Wood and Madingley Wood SSSI, avoids M11 J13 bridge.



4.3.2. Analysis

This proposal has many similarities with Option 1 North Many of the elements proposed are detailed features which could be considered in future stages of scheme development should Option 1 North be selected as an option to be taken to a subsequent stage of scheme development following the Board's consideration of the outline business case analysis.

The different elements are summarised below.

- The bus-only short cut to avoid the roundabout: the requirement for this short-cut may depend on the exact location of a P&R at Madingley Mulch. If this particular alignment is deemed to offer benefits, it will be examined during scheme development, as considerations such as levels, sight lines and bus turning radii will inform its feasibility.

- Access restrictions to Church Lane: even with resident passes (required for all car owners of Madingley and potentially Dry Drayton), operational considerations such as access for visitors, deliveries and emergency services may mean that restricting access is unfeasible. Other mitigation measures to limit impact of traffic on Church Lane should also be considered.

- Routing along the embankment: the requirement for this route may depend on the exact location of a P&R at Madingley Mulch. If beneficial, an assessment of the suitability of this alignment should be carried out during subsequent stages of scheme development. Considerations such as topography, environmental impacts and proximity to the American cemetery will inform the feasibility of this alignment.

- Route through 800 Wood: the extent by which a single rather than double lanes will reduce impact on the wood should be considered during subsequent stages of scheme development should this route be chosen.

- On-road bus route: the benefits of having this section of the route on-road are not explicitly stated, but it will limit journey time reliability if included in the route as presented.

- Bus-only route immediately north of Cambridge Road: this alignment could be considered as part of ongoing assessment, however initial considerations indicate Cambridge road may need upgrading and safety barriers installed for the bus/cycle route to run 2m lower than the existing road. If required a RRRAP (Road Restraint Risk Assessment Process) assessment would ascertain containment type.

- Future-proofing P&R site: should the existing site need be replaced a study to assess alternative arrangements would identify suitable sites

- New bridge over the M11: a new structure is likely to incur high costs, but will also remove the constraint of limited crossings over the M11. The ratio of benefits and costs associated with

achieving this potential benefit is assessed as part of the business case via a sensitivity test on Options 1 Central and 1 North

4.4. Alternative route alignments east of M11 J13

4.4.1. Proposal

Three options have been proposed by consultees for the section of Madingley Road east of the M11:

- On-road without segregated bus lane but with local street parking/management measures
- On-road with new segregated bus lanes
- Through West Cambridge site and new off-road link to Grange Road

4.4.2. Analysis

Within the City Option 1

No segregation on Madingley Road will severely reduce the reliability of the route and increase journey times. This will make the route less attractive and discourage modal shift, and is therefore would not meet the scheme's transport objectives.

It is unclear what "localised 'street traffic management' (e.g. parking restrictions and residents' parking)" would comprise, as there is little parking currently along Madingley Road.

Within the City Option 2

This proposal is broadly consistent with Options 1 Central and 1 North. Providing two bus lanes or a tidal bus lane east of the M11 on Madingley Road is likely unfeasible, as described in section 4.5 below.

Within the City Option 3

This proposal is broadly similar to other alternative proposals which contemplate using Options 1 Central /1 North and then routing buses thorough then West Cambridge site (this is discussed in more detail in section 4.6).

As required the exact alignment of the route would need to be determined during subsequent stages of scheme development, as the sharp turns shown may increase journey times. The proposed single lane with passing point would likely increase journey times if buses need to stop to pass.

4.5. Tidal bus lane on Madingley Road

4.5.1. Proposal

A tidal bus lane for Madingley Road has been suggested. The respondent proposes that a bus lane would operate in the eastbound direction during the morning, and in the westbound direction during the afternoon/evening. Signals would be used to indicate whether the lane was operating in or outbound.

The main advantage cited in the proposal as received is that it could provide improved journey time reliability both in the AM and PM peaks without requiring two bus lanes or an offline solution.

4.5.2. Analysis

Initial analysis had been carried out to determine the feasibility of introducing a tidal bus lane along the A1303 and Madingley Road and considered characteristics of similar schemes, including access arrangements, and safety considerations for right and left turning traffic.

Examination of other schemes in the UK showed that the majority have a central lane or lanes which switch at peak periods to provide additional capacity. Existing schemes make use of overhead signals to inform motorists of lane designation, additionally they all have a continuous lane along the length of the scheme rather than allowing short sections of tidal flow, enabling motorists to identify the tidal flow sections and know when they begin and end.

There are a number of engineering, safety and environmental considerations for the possible and particular implementation of a tidal bus lane along A1303 Madingley Road including:

- Three continuous lanes.
- Overhead signals.
- Removal of right turn lanes.
- Signalisation of Madingley Road / Cambridge Road Junction
- Advance Signage

Following initial analysis of the road characteristics from Madingley Mulch roundabout to Northampton Street, it was considered potentially possible to implement a tidal bus lane along the 2.5km section of A1303 Madingley Road between Madingley Mulch roundabout and the M11, with suitable redesign of this section of the route in particular its junction with Cambridge Road. The section from the M11 to Northampton Street contains too many junctions and resident accesses for a tidal bus lane to be feasible.

Incorporation of improved cycle facilities may be more problematic with a central tidal bus lane than with bus lanes which operate with the flow of general traffic. Cyclists are unlikely to make use of a central lane due to the difficulties of entering it arising from crossing the flow of general traffic. Consideration of this will be made during the scheme development.

4.6. Option 1 Central /1 North with a route through West Cambridge

4.6.1. Proposal

These proposals involve using similar infrastructure to that proposed for Options 1 Central and 1 North for the Madingley Hill section of the route. Once buses have crossed the M11 using the existing route, they would enter the West Cambridge site and continue towards Grange Road by means of a possible combination of a segregated route and roadway.

The main benefit listed by promoters of this proposal is the use of the existing M11 bridge, thereby eliminating the need for a new structure, while still retaining some of the benefits of offline segregation of Option 1 South. Limiting the impact to Coton is also listed as an advantage.

4.6.2. Analysis

As proponents described, this route albeit a compromise of two options may potentially realise some of the benefits of off-line alignment while limiting the overall scheme cost, as a new bridge over the M11 would not be required.

The route through West Cambridge also has the potential for increased patronage should development at this location continue. A bus stop might be located towards the centre of the site and may therefore attract more users than that on Madingley Road.

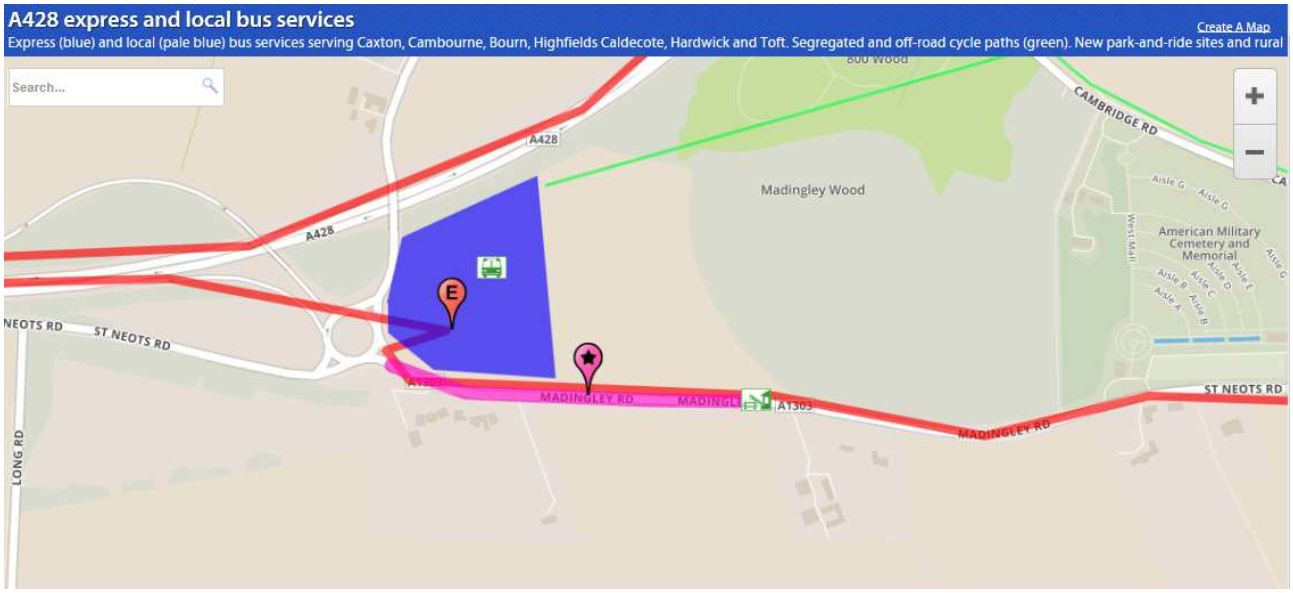
Adams Road and Herschel Road are perhaps two of a number of potential locations where this route's exit onto Grange Road could be achieved. Initial assessment indicates the need for complementary on street measures.

4.7. Smart Traffic Management

4.7.1. Proposal

This proposal as understood involves using signals to regulate traffic flow into the City. Construction of a 500m queuing lane on Madingley Hill and a similar one on the M11 slip road are proposed for traffic to wait until access is provided. A bypass lane for the bus would be introduced at this location.

The map below shows the proposed bus route (in red) and the location where road widening would be required to accommodate the queuing lane (in pink).



Note the lane diagram above is our interpretation of how the queuing and bypass lanes would be arranged at this location.

4.7.2. Analysis

As proponents described, this arrangement can help regulate flow. However, the proposed measures do not reduce congestion but instead relocate it. As a result, the proposal is unlikely to support growth, one of the City Deal objectives.

Widening the existing road to provide queuing space is not an effective use of the highway, which instead could be widened to provide a bus lane. If buses share road space with other traffic once past the queuing locations, mode switch will not be encouraged to the same extent as in the original proposals.

For the bypass lane to be as effective as a bus lane, regular traffic would need to be held back until the entire length of the queue clears (usually from the M11 to Madingley Hill), otherwise buses would travel past the signals and immediately encounter the back of the following queue. Holding back traffic to this extent would lead to very high queuing times and queue lengths, and it is likely that traffic would relocate to other radial routes. Long queue lengths may also tail back to the M11 or A428, where they may pose a safety risks for both drivers in the queue and other road users.

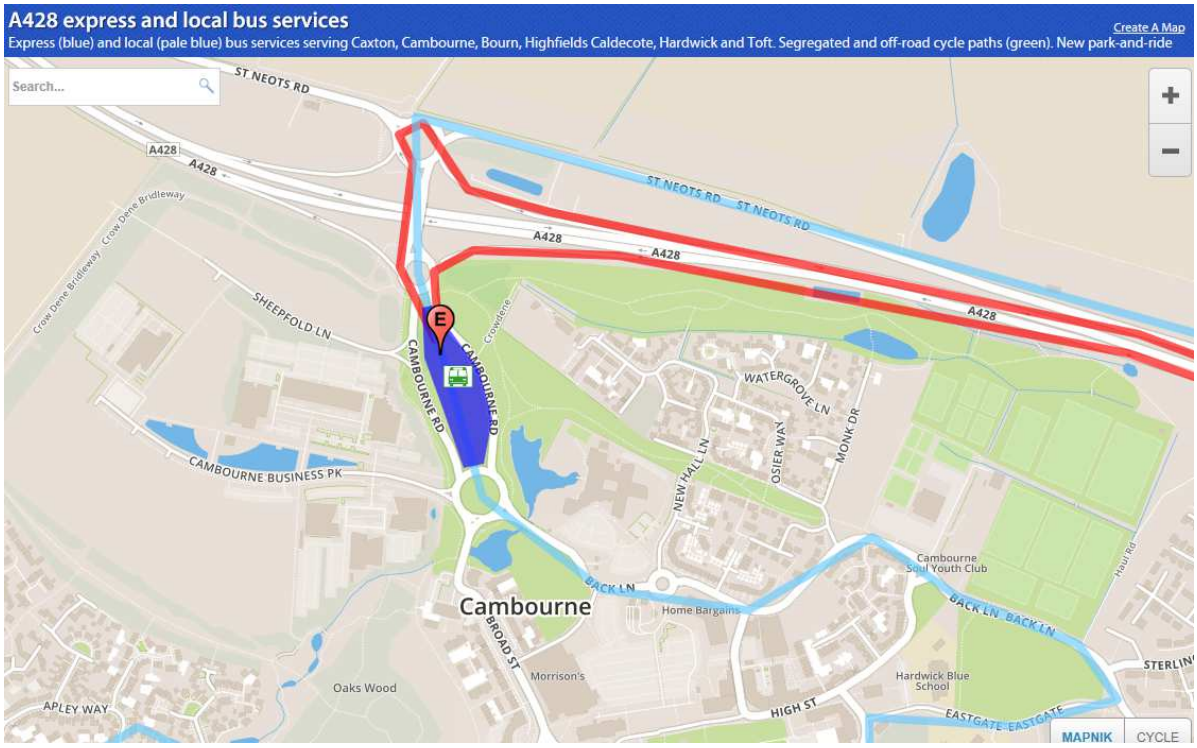
The assessment of queue space required included in the proposal assumes that queuing space should be proportionate to the length of the congested route. This assessment assumes traffic is completely stationary, which is not correct. Since traffic is flowing (albeit slowly) the assessment should be based on flow, not route length.

For example, if the flow on Milton Road is 1000 vehicles/hour, 20% of that is 200 vehicles which each need 6m to stack giving 1.2km of new carriageway to provide. This is four times the length identified in the example worked through by the proposer.

4.8. Additional P&R north of Cambourne

4.8.1. Proposal

This proposal involves the creation of a new Park and Ride in the vicinity of Cambourne. Two potential locations have been suggested: between the two roundabouts south of the A428 access, and north of the junction with the A428.



Note the area in the second image has been shaded based on Atkins interpretation of the description in the alternative proposal.

4.8.2. Analysis

With regards to interception, considerations are similar to those listed in section 4.1.2 above, which states driver behaviour will likely limit mode switch for P&Rs located at points where congestion is not visible.

Walk-and-ride patronage from Cambourne will be present, but this could also be achieved by providing bus stops in Cambourne. Interception of vehicles further east than Cambourne will only be possible at the Madingley Road P&R, and congestion on Madingley Hill is likely to persist as a result.

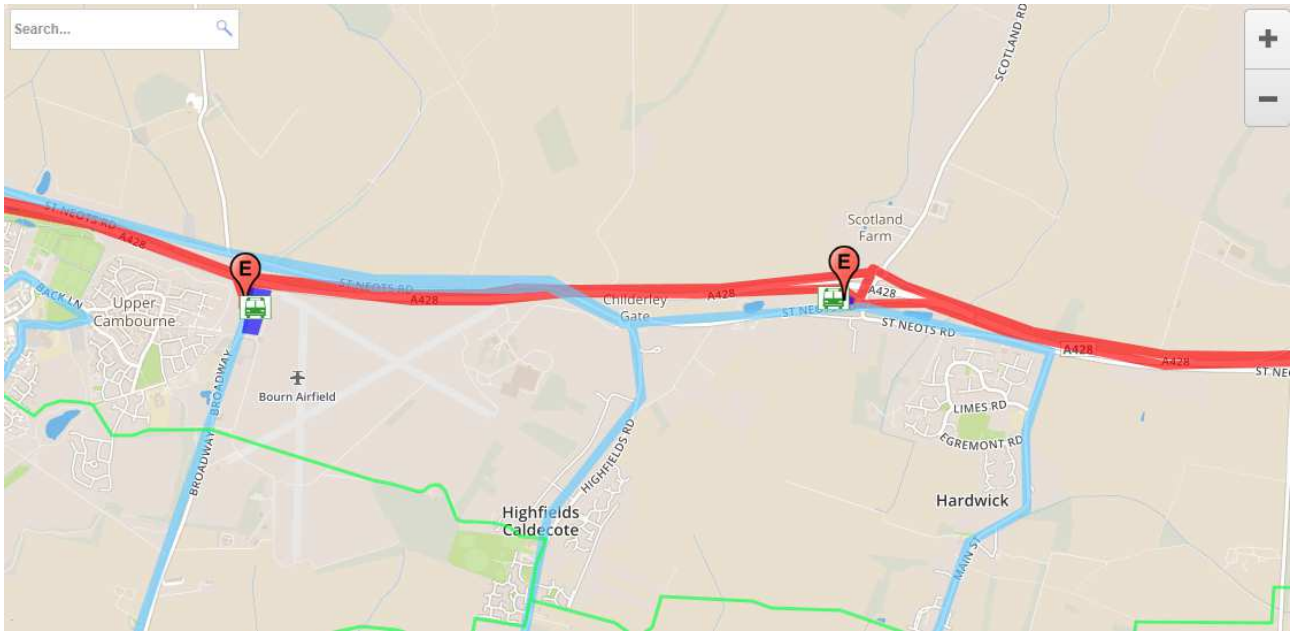
Operation costs are also likely to be higher for Park and Rides further from the end of the bus route, as more buses will be required to operate the same route, and result in economic dis-benefits when compared to a closer location. The magnitude of this effect cannot be quantitatively assessed without further analysis.

These three considerations indicate that locating a Park and Ride at Cambourne will be less beneficial than locating it further east (e.g. at Madingley Mulch and Scotland Farm), where the congestion starts, patronage will likely be higher and operating costs are lower.

4.9. Transport Hubs at Cambourne, Bourn and between Highfields and Caldecote

4.9.1. Proposal

This proposal involves the creation of transport hubs at Cambourne, Bourn and between Highfields and Caldecote. These transport hubs would have “facilities similar to a train station”.



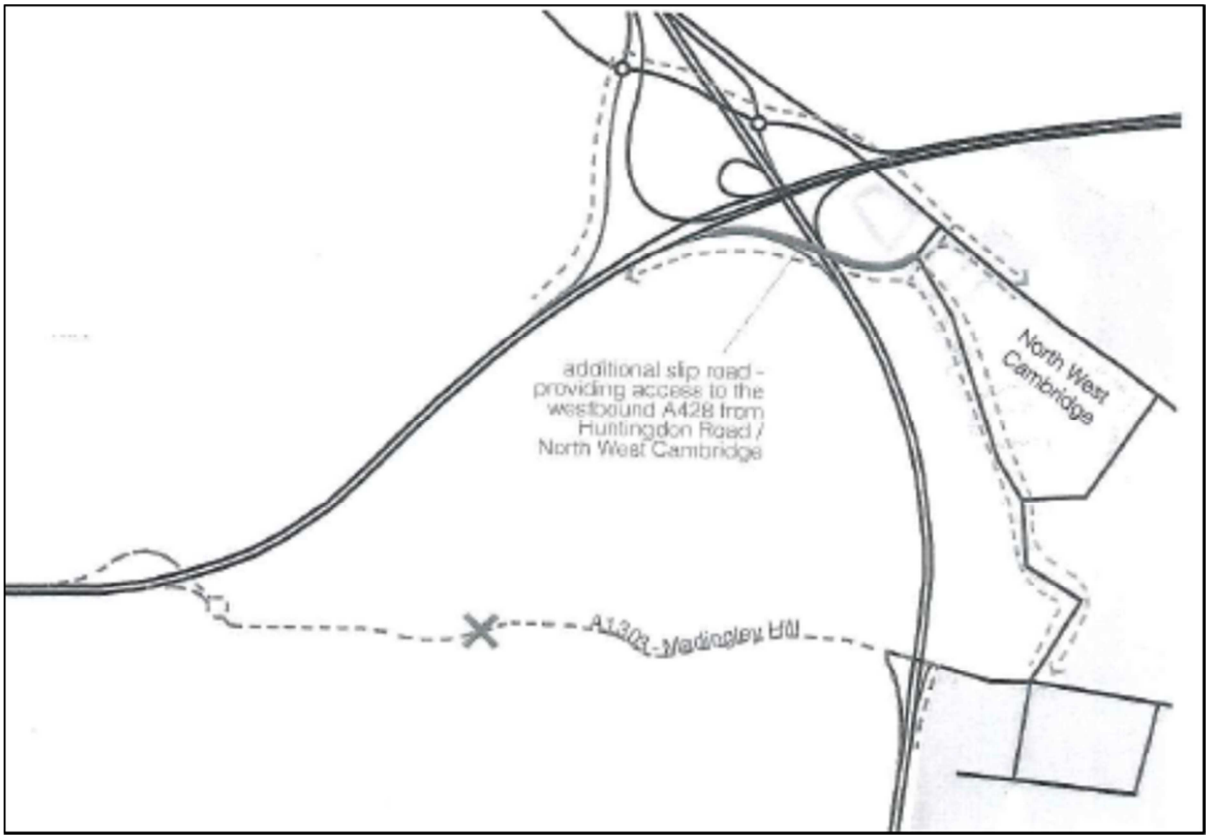
4.9.2. Analysis

Similar considerations to those listed in sections 4.1.2 and 4.8.2 above apply. In addition, these transport hubs are likely to have poorer accessibility as they are located off the old A428 road (St. Neots Road). A bus route with local stops is likely more efficient to operate than several small Park and Ride sites.

4.10. Closing Madingley Hill to through-traffic

4.10.1. Proposal

This proposal involves closing Madingley Hill to through-traffic and using the existing road space to provide a busway. It should be pointed out that it assumes full connectivity at the Girton interchange, as depicted below.



4.10.2. Analysis

Development of the Girton interchange is necessary for this option to be feasible. Current discussions with Highways England indicate amendments to the interchange are not programmed for the foreseeable future. Without developments to the Girton interchange, which are outside the scope of the project, this option would worsen congestion and accessibility, and as such would not meet the transport objectives.

5. Summary of Alternative Proposals

Table 1 lists the alternative proposals analysed in this technical note and presents a summary of some of the considerations discussed in the initial analysis above.

Proposal	Summary of initial analysis
P&R at Scotland Farm	Potential benefits and dis-benefits should be quantified as part of further evaluation - compatible with all options except 2 South
Removal of P&R at Madingley Mulch	Potential benefits and dis-benefits should be quantified as part of further evaluation
Route north of Cambridge Road and bridge across M11	The proposal is very detailed and should be considered further if Option 1 North is taken forward to subsequent stages of scheme development
Options beyond M11	Some measures (e.g. bus lane/ do nothing) are incorporated into the original proposals. Others can be examined during subsequent stages of scheme development
Tidal bus lane for Option 1 Central	Potential benefits and dis-benefits should be considered further as part of the assessment of 1 Central
Option 1 Central /1 North with a route through West Cambridge	Potential benefits and dis-benefits should be quantified as part of further evaluation – compatible with 1 North and 1 Central
Smart Traffic Management	Potential benefits and dis-benefits should be examined as part of further evaluation
Transport Hubs at Cambourne, Bourn and between Highfields and Caldecote	Potential benefits and dis-benefits should be examined as part of further evaluation
Additional P&R north of Cambourne	Potential benefits and dis-benefits should be examined as part of further evaluation
Closing Madingley Hill to through-traffic	Potential benefits and dis-benefits should be examined as part of further evaluation

Table 1. Alternative proposals

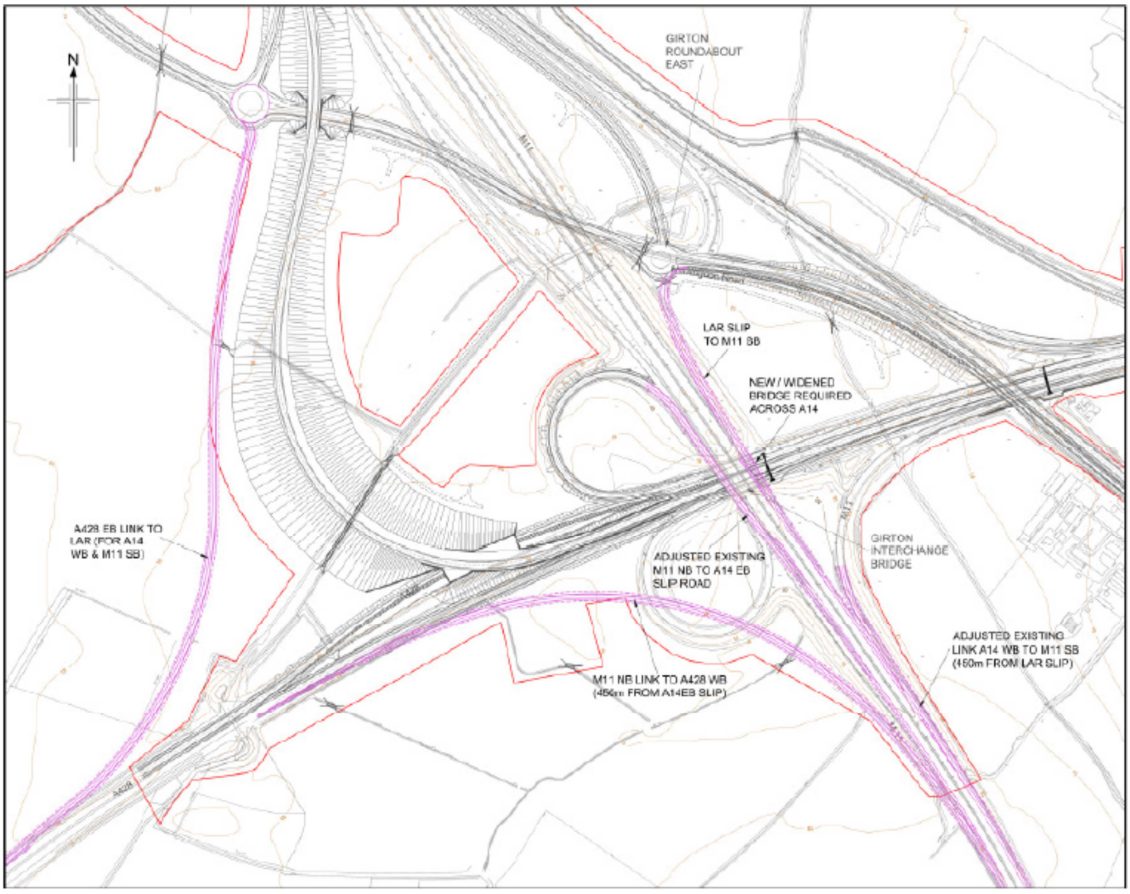
Appendix A. Alternative Proposals Outside Scope

The alternative proposals listed below have been considered outside the scope of the A428 improvements for the following reasons:

- A428 Upgrade and connection to A14 / development of cloverleaf at Girton

  This proposal involves improving the connectivity between the A428 and the A14 northbound) and (southbound) –towards M11 at the Girton interchange. At the moment, it is possible to continue along the A14 eastbound from the A428. The main advantage of this proposal would be to provide car users with an alternative method for accessing the M11 southbound, therefore alleviating queues on Madingley Hill.

  Improvements to the Girton Junction have been considered by Highways England, who own and maintain both the A14 and A428. As part of the A14 upgrade capacity of the interchange will be increased, but new connections will not be added. In response to representations by Coton Parish Council during the A14 public consultation a sketch of an alternative design with increased connectivity was produced. However, agreements in the statement of common ground do not include this upgrade (although it is stated that the A428 dualling does not preclude changing J14, but that any solution would be separate from the A428 dualling scheme). Therefore, it is unlikely that improvements to the Girton interchange will be carried out before 2020.



-

- Construction of Park and Ride sites at Barton and Bar Hill

  Construction of a P&R site at Barton is being considered as part of the Western Orbital transport study. This will be consulted on in early 2016. Full assessment of the benefits and costs of providing this P&R will be included in the outline business case for this study.

  A P&R site at Bar Hill is likely to duplicate the function of the Longstanton P&R. Journey times into Cambridge would likely be shorter from Longstanton using the busway than from a new P&R at Bar Hill, as the bus lane on Huntingdon Road only extends up to Girton Road.

- Construction of Park and Ride site at Girton

  Considerations similar to those for locating a P&R site at Bar Hill apply. A potential future interchange upgrade at Girton is outside the scope of the A428 project, but if it were to come forward this could support a separate reconsideration of the benefits of a Park and Ride at Girton

- Relocate Madingley Road P&R to north west of J13

  The lease of the existing P&R expires in October 2035. Options for its relocation or closure will need to be considered in full in advance of this date. An initial study into Park and Ride sites to the west of the City has been commissioned as part of the Western Orbital study.

- Include Northampton Street in the Core Traffic Scheme, limiting through traffic

  Northampton Street lies just outside the study area, but limiting through traffic may be included as part of the Access to Cambridge study, which is investigating transformative improvements and interventions to considerably improve access, capacity, and movement to and within the city.

- Madingley Village Road Closures / Traffic Management

  Installation of residents-only access gates at Madingley village is likely to be unfeasible, as deliveries, visitors, emergency services etc. would also need to be catered for. Complete closure of the avenue will have adverse effects on the accessibility for residents of Madingley and neighbouring communities. Traffic currently using the Avenue would have to use alternative routes, which would see an increase in congestion on those routes.

  Should the proposed location of a new P&R at Madingley Mulch impact traffic volumes through Madingley, mitigation options in addition to the current traffic calming already in place will be considered.

- Development closer to the City

  Alternative proposals for development locations should be considered as part of the Local Plan process.

- Congestion charge

  Should congestion charge be introduced this is likely to require city-wide implementation, otherwise traffic will likely relocate to other corridors. City-wide congestion charging is one of the options submitted during the call for evidence for the Access to Cambridge study, which is investigating transformative improvements and interventions to considerably improve access, capacity, and movement to and within the city. .