

A428 Western Corridor Study

Park and Ride Locations
City Deal Partners

28 September 2015

DRAFT

Notice

This document and its contents have been prepared and are intended solely for City Deal Partners' information and use in relation to the A428 Western Corridor study.

WS Atkins Ltd assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

Document history

Job number: 5134058			Document ref:			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1.0	First draft	EG	EM	NC	EM	28.09.15
Rev 1.1	Second draft	NW	EM	NC	EM	15.10.15

Client signoff

Client	City Deal Partners
Project	A428 Western Corridor Study
Document title	Park and Ride Locations
Job no.	5134058
Copy no.	
Document reference	

Table of contents

Chapter Pages

Executive summary	4
1. Introduction	5
Context	5
This Study	5
2. Potential Locations	7
Location Characteristics	7
Locations	8
3. Location Characteristics	9
Capacity	9
Access arrangements	9
Accessibility	11
Potential Transport Impacts	11
Current land use	13
Environmental considerations	13
4. Summary	33
Appendix A. Engineering Input	34
A.1. Access Sites	34
Appendices	37

Tables

Table 3-1	Ecology Desk Study Results for Locations 1, 2 & 3	16
Table 3-2	Landscape and Visual Considerations	21
Table 3-3	Summary of water environment characteristics.....	27
Table 3-4	Number of sensitive receptors closest to the proposed P&R site boundaries and within a 200 m and 1 km buffer area.....	29
Table 4-1	Location Summary Matrix	33

Figures

Figure 1-1	Development Hubs	5
Figure 2-1	Potential Bus Routes from Madingley Mulch P&R	7
Figure 2-2	Potential Locations	8
Figure 3-1	Features map showing all three potential locations and the various important ecological features such as Madingley SSSI/ancient woodland and waterbodies located in the area	17
Figure 3-2	Aerial view of the site showing the three potential locations and surrounding habitat.	18
Figure 3-3	The three proposed P&R locations with surrounding air quality constraints	28
Figure 3-4	Sensitive Receptors surrounding proposed P&R sites	31

Executive summary

The A428 study aims to provide high quality public transport infrastructure along the A428 corridor in the west of Cambridge, allowing for planned growth and economic development in this area. Without mitigation this growth would result in increases in congestion and poor journey times. The introduction of high quality public transport links will aim to reduce the number of journeys undertaken by private car, and hence mitigate these impacts.

All options being proposed as part of the A428 study feature a Park and Ride to intercept traffic in the vicinity of the Madingley Mulch roundabout. The area surrounding the roundabout has been selected for this purpose as this is where congestion towards Cambridge starts. The section of corridor west of this point is predicted to experience lower levels of congestion, and therefore locating the Park and Ride closer to Cambourne or Bourn Airfield would offer limited benefits.

This report explores three possible locations in the vicinity of Madingley Mulch roundabout, which have been identified as potentially meeting the needs of a Park and Ride for all options. A high-level commentary on the relative merits of each location has been provided in terms of capacity, accessibility, traffic impact and environment considerations. A summary table is provided in the last section of the report. The report assumes the current Park and Ride on Madingley Road will remain open to the public, catering for traffic which is not intercepted by a site at Madingley Mulch (e.g. from the M11).

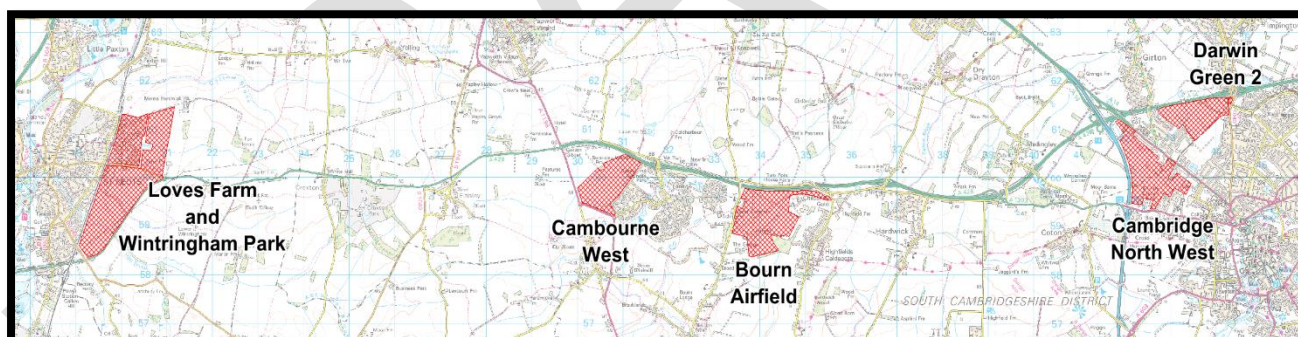
No single location has emerged as the preferred one in all categories. The location selection process will have to consider all criteria and possible trade-offs between locations. Further work will be carried out during the next stage of the A428 study to fully explore the characteristics of the locations, and to consider possible mitigation measures for any adverse effects.

1. Introduction

Context

- 1.1. The Greater Cambridge City Deal aims to ensure the region maintains and grows its status as a prosperous economic area by investing in the transport infrastructure, housing and skills needed to see future economic growth.
- 1.2. Greater Cambridge city region has high levels of population and employment growth, fuelled by the 'Cambridge phenomenon' – an agglomeration of high-tech and research-based economic activity currently employing over 50,000 people in Cambridge which is expected to continue to grow rapidly.
- 1.3. These opportunities for the city are likely to place further strain on the current proposals contained within the Transport Strategy for Cambridge and South Cambridgeshire (TSCSC). The City Deal Transport package is an integrated, multi-modal program expanding upon the TSCSC to help accommodate this rapid growth within the region by improving connectivity between employment hubs and residential areas and improving travel capacity on the existing infrastructure.
- 1.4. The A428 Western Corridor study will seek to help to unlock economic growth and development in the region by providing public transport improvements between Cambourne and Cambridge, enabling people in the new developments along this corridor (depicted Figure 1-1) to travel to and from work.

Figure 1-1 Development Hubs



This Study

- 1.5. The Cambridge City Deal Partnership commissioned the A428 Phase 1 study in April 2014 in accordance with the Department for Transport (DfT) guidance for transport scheme appraisal (WebTAG). The early study work identified the problems and challenges of the A428 corridor, and established the objectives that any interventions should achieve before proceeding to option generation and assessment.
- 1.6. Phase 2 of the project is currently in progress. The aim of this phase is to develop the shortlisted options for further assessment to inform an outline business case for a scheme. Initial assessment of the shortlisted options has been undertaken to identify key risks and determine their feasibility. At this stage public consultation is being undertaken before proceeding to detailed option assessment, as the development and appraisal of the options should be informed by stakeholders' views.

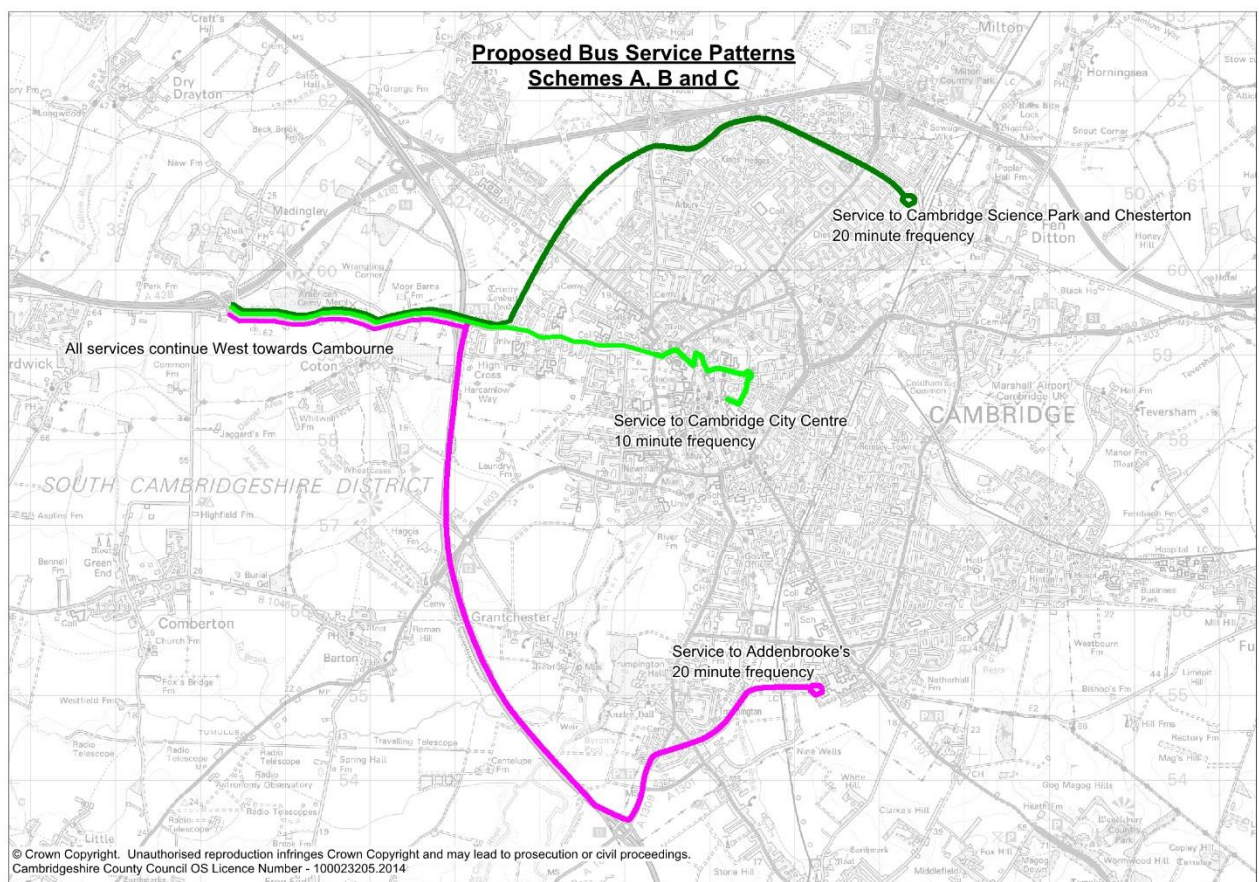
- 1.7. The aim of the A428 Western Corridor study is to improve public transport, walking and cycling facilities on the Madingley Road/A428 Corridor. Madingley Rise and Madingley Road are two of the areas along this corridor in which increased traffic levels are predicted. Current conditions on these roads in the morning peak are undesirable, with up to 80% of the length of these routes subject to queuing, with delays up to 18 minutes. One aim of this scheme is therefore to ensure that the current congestion levels on Madingley Rise are not any worse in the future than they are today. All options currently being considered include public transport improvements in this section of the corridor, including a proposed new Park and Ride close to the Madingley Mulch Roundabout, south of Madingley village.
- 1.8. Park and Ride is a public service which allows customers to park their cars on the edge of the city and use a dedicated quality bus service. The introduction of a new Park and Ride site should provide an attractive alternative to private car usage and may reduce congestion along the A428 corridor.
- 1.9. This report aims to assist understanding of the relative advantages and disadvantages of possible Park and Ride locations in the vicinity of Madingley Mulch roundabout at a high level. A more detailed assessment will be carried out as part of the next stage of the option selection process.

2. Potential Locations

Location Characteristics

- 2.1. It is envisaged that the potential Park and Ride will be located in the area around Madingley Mulch Roundabout, as this is where congestion towards Cambridge starts. The section of corridor west of this point is predicted to experience lower levels of congestion, and therefore locating the Park and Ride closer to Cambourne or Bourn Airfield would offer limited benefits.
- 2.2. This location is also ideal to connect to bus services running to the City Centre, and other employment hubs within Cambridge. The potential routes for these services are outlined in Figure 2-1.

Figure 2-1 Potential Bus Routes from Madingley Mulch P&R¹

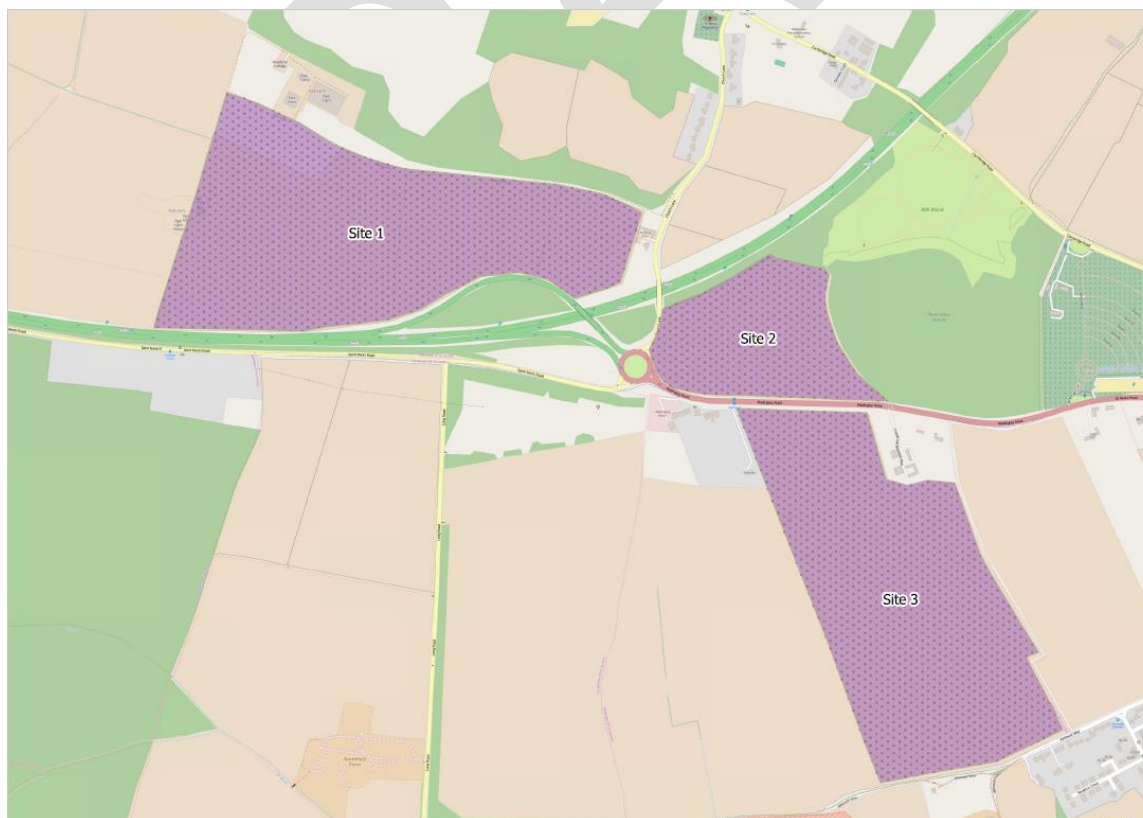


¹ Please note bus service frequencies are assumptions and not part of the proposal.

Locations

- 2.3. Three potential locations have been considered around the Madingley Mulch Roundabout.
- 2.4. **Location 1** is situated north of the northern A428 slip and to the west of Church Lane. It has an area of approximately 364,000 m².
- 2.5. **Location 2** is situated north of the A428 and directly east of the Madingley Mulch Roundabout. Physically constrained by the University-owned Madingley Wood and 800 Wood, it is the smallest of the potential locations with an area of approximately 122,000 m².
- 2.6. **Location 3** is situated south of the A428 and the Madingley Mulch Roundabout. This is the largest of the potential locations, and has an area of approximately 369,000 m².
- 2.7. This report will provide an outline of the following characteristics of each location: capacity, access arrangements, accessibility, transport impact, current land use and environmental impact.
- 2.8. Locating the Park and Ride to the south west of the Madingley Mulch Roundabout has not been considered, as access arrangements for this location have the potential to be severely affected by congestion at the roundabout. Vehicles wishing to access the Park and Ride would exit the A428, and U-turn using the roundabout to come back towards the old A428 road, where entrance to the Park and Ride would have to be situated. This access arrangement also creates potential for vehicles to use the old A428 as a “rat run” to avoid this manoeuvre. In addition to private vehicles, buses would also need to use the roundabout to perform a right turn (for all options except 1C) on exiting the Park and Ride, and would also be affected by this congestion.

Figure 2-2 Potential Locations



3. Location Characteristics

- 3.1. This section describes the characteristics of each of the locations in terms of capacity, access arrangements, accessibility, land use, and environmental considerations.

Capacity

Location 1

- 3.2. This location is approximately 364,000 m² with space available for future expansion to the west, with restrictions to the south and north due to the A428 and planted trees respectively. The potential access arrangement from the A428 slip road (roundabout from slip road) may result in an area of land to the east not being ideal to locate parking spaces, due to having limited access to the bus service. With this in mind a car park in this location may require a different design to others in the Cambridge area so that the full space could be utilised. It is estimated that in the worst case 35,000m² would be required for access into the car park, leaving 329,000m² available for bus passenger facilities, including toilets, waiting area, tourist information desk, telephone and cycle facilities, the parking and any landscape features.

Location 2

- 3.3. This location is approximately 124,000m², and is a good shape for site development (i.e. for a fan-shaped car park). Whilst it is constrained by the surrounding Madingley Wood (an ancient woodland and SSSI), it would be able to provide over 1.5 times the car capacity of the existing Park and Ride on Madingley Road. It is estimated that 9,000m² would be needed for access, leaving 113,000m² available for bus passenger facilities, including toilets, waiting area, tourist information desk, telephone and cycle facilities, the parking and any landscape features.

Location 3

- 3.4. This location is approximately 369,000m² with room for future expansion. The only constraints are the A1303 and the properties located along the A1303, adjacent to the site. This location is the largest of the three with over 5 times the space that the existing Park and Ride on Madingley Road has. The location is a good shape for site development (i.e. for a fan-shaped car park) but its size means that some people may have to walk some distance to get to the bus pick up area unless there is more than one. It is estimated that 18,000m² would be required for access, leaving 351,000m² available for bus passenger facilities, including toilets, waiting area, tourist information desk, telephone and cycle facilities, the parking and any landscape features.

Access arrangements

- 3.5. Four forms of junction access can be considered to the potential Park and Ride:
- Roundabout
 - Priority controlled
 - Signal controlled
 - Access directly off the A428 slip roads

Location 1

- 3.6. Access for Location 1 is the most complex with two possible options: access along Church Lane and through the northern access track, or access from the A428 slip road.
- 3.7. To provide access from the A428 directly, the slip road would need to be re-aligned as well as an additional roundabout being added to provide access into the Park and Ride². Several requirements would be likely prior to this option being taken forward, including permission from Highways England to alter the slip road alignment, a structural assessment to determine whether the existing bridge could accommodate two way traffic and traffic modelling to assess the impact on the A428 traffic queues. It is expected that this would be the most costly access option for any of the three locations due to the extensive earthworks that would be required for the slip road realignment, potential widening of the bridge following the structural assessment and the new roundabout. Despite all of this, it should be noted that this is the only option that has the potential of reducing traffic on Madingley Mulch Roundabout.
- 3.8. The alternative option is for access to be gained from an existing farm access track off Church Lane. This option brings its own issues one of which being the close proximity of the access track to a farm house and buildings. A change in access arrangements for the farm would be required as the current access would be potentially adopted for the Park and Ride. In addition, a junction inter-visibility assessment as per DMRB TD 50/04 and assessment of the forward visibility to the junction would be required with special focus on vehicles travelling from Madingley Mulch roundabout.

Location 2

- 3.9. A priority junction for the P&R entrance from the A1303 is not feasible at this location due to cars and buses being forced to cross the flow of traffic on entry from the east and exit to the west. This would create a potential safety risk due to the high volume of un-signalised right turns, and would also potentially cause delays to the buses performing this manoeuvre. Therefore the only potential safe access arrangement for Location 2 is a signalised junction with bus priority. The optimum solution would be to have a dedicated lane allowing traffic to enter from the west straight into the car park. Traffic travelling from the east along Madingley and exiting the car park would be required to enter/exit using a signalised junction. In order to provide buses with priority it is proposed that the buses would have a separate access/egress from the car park.

Location 3

- 3.10. As for Location 2 there is only one potential access arrangement for Location 3, a signalised junction with bus priority. This junction would work in a similar manner to that for Location 2 but with the difference that there would be no dedicated entry lane for cars travelling from the west. A lane from the east is feasible, but would only likely benefit the bus on return from Cambridge. Traffic travelling from the west would therefore be required to wait at traffic lights before gaining access to the Park and Ride which is not ideal, as queues back to the roundabout would likely develop. The bus would require a separate 'Bus Lane' at the traffic lights in order to provide priority over other vehicles entering or leaving the car park. If the offline route was utilised from the car park to Grange Road (Option 1C) this would allow a separate route for the bus and reduce some delays that it might incur otherwise.

² The current configuration of the slip road only offers roughly 140m of forward visibility at its longest point (other areas are shorter due to the curvature and levels of ground surrounding to the slip road). To meet highway standards TD 16/07, TD42/95 and TD50/04, the stopping sight distance needs to be 295m for a 120kph road meaning that the slip road would require modification and potentially a reduced speed limit if a junction/roundabout was proposed.

Accessibility

Location 1

- 3.11. This location provides more accessibility challenges than the other two, meaning bus journey times to and from this Park and Ride could be longer. If access could be arranged by changing the A428 slip road then both buses and other traffic would have good accessibility from the west, east and south while also reducing the amount of traffic on Madingley Mulch roundabout. Unfortunately this access arrangement is unlikely due to cost and required permissions and therefore it is expected that access into the Park and Ride would be required from Church Lane. This is not an ideal solution as the signalised junction arrangement on Church Lane would have accessibility issues from all directions due to the limited land available and the potential reduced forward visibility to the proposed junction. Buses may have to wait to exit the Park and Ride along with other traffic unless a bus priority system could be installed. Queues may also form entering the Park and Ride as the existing house and farm buildings may prevent a dedicated lane into the Park and Ride. Buses would also have to wait in queue to enter unless a separate entrance could be arranged.

Location 2

- 3.12. The proposed type of access/egress has several benefits for buses using the A1303 Madingley Road (Option 1A) or the potential offline route to the north (Option 1B). In either option a separate bus entrance/egress could be incorporated into the arrangement, giving priority to buses. Traffic travelling from the A428 into Cambridge would also be able to benefit from a dedicated lane into the Park and Ride, reducing its impact on other A1303 traffic. To prevent a time delay to the bus on entry into the Park and Ride from Cambridge a bus priority system could be incorporated into the signal design.

Location 3

- 3.13. The benefits of this location in terms of access from/to the east for the bus depend on the final agreed route, either along Madingley Road (Option 1A/1B) or the offline route to the south connecting into Grange Road (Option 1C). Bus priority can be incorporated for either of these route options with the most benefit occurring if the offline route was developed as the bus would not have to wait to join Cambridge bound traffic. From/to the west, traffic from the A428 including the bus would have to wait at traffic lights before being able to enter the Park and Ride. This could lead to long delays with the potential to traffic backing onto Madingley Mulch roundabout. Traffic modelling would be required to determine the impact queuing traffic would have, and if connecting the signal phases of Madingley Mulch Roundabout and the Park and Ride would mitigate the issue.

Potential Transport Impacts

- 3.14. Due to the fact that each of the three potential locations are located within close proximity to one another, it is likely that any wider transport impact would be highly similar if they were to be reviewed separately. Therefore, there has not been an assessment of each of the locations individually within the strategic level of modelling undertaken thus far.
- 3.15. The local areas which may see some changes in trips would be 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 above 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.

- 3.16. The different locations will each give rise to a different number of new or amended junctions on the road network, each with their own consequential impacts. The impact on the existing cycle way on the southern side of the A1303 would depend on whether the access arms to the proposed Park and Ride were north or south of the A1303.

Location 1

- 3.17. The impacts that Location 1 may have would be dependent on whether changes to the slip road could be made to facilitate direct access from the A428. If such direct access can be accommodated, there is the potential for a benefit to the Madingley Mulch junction in the AM peak, by intercepting cars destined for the Park and Ride before this junction. However, vehicles leaving the Park and Ride would still need to pass through the junction. This arrangement severely limits access to the Park and Ride from any direction other than the A428 however.
- 3.18. If a direct access from the A428 slip road cannot be accommodated, then there is a benefit in terms of easier access from all directions, although this still relies on traffic passing through the Madingley Mulch junction. There would also likely be heavier traffic flows along Church Lane to access the Park and Ride, with the addition of a new junction causing increased delay to existing users of Church Lane.

Location 2

- 3.19. The arrangements for Location 2 would allow vehicles entering the Park and Ride from the west or north to simply diverge off the A1303 into the Park and Ride. This would give rise to limited impact for eastbound traffic as there still will be some delay from the junction to allow for exiting vehicles. The bus exit and entrance junction would cause some impact on the A1303 in addition to the general traffic entrance and exit junction, although this separate junction would not be required if Option 1B was taken forwards. The largest conflict would be for cars leaving the Park and Ride to travel west, with them having to turn across the A1303, particularly in the PM peak.

Location 3

- 3.20. The impact from Location 3 would largely be similar in principle to Location 2, however the location of the Park and Ride on the southern side of the A1303 would mean that there would be a requirement for traffic entering from the west to turn across outbound traffic on the A1303. This would likely give rise to greater delay for those entering the Park and Ride, however the opposing exit movement would be easier. There is also less flexibility in being able to provide a separate entrance and exit junction for buses. While this could reduce the number of junctions and therefore impact on the A1303, it could mean that bus movements in and out of the Park and Ride are less free-flowing.
- 3.21. For any of the locations, it should be noted that while there is the potential for additional delays as noted above due to the addition of any new junction, there is likely to be benefit to the A1303 corridor as a whole due to the interception of Park & Ride users further west in the corridor than currently occurs.
- 3.22. The larger locations (1 and 3) also have the potential to provide longer routes within the site before vehicles would begin to search for a parking space, therefore reducing the chance of blocking back onto the A1303/A428 from the Park and Ride entrances. A larger Park and Ride also has the benefit of being able to provide a greater number of parking spaces, which could lead to improved 'search' times for a space, despite the additional distances involved.

- 3.23. While each of the locations may induce localised increases in traffic and delay immediately adjacent to any chosen location, the impact of Park and Ride on existing flows on the network as a whole would be to reduce the amount of traffic going into the City beyond the site access during the AM Peak hour and out of the City during the PM Peak hour. Each location has different positive and negative impacts associated with it, and it is likely that the transport impacts alone will not form the basis of any decision over which location is taken forwards.

Current land use

- 3.24. All three potential locations are currently in use as Grade 2 agricultural land, and are within the Cambridge Greenbelt. Location 1 has a small amount of tree cover, and all three of the locations would require earthworks prior to development in order to account for ground level differences.

Environmental considerations

Planning Considerations

- 3.25. The National Planning Policy Framework (NPPF) was published on 27th March 2012 and is a material consideration in the determination of planning applications as part of the statutory development plan.
- 3.26. The NPPF promotes sustainable transport and paragraph 29 states that the transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel. Paragraph 31 states that Local authorities should work with neighbouring authorities and transport providers to develop strategies for the provision of viable infrastructure necessary to support sustainable development. Paragraph 41 supports Local planning authorities in identifying and protecting, where there is robust evidence, sites and routes which could be critical in developing infrastructure to widen transport choice. Park & Ride facilities are thus supported in principle, through NPPF Section 4: 'Promoting sustainable transport'.
- 3.27. Section 9 'Protecting Green Belt land' is relevant as all three proposed sites are located within the green belt. This states that as with previous Green Belt policy, inappropriate development is, by definition, harmful to the Green Belt and should not be approved except in very special circumstances. When considering any planning application, local planning authorities should ensure that substantial weight is given to any harm to the Green Belt. 'Very special circumstances' will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations.
- 3.28. Paragraph 80 confirms that the Green Belt serves five purposes, these are:
- to check the unrestricted sprawl of large built-up areas;
 - to prevent neighbouring towns merging into one another;
 - to assist in safeguarding the countryside from encroachment;
 - to preserve the setting and special character of historic towns; and
 - to assist in urban regeneration, by encouraging the recycling of derelict and other urban land.

3.29. Paragraph 90 confirms that some forms of development are not inappropriate in the Green Belt provided they preserve the openness of the Green Belt and do not conflict with the purposes of including land in Green Belt. The NPPF states that within Green Belt, an acceptable development is *“local transport infrastructure which can demonstrate a requirement for a Green Belt location”*. A Park & Ride site could be considered local transport infrastructure and appropriate development in green belt, if they pass the five tests above. If not, very special circumstances would need to be demonstrated.

3.30. The potential sites are also located within Grade 2 agricultural land which is considered the best and most versatile. The National Planning Policy framework states in paragraph 112: *‘Local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality.’*

Transport Policy

3.31. The Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) was adopted by Cambridgeshire County Council on 4 March 2014 and ensures that local councils plan together for sustainable growth and continued economic prosperity in the area. Appendix H of the TSCSC sets out strategic transport interventions for the St. Neots/Cambourne to Cambridge Corridor which specifically refers to the provision of further Park and Ride facilities on the A428 western corridor:

3.32. *“The focus for this corridor will be on providing a segregated bus and cycle route along the length of the A428 between Queen’s Road in Cambridge to the Caxton Gibbet roundabout, allowing buses an unhindered route into the city and cyclists a safe, direct route between the city and the new developments. The segregated bus route will be enhanced by the provision of further Park and Ride facilities along the corridor to allow more traffic to be intercepted further out”*.

3.33. Therefore, provision of a new Park and Ride site on this corridor is supported in the TSCSC Appendix H.1.

Local Planning Policy

3.34. The potential sites are located within the administrative boundary of South Cambridgeshire District Council (SCDC). SCDC are currently preparing their Local Plan 2011-2031 which sets out policies and land allocations that will guide the future of the district up to 2031. Once adopted, all planning applications will be assessed against the policies in the Local Plan. Also on adoption of the Local Plan, the Core Strategy, Development Control Policies DPD, Site Specific Policies DPD and 'saved' Policy CNF6 from the Local Plan 2004 will be revoked in their entirety and will no longer form part of the development plan. Some of the objectives of Policy TI/2: 'Planning for sustainable travel development' will be facilitated with the proposed Park and Ride facility:

3.35. *“Policy TI/2: Planning for Sustainable Travel Development: development must be located and designed to reduce the need to travel, particularly by car, and promote sustainable travel appropriate to its location and development will only be granted inter alia, where there will sufficient integration and accessibility by walking, cycling or public and community transport”*.

3.36. The potential sites are all within the Cambridge Green Belt and protected through Policy S/4: 'Cambridge Green Belt'. Policy NH/8: 'Mitigating the impact of development in and adjoining the Green Belt' mirrors that of the NPPF in that *“Any development considered appropriate within the Green Belt, or proposals outside but in the vicinity of the Green Belt, must be located and designed so that it does not have an adverse effect on the rural*

character and openness of the Green Belt". The proposed sites are included in an 'Area of Search' on the Local Plan Proposals Map.

- 3.37. Policy NH/3: Protecting Agricultural Land mirrors that of the NPPF in that "*Planning permission will not be granted for development which would lead to the irreversible loss of Grades 1, 2 or 3a agricultural land unless: a. Land is allocated for development in the Local Plan; or b. Sustainability considerations and the need for the development are sufficient to override the need to protect the agricultural value of the land*".
- 3.38. A number of strategic sites have been identified within the South Cambridgeshire Local Plan in the Madingley Road/A428 Corridor. Of relevance are the development hubs planned for Cambourne and Bourn Airfield. Policy SS/6: 'New Village at Bourn Airfield' and Policy SS/8: 'Cambourne West propose a new settlement' and a most sustainable village respectively. Part 'U' of Policy SS/6 includes the incorporation of a Park and Ride facility for the A428 corridor within measures to promote cycling and walking.
- 3.39. The Local Plan states that "*a fundamental requirement for the Cambourne West site is that it will be highly accessible and permeable to all its residents on foot, by cycle and public transport, to support sustainable transport, recreation and health. High quality provision for buses and segregated cycle use provides for quicker journeys, greater use and improved safety.*
- 3.40. Together with the development at Bourn Airfield, the Local Plan supports extensive off-site transport infrastructure provision to mitigate transport impacts, and a Park and Ride site would contribute to meeting the requirements to facilitate development growth aspirations.

Summary

- 3.41. In planning policy terms, all three potential locations are assessed as the same as they would support the objectives of national and local transport policy in promoting sustainable transport and would support the development aspirations of the strategic sites in the SCDC Local Plan. All three potential locations are in the Cambridge Green Belt where Park and Ride sites are considered appropriate development as long as they preserve the openness of the Green Belt and do not conflict with the purposes of including land in Green Belt. National and local transport and planning policy cannot be considered a differentiating factor in recommending one of the three locations for the Park and Ride facility.
- 3.42. The Proposed Park and Ride site would require a planning application in which the development would need to be assessed against, and meet, the Green Belt tests for planning permission in order to be secured.

Ecology

- 3.43. Table 3-1 below gives a description of the habitat area and summary of any ecologically important statutory designated sites and waterbodies located within the surroundings of the three potential locations.

DRAFT

Table 3-1 Ecology Desk Study Results for Locations 1, 2 & 3

Site Reference	Location 1	Location 2	Location 3
	Approximate Distance and Direction from Site	Approximate Distance and Direction from Site	Approximate Distance and Direction from Site
Madingley woodland Site of Special Scientific Interest (SSSI)/ ancient woodlands	485 m to the east	Adjacent to the east facing side of site two	50 m to the north
Habitat description	Open fields/planation land to the north-west. Madingley Hall/University grounds to the north, surrounded by dense forest vegetation and various waterbodies.	Open fields/planation land to the south. To the north are located school buildings, residential housing, town centre and far north farmland.	Open field with hedgerow divisions. Residential housing to the north-east. Adjacent to A1303 and west of Madingley woodlands.
Water body Reference			
1 Home Farm pond (TL398603)	640 m to the north-east	570 m north-west	895 m north-west
2 University Pond (TL398606)	834 m north-east	929 m north-west	1165 m north-west
3 University Pond (TL398606)	929 m north-east	929 m north-west	1262 m north-west
4 Burnt Farm Pond (TL397607)	896 m north-east	940 m north-west	1291 m north-west
5 Madingley Hall pond 1 (TL393605)	540 m north	838 m north-west	1157 m north-west
6 Madingley Hall Pond 2 (TL392604)	614 m north	816 m north-west	1214 m north-west
7 Madingley Lake (TL395604)	532 m north	694 m north-west	1088 m north-west
8 Thompson Planation pond 1 (TL391602)	333 m north	703 m north-west	938 m north-west
9 Thompson Planation pond 2 (TL393602)	355 m north	588 m north-west	914 m north-west
10 Horseshoe Pond (TL390607)	781 m north	1083 m north-west	1456 m north-west
11 American Cemetery ground ponds (3)	1201 m west	474.9 m west	474.3 m north-west
12 Field pond (TL409587)	19282 m south-west	1371.1m south-west	508.4 m south-west

Figure 3-1 Features map showing all three potential locations and the various important ecological features such as Madingley SSSI/ancient woodland and waterbodies located in the area

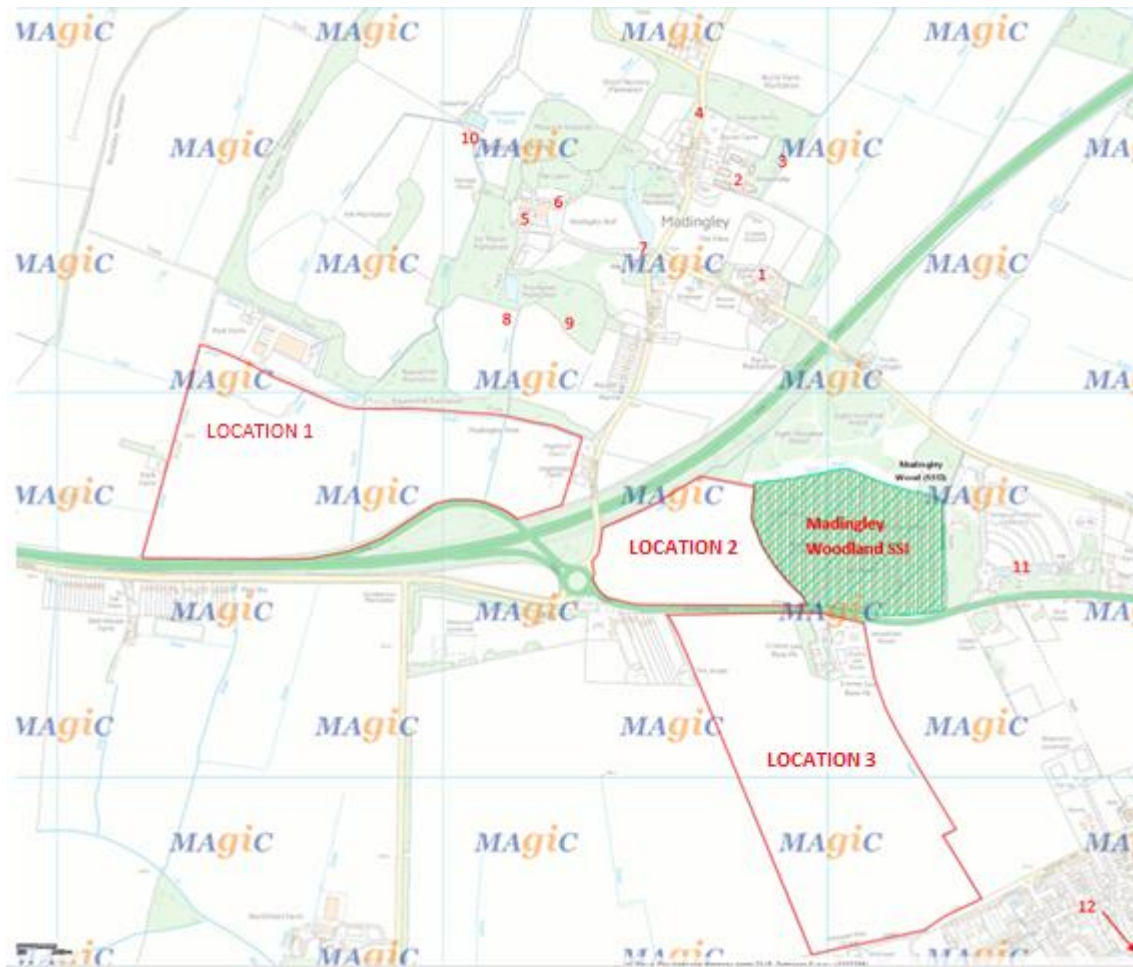
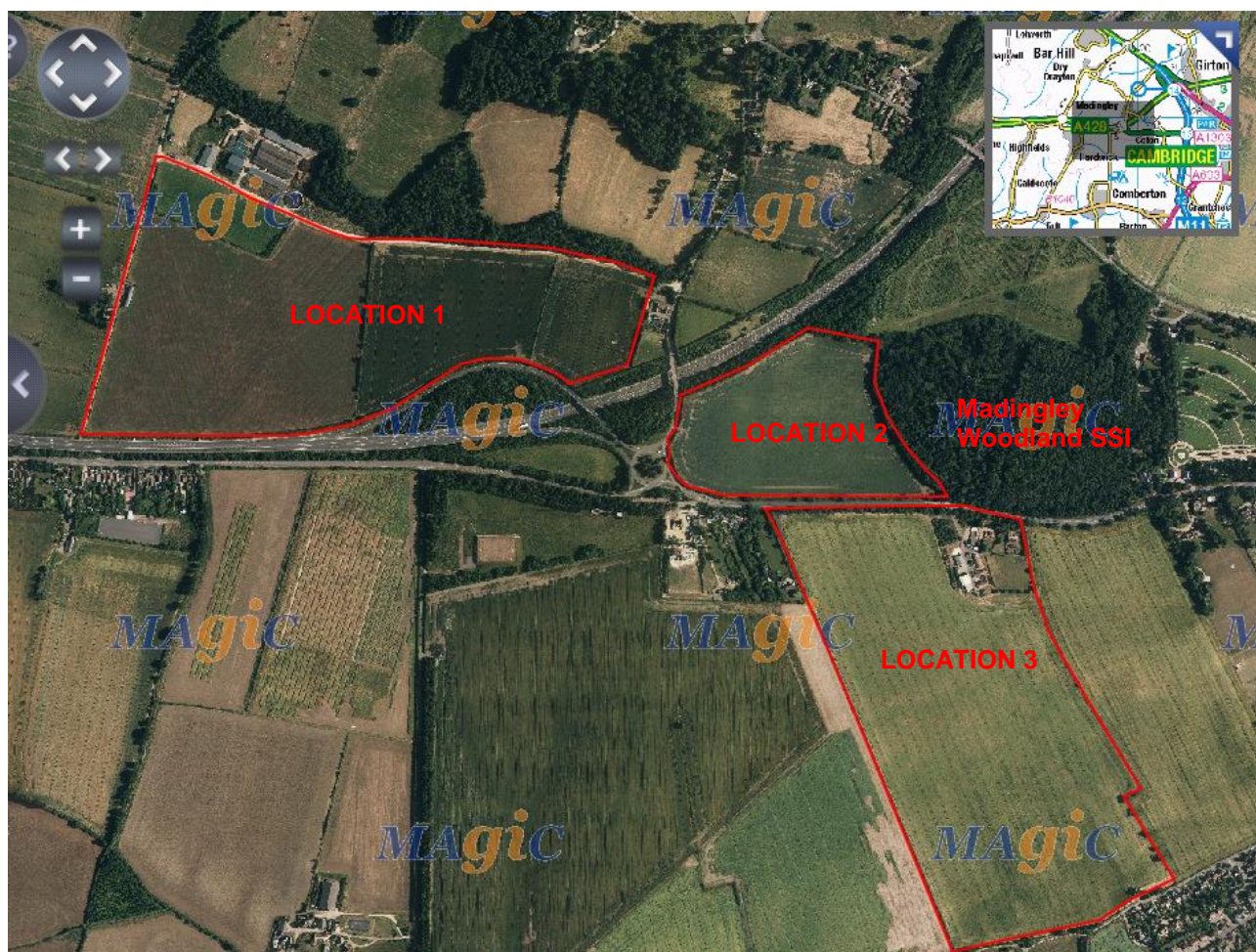


Figure 3-2 Aerial view of the site showing the three potential locations and surrounding habitat.



Ecological Constraints

Habitats

- 3.44. Small pockets of broadleaved woodland lie to the north of the three locations. These woodland blocks may offer suitability for a range of protected and or notable flora and fauna, including species such as bats, badgers and nesting birds. The connectivity between these woodland blocks may also increase the suitability of the woodland for use by wildlife.
- 3.45. Madingley Woodland Site of Special Scientific Interest (SSSI) is an ash-maple woodland covering approximately 15.2 ha. The woodland contains a mixture of both ancient primary and secondary woodland and is of wildlife, recreational and educational value. All three sites are located within 1 km of the woodland, Location 2 being immediately adjacent.

Protected or Notable Species

- 3.46. The various water bodies located surrounding the sites may provide suitable habitat for protected species such as water voles, foraging bats and great crested newts (great crested newt licences have been requested within the area previously). There are eleven bodies of

water located within 1km of the three potential P&R locations. Habitats surrounding the water bodies include a mosaic of grassland and dense woodland. Locations 2 and 3 are separated from most water bodies by the A428, which is considered to likely be acting as a physical barrier to the movement of newts, with the exception of the American Cemetery ponds (P11) for Location 2 and the field pond (P12) for Location 3. Location 1 has no physical barriers to the movement of newts between it and the water bodies.

- 3.47. Protected species such as bats and badgers may make use of the habitats within the three locations such as farmland and hedgerows. The woodland network to the north could offer good habitat for bats to forage, roost and commute and for badgers to forage, commute and utilise for sett creation. The surrounding urban areas (such as residential homes, old buildings within the city and the American Cemetery) area could all offer suitable habitat for roosting bats. The grassland fields, amenity grassland, woodland edge and denser vegetative areas could offer suitability for reptiles to bask and forage. The habitats including hedgerows, woodland and grassland could offer suitable locations for nesting birds. The woodland network and hedgerows also could offer suitable habitat for dormice.

Summary

- 3.48. A limited desk study has been completed on each of the three proposed Park and Ride locations, including a search for statutory designated sites, water bodies and notable habitats such as ancient woodland. The three locations have been ranked in order from 1 to 3 (see below); with Rank 1 being the location with the least ecological effects from the proposed Park and Ride.
- 3.49. **RANK 1:** Location 3 is predominantly surrounded by open fields separated by hedgerows. These fields are unlikely to contain a high diversity of fauna but may offer suitable habitat for a range of species such as badgers, bats, nesting birds and reptiles. Location 3 is situated across a minor road from Madingley Woodland SSSI. The A1303 creates a buffer between the woodland and the site which would prevent encroachment into the woodland therefore limiting disturbance. Location 3 is located approximately 50 m from Madingley woodland and approximately 475 m from the nearest water body (P11). These areas would need to be surveyed as part of an ongoing assessment for any important species before work was to commence. However, it is considered that the A1303 acts as a buffer to help mitigate against any potential disturbance to these areas.
- 3.50. **RANK 2:** Location 1 consists of large areas of open flat farm land to the south which are likely to have limited species diversity, with the exception of dense hedgerows. Within the north there are small clusters of woodland and several water bodies including a large lake (P7). Location 1 is located approximately 485m from Madingley woodland SSSI and is separated from this by the A428 and therefore any potential disturbance on this woodland is likely to be limited. This site may support protected species such as water vole and newts within the water bodies, nesting birds and dormice within the hedgerows and woodland, and bats and badgers. Although a minor road separates the open areas from the water bodies and woodland which could offer the best suitability for protected species this is not considered a physical barrier to the movement of species such as badgers and newts.
- 3.51. **RANK 3:** Location 2 consists of farm land to the south, and clusters of dense woodland and urban developments to the north. This site is located directly adjacent to Madingley woodland SSSI which is an area of high amenity value to the public and offers valuable habitat to legally protected and notable species. Work within Location 2 could affect wildlife within the woodlands whilst disturbance to the SSSI once the Park and Ride is operational may also have a negative effect on species using the woodland through noise and air pollution, although this will need to be determined through subsequent assessment.
- 3.52. In conclusion, based on the limited desk study undertaken, Location 3 has the least amount of ecological constraints and would require less survey effort in comparison to the other two

locations. Location 3 has a natural buffer zone, in the form of the A1303 from any valuable habitat areas and as such the impacts from site development are likely to be minimised. Given the suitability of the habitat surrounding the potential locations, it may be appropriate to consider further more detailed ecological assessment in the next stage to determine the location with the least impact.

Land Quality

- 3.53. All three potential locations are currently in use as Grade 2 (designated 'very good') agricultural land. Each location is situated within the Cambridge Green Belt. Location 1 has a small amount of tree cover, and all three locations would require earthworks prior to development in order to account for ground level differences.
- 3.54. All locations lie within a nitrate vulnerable zone for surface water. None of the sites are at risk of flooding or lie within a groundwater Source Protection Zone (SPZ). The superficial geology is Oadby Member – diamicton (borehole logs available via the British Geological Survey website generally describe this as stiff boulder clay with chalk and sand). The superficial deposits are designated as a Secondary Undifferentiated Aquifer. The bedrock geology is West Melbury Marly Chalk Formation; a Principal Aquifer covering Locations 2 and 3 and all but the western regions of Location 1. Surrounding bedrock is mudstone of the Gault Formation (unclassified).
- 3.55. Groundwater vulnerability is designated as 'major aquifer – intermediate' across the majority of the footprint of the Principal Aquifer and 'major aquifer - high' in the southern section, within the area of the Principal Aquifer in the southern regions of Location 3. There is one groundwater abstraction to the northwest of Location 1 for agricultural spray irrigation. No landfills (historical or active) are present in the vicinity of any of the sites. One significant impact to water is recorded to the west of Location 1 from agricultural materials and wastes in June 2012. Others are considered too far away to be noteworthy as they would be unlikely to affect the P&R potential locations.

Soils

- 3.56. The proposed land use would present a fairly low risk to soil quality during the construction and operational phases. There are no significant differences between the underlying geology and aquifer designations across the three potential locations. Migration of contaminated dusts (via oils or fuels) to prime agricultural land resulting in a loss of soil quality would need to be considered and mitigated accordingly following further assessment.

Groundwater and surface water

- 3.57. The boulder clay persists to a depth well below any anticipated earthworks associated with the scheme so there is not considered to be any significant risk to the sensitive aquifer within the Chalk bedrock (this assumes that no piling is required). Should the topography of the scheme in Location 3 slope south towards Bin Brook there is a risk of surface water run-off leaving the site and migrating towards the Brook. Groundwater is very sensitive in this region (the farmland is identified as a target area by the catchment sensitive farming project to reduce water pollution from agriculture). With a large area of hardstanding used to park vehicles effective engineered surface water drainage, with associated interceptors, would be necessary to protect this sensitive receptor on all three sites.
- 3.58. For the reasons outlined above, Location 2 would be likely to have the least impacts from a land quality point of view based mainly on the fact that it would result in the loss of the smallest area of land. This site is already compartmentalised by the roads, roundabout and woodland and hence it may be considered less intrusive to develop this area. Location 1

could be considered marginally a second favourite over Location 3 due to Location 3's proximity to the river and the unproductive bedrock in the western section of Location 1 making this region less sensitive.

Landscape and Visual Amenity

National Landscape Character

- 3.59. The Study area including the three sites is located within the NCA Profile: 88 'Bedfordshire and Cambridgeshire Claylands' (NE555).

Regional/Local Landscape Assessment

- 3.60. South Cambridgeshire District Council refer to the Cambridgeshire Landscape Guidelines 1991, in the absence of a borough Landscape Assessment. This document recommends ways in which new development can be integrated into the wider landscape and provides examples of ways in which to restore or enhance a rural landscape.
- 3.61. Potential Policy/guidance and Landscape and Visual issues have been compared for each location. See Table 3-2 below:

Table 3-2 Landscape and Visual Considerations

Effects	Location 1	Location 2	Location 3
Existing Site landscape elements, vegetation, relationship to road corridors.	Location 1 is bound by the northern A428 slip road to the south and the northern site boundary is partially contained by woodland (Round Hill Plantation) and adjoined by Woodside House, Farm Park, Madingley to the north west. The western boundary adjoins a farm track which runs parallel to the site boundary. The eastern boundary abuts the A428 and Highfield Court, Madingley. Location 1 runs parallel with and is influenced by the urbanising effects of the A428 road corridor.	Location 2 is bound by the A428 and vegetated landscape edge on its northern boundary, and the A1303 (St Neots Road) to the south. To the east the site is contained by Madingley Wood. To the west, the site is contained by the roundabout junction for the A428/A1303. The land use is agricultural. Location 2 adjoins two road corridors.	Location 3 is located within an agricultural field with its northern boundary adjoining the A1303 to the north. The southern portion of the site has an underground reservoir and compound with outbuildings. Location 3 is less closely associated with the A428 road corridor in comparison with the other sites.
National Landscape Character	All three potential locations are situated to the west of Cambridge and adjoin the A428/A1303 western approaches to Cambridge. They are located within an undulating agricultural landscape influenced by road		

	corridors which form the western settlement approach to Cambridge and the Madingley area.		
Local/Regional Landscape Character/Guidance	Location 1 offers potential to be integrated into the wider landscape as it is screened by the tree belt to the north of the site and the slip road and roadside planting to the south of the site. This location is larger than locations 2 and 3 and could incorporate a landscape buffer along the west and east boundaries in addition to mitigating planting within the internal Park and Ride layout. The north portion of the site, Comberton Plantation, includes a covered reservoir and associated outbuildings and access. The remainder of the site is agricultural.	Location 2 is the smallest site, and would be more constrained in physical extents. Location 2 is contained by planting on the northern and eastern boundaries, which would allow the scheme to sit within an established landscape context. There is some scope to integrate the layout with internal planting. However this location is the smallest.	Location 3 is a larger site which is largely spatially open in character with tree belt containment along its northern edge, adjacent to the St. Neots Road, a clipped hedge and partial tree belt on its western edge, adjacent to Long Road and a tree belt containing the south western corner of the site. Opportunity exists to reintroduce former field boundaries and subdivide the layout to include integrating landscape structure between parking areas and rows.
Planning Policy	All three locations are situated within the Greenbelt. For all three locations it will be important to consider the setting or approach to the western settlement edge, this reflected in Cambridge City Council Local Plan 2006, Policy, Designing Cambridge. There are several Listed buildings within the area, which are generally contained within or beyond woodland areas, and they are unlikely to offer views to the sites.		
Landscape Designations/Planning Designations/Registered Gardens	Location 1 is situated to the south of a Historic Park and Garden, Madingley Park with the Round Hill Plantation on its southern boundary.	Location 2 is adjacent to Madingley Wood SSSI with a portion of Ancient Woodland within the SSSI and to the immediate East of the woodland.	There are no landscape designations within the vicinity of Location 3.
Issues associated with landscape character	Location 1 adjoins the A428 transport corridor and nearby junction slip road.	Location 2 will affect the approach to the city via the A1303.	Location 3 will affect the approach to the city via the A1303.
Summary of visual Receptors	There are very few dwellings around Location 1, and these	Location 2 is relatively well contained visually, with potential	Location 3 is potentially visible from farm buildings,

	<p>are limited to farms adjoining the site boundary; Park Farm on the north, unnamed farm buildings to the west and Highfield Court to the east of the site boundaries. There may be views from properties on St Neots Road. There may also be more distant visual receptors from the eastern settlement edge of Hardwick.</p>	<p>views from properties on Church Lane, Cambridge Road and Madingley Road.</p>	<p>Madingley Mulch and other properties on Madingley Road and properties in the vicinity of Whitwell Way to the south east of the site. There is a bridleway track running east-west along the southern site boundary.</p>
--	--	---	--

Summary

3.62. Location 2 has the greatest opportunity to integrate the proposals within the landscape structure. This is however the smallest of all three locations, and offers limited scope for landscape structure across or within the site. This location is the most visually contained. Locations 1 and 3 are potentially larger and more visible to surrounding receptors. Location 1 is more closely associated with the A428 road corridor. Both locations would require landscape integration to mitigate the landscape and visual effects.

Noise and Vibration

Location 1

Baseline Noise Climate

3.63. Based on a review of mapping data and aerial imagery, it is expected that the existing noise climate in the area surrounding this location will be dominated by road traffic noise from the A428 to the south, with less prominent contributions from traffic on local roads such as Church Lane.

Affected Receptors

3.64. Affected receptors may include:

- Highfield Farm & Highfield Court, to the east of the site (approx. 20 m from site boundary).
- Park Farm, to the west of the site (approx. 20 m from site boundary).
- Properties on Church Lane, to the northeast of the site (approx. minimum 150 m from site boundary).
- Madingley Hall, to the north of the site (approx. 480 m from site boundary).
- Properties on St. Neots Road, to the south of the site (approx. 80 m from site boundary).

Potential Noise Impacts

- 3.65. Increased noise levels at Highfield Farm & Highfield Court due to additional vehicles travelling along Church Lane to the Park and Ride access.
- 3.66. Increased noise levels associated with the general operation of the Park and Ride site, such as vehicle movements, manoeuvres and door slams. This is likely to affect noise sensitive receptors in close proximity to the site boundary, particularly during peak periods of activity.
- 3.67. There is potential that the existing ambient noise levels in the area will provide acoustic screening to certain on-site activities, thereby potentially diminishing the magnitude of effect.
- 3.68. The Park and Ride facility will introduce a hard landscaped surface which is acoustically reflective, compared to the existing agricultural land use. This change in ground cover has the potential to increase the noise levels at receptors in the vicinity of the site.
- 3.69. Construction induced noise and vibration levels are likely to affect the surrounding receptors.

Location 2

Baseline Noise Climate

- 3.70. It is expected that the existing noise climate in the area surrounding this location will be dominated by road traffic noise from both the A428 and Madingley Road (A1303), with less prominent contributions from traffic on local roads such as Church Lane.

Affected Receptors

- 3.71. Affected receptors may include:
- Residential properties along Madingley Road (A1303), to the south of the site (approx. 35 m from site boundary).
 - Madingley Wood (SSSI), to the east of the site (approx. 10 m from site boundary).
 - American Military Cemetery, to the east of the site (approx. 370 m from site boundary).

Potential Noise Impacts

- 3.72. Increased noise levels experienced by properties fronting onto Madingley Road due to additional vehicles travelling along the A1303 to the Park & Ride site access.
- 3.73. Increased noise levels associated with the general operation of the Park and Ride site, such as vehicle movements, manoeuvres and door slams. During peak periods of activity, this is likely to affect Madingley Wood and potentially properties on Madingley Road.
- 3.74. Introduction of hard landscaping for the car park has the potential to increase the noise levels at receptors in the vicinity of the site.
- 3.75. Construction induced noise and vibration levels are likely to affect the surrounding receptors.

Location 3

Baseline Noise Climate

- 3.76. It is expected that the existing noise climate in the area surrounding this location will be dominated by road traffic noise from Madingley Road (A1303) to the north, with additional contributions from the A428 beyond, and traffic on nearby local roads. There is also potential for intermittent noise associated with the rifle range to the south of Coton.

Affected Receptors

- 3.77. Affected receptors may include:
- Residential properties along Madingley Road, to the east and west of the northern section of the site (approx. minimum 20 m from site boundary).
 - Properties on Whitwell Way, Coton, to the southeast of the site (approx. minimum 20 m from site boundary).
 - Whitwell Farm & Cottages to the south of the site (approx. minimum 25 m from site boundary).
 - Users of the Public Right of Way to the south of the site, following Whitwell Way (approx. 5 m from site boundary).
 - Madingley Wood (SSSI), to the northeast of the site (approx. 50 m from site boundary).

Potential Noise Impacts

- 3.78. Increased noise levels experienced by properties fronting onto Madingley Road due to additional vehicles travelling along the A1303 to the Park and Ride site access.
- 3.79. Increased noise levels associated with the general operation of the Park and Ride site, such as vehicle movements, manoeuvres and door slams. During peak periods of activity, this is likely to affect the residential properties along Madingley Road and Whitwell Way.
- 3.80. The existing ambient noise levels are expected to be lower at the southern section of the site, due to the increased separation distances from the A1303 and A428 highways. The reduction in existing ambient noise at receptors to the south of the site may give rise to a greater level of noise impact i.e. change in noise levels attributable to the Park and Ride site are more noticeable.
- 3.81. Introduction of hard landscaping for the car park has the potential to increase the noise levels at receptors in the vicinity of the site.

Summary

- 3.82. On the basis of the anticipated environmental noise constraints at each of the three prospective Park and Ride locations, it is evident that each has the potential to give rise to noise impacts at the surrounding noise sensitive receptors. It is considered that there is no clear preference in location on the basis of potential noise impacts, however, Location 3 is likely to affect a greater number of noise sensitive receptors when compared with Location 1 and Location 2.

Water Environment

Existing environment

Surface water

- 3.83. There are no Water Framework Directive (WFD) designated surface watercourses within the boundary of any of the potential locations. There are also no main or ordinary watercourses within the boundary of any of the potential locations.
- 3.84. There is one Water Framework Directive (WFD) designated surface watercourse within 1 km of the boundary of Location 1. Callows Brook is also located within 1 km of the site boundary, although this watercourse is not designated as a WFD watercourse. There are four ordinary watercourses within 1 km of the site boundary which eventually feed into Cottenham Lode which is a WFD designated surface watercourse and located approximately 1.5 km north of the site boundary. There is a network of field drainage ditches within 1km of the Site boundary, including within the site.
- 3.85. There are no WFD designated surface watercourses within 1 km of the boundary of Location 2. There are three un-named watercourses within 1 km of the site boundary which eventually feed into Cottenham Lode which is located approximately 2 km north of the site boundary. There is a network of field drainage ditches within 1 km of the site boundary.
- 3.86. There is one WFD designated surface watercourse within 1 km of the boundary of Location 3. There are two un-named watercourses within 1 km of the site boundary which eventually feed into Cottenham Lode which is located approximately 2.5 km north of the Site boundary. There is a network of field drainage ditches within 1 km of the Site boundary.

Groundwater

- 3.87. The three potential locations are not underlain by any WFD groundwater bodies and there are no Groundwater Source Protection Zones within 1 km of the sites.
- 3.88. British Geological Survey (BGS) online geology (1:50,000) indicate the Sites are underlain by the following bedrock type: West Melbury Marly Chalk Formation. The West Melbury Marly Chalk Formation is overlain by superficial deposits comprising Oadby Member – Diamicton. Location 3 is not completely underlain by this superficial deposit. The south east corner of the Site has no superficial deposit recorded.
- 3.89. The Environment Agency groundwater interactive maps indicate that the bedrock is classified as a principal aquifer and the superficial deposits are a Secondary (undifferentiated) aquifer.

Flood risk

- 3.90. The Environment Agency flood maps indicate that the three locations have a very low chance of flooding from rivers. This means that each year, these areas have a chance of flooding of less than 1 in 1,000 (0.1%). The Environment Agency flood maps also indicate that the majority of the locations have a very low (less than 0.1% annually) risk of surface water flooding.
- 3.91. There are small areas within Location 1 and within 1 km of the site which have a low (0.1% and 1% annually) and medium (between 1% and 3.3% annually) risk of surface water flooding. There are also small areas within Location 2 and 3 which have a low (0.1% and 1% annually) risk of surface water flooding. Within 1 km of Location 2 there are areas which have a low (0.1% and 1% annually) and medium (between 1% and 3.3% annually) risk of surface water flooding and within 1 km of Location 3 there are areas which have a low (0.1%

and 1% annually), medium (between 1% and 3.3% annually) and high (greater than 3.3% annually) risk of surface water flooding.

Likely significant effects

3.92. The following could be affected during construction and operation at each site: surface water, groundwater and flood risk.

Construction effects

3.93. There is a risk that surface water quality could be impacted by construction activities due to sediment runoff from exposed areas, and leaks and spills of fuel and other chemicals. Contamination of the underlying aquifer could occur due to leaks and spills from fuel and other chemicals and sediment laden runoff. This would be an enhanced risk in areas where excavation or piling works are proposed where new pathways to the underlying aquifer could be created.

Operational effects

3.94. There is a risk that surface water quality could be impacted during operation from discharge of polluting runoff through drainage outfalls. There may also be increased runoff due to the increase in impermeable surface area which could change flood risk in other areas. Any physical changes to watercourses within the site boundary may impact WFD objectives for the water body and appropriate mitigation would be required.

Preference

3.95. In terms of the water environment the characteristics of the three locations are fairly similar. However, based on proximity of WFD watercourses, the presence/absence of field drainage ditches within the proposed locations and the risk of surface water flooding in the surrounding area has been determined that Location 2 would likely have the least impact. Table 3-3 summarises these characteristics for the three locations.

Table 3-3 Summary of water environment characteristics

	Location 1	Location 2	Location 3
WFD designated surface watercourse within Site boundary?	No	No	No
WFD designated surface watercourse within 1 km of Site boundary?	Yes – approximately 750 m from Site boundary	No	Yes – approximately 200 m from Site boundary
Main or ordinary watercourse within Site boundary?	No	No	No
Main or ordinary watercourse within 1 km of Site boundary?	Yes – closest approximately 50 m from Site boundary	Yes – closest approximately 500 m from Site boundary	Yes – closest approximately 550 m from Site boundary
Field drainage ditches within Site boundary?	Yes	No	No
Field drainage ditches within 1 km of Site boundary?	Yes	Yes	Yes
Risk of Site flooding from surface water?	Majority very low but small areas which have a low and medium risk	Majority very low but small areas which have a low risk	Majority very low but small areas which have a low risk

	Location 1	Location 2	Location 3
Risk of surface water flooding within 1 km of Site boundary?	Small areas which have a low and medium risk	Areas which have a low and medium risk	Areas which have a low, medium and high risk

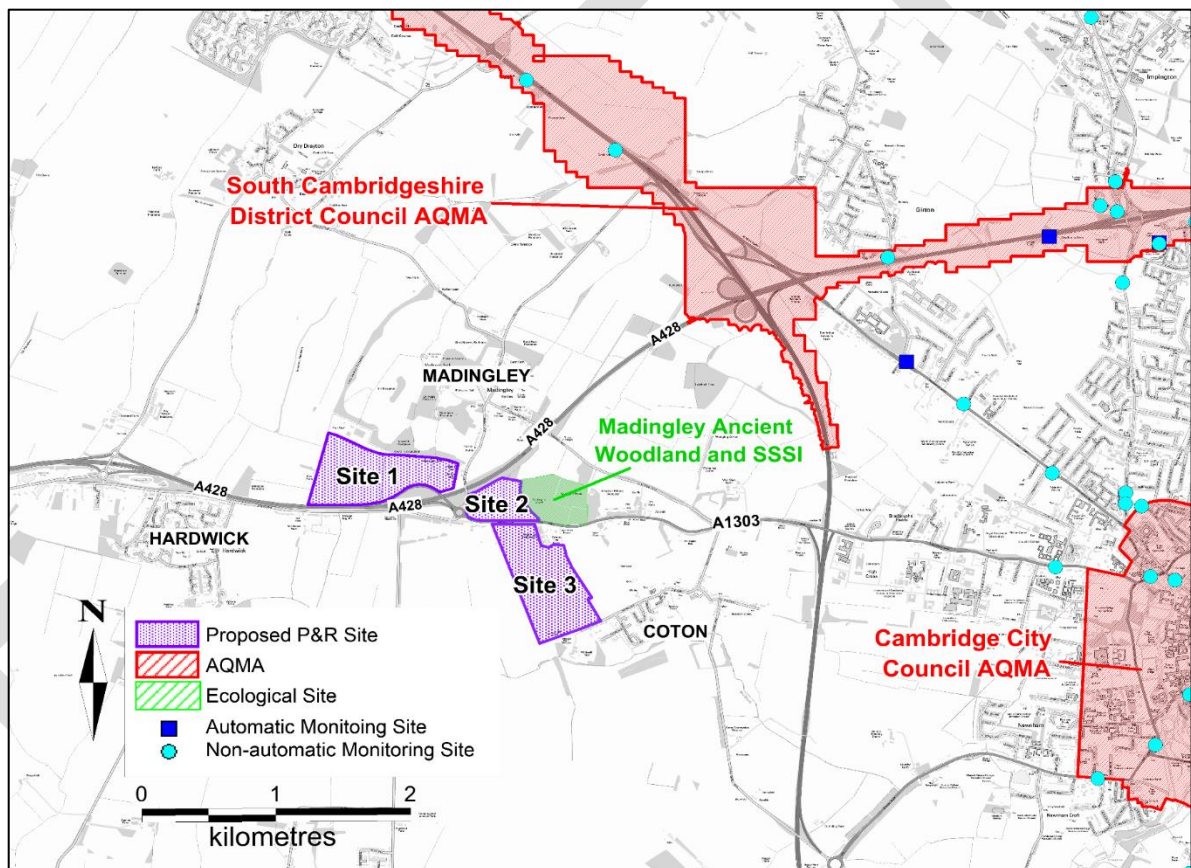
Air Quality Considerations

3.96. All three potential locations are currently in use as Grade 2 (designated 'very good') agricultural land within the green belt, and are located within the South Cambridgeshire District Council area.

Air Quality Management Areas

3.97. There are two Air Quality Management Areas (AQMAs) within 5 km of the potential Park and Ride locations. Figure 3-3 below shows their locations.

Figure 3-3 The three proposed P&R locations with surrounding air quality constraints



3.98. South Cambridgeshire District Council (SCDC) has declared an AQMA surrounding the M11 Junction 14, where the motorway intersects the A428. The AQMA extends approximately 4 km north and 1.3 km south along the M11 as well as approximately 4.5 km east along the A428. The AQMA was declared initially in 2007 due to exceedances in annual mean NO₂ concentrations above EU limit values, but from 2010, has been declared for exceedances in both NO₂ and PM₁₀. At its closest point, the SCDC AQMA is approximately 1.8 km north east of Location 2, 1.9 km from Location 3 and 2 km from Location 1.

- 3.99. Cambridge City Council (CCC) declared a city wide AQMA for Cambridge in 2004 due to exceedances in annual mean NO₂ concentrations. At its closest point, the CCC AQMA is approximately 3.6 km east of Location 3, 4.1 km from Location 2 and 4.7 km from Location 1.
- 3.100. Given the location of the Park and Ride proposed locations relative to prevailing winds and the location of the AQMA, no one location would have any advantage. As neither AQMA is within close proximity to any of the three proposed locations or their surrounding receptors, the proximity of an AQMA will not be considered when ranking the potential locations in order of preference.

Local Air Quality Monitoring

- 3.101. SCDC and CCC have published local air quality monitoring (LAQM) results in their 2014 Air Quality Progress Reports³. The nearest automatic monitoring site is located approximately 3 km north east of Location 2 and recorded an annual mean of 30 µg/m³ for NO₂ in 2013. There is also another automatic site approximately 4.3 km north west of Location 2, located within the SCDC AQMA next to the A428. This recorded an NO₂ annual mean on 55 µg/m³ in 2013. The nearest non-automatic monitoring site is approximately 3.2 km north east of Location 2 (also located next to the A428 but within the SCDC AQMA) and measured annual mean NO₂ in 2013 to be 26.8 µg/m³. Although these are all roadside sites, the monitors next to the A428 could be considered broadly representative of conditions at Locations 2 and 1 which also border the A428.
- 3.102. The nearest background site is a non-automatic site, located approximately 4.7 km south east of Location 3. At this site the annual mean NO₂ was 12 µg/m³, well below the air quality limit value of 40 µg/m³. Conditions here could be considered broadly representative of conditions at Location 3.
- 3.103. In terms of existing air quality conditions, Locations 1 and 2 are likely to have a higher background NO₂ concentration, due to being bordered by the A428. Although it is unlikely that NO₂ at any of the locations would be currently exceeding EU limit values, Location 3 is likely to have the lowest background pollutant concentrations, although the locations themselves will not act as relevant receptors as visitors will be present for short periods only.

Sensitive Receptors

- 3.104. All three locations are within close proximity to a number of sensitive receptors (residential properties, schools and hospitals). Table 3-4 below presents the number and type of sensitive receptors that have been counted within a 200 m and 1 km buffer area of each site boundary. It also states the distance from each site boundary to the closest receptor.

Table 3-4 Number of sensitive receptors closest to the proposed P&R site boundaries and within a 200 m and 1 km buffer area

	Location 1		Location 2		Location 3	
	Distance (m)	Type	Distance (m)	Type	Distance (m)	Type
Closest receptor	14	residential	34	residential	15	residential

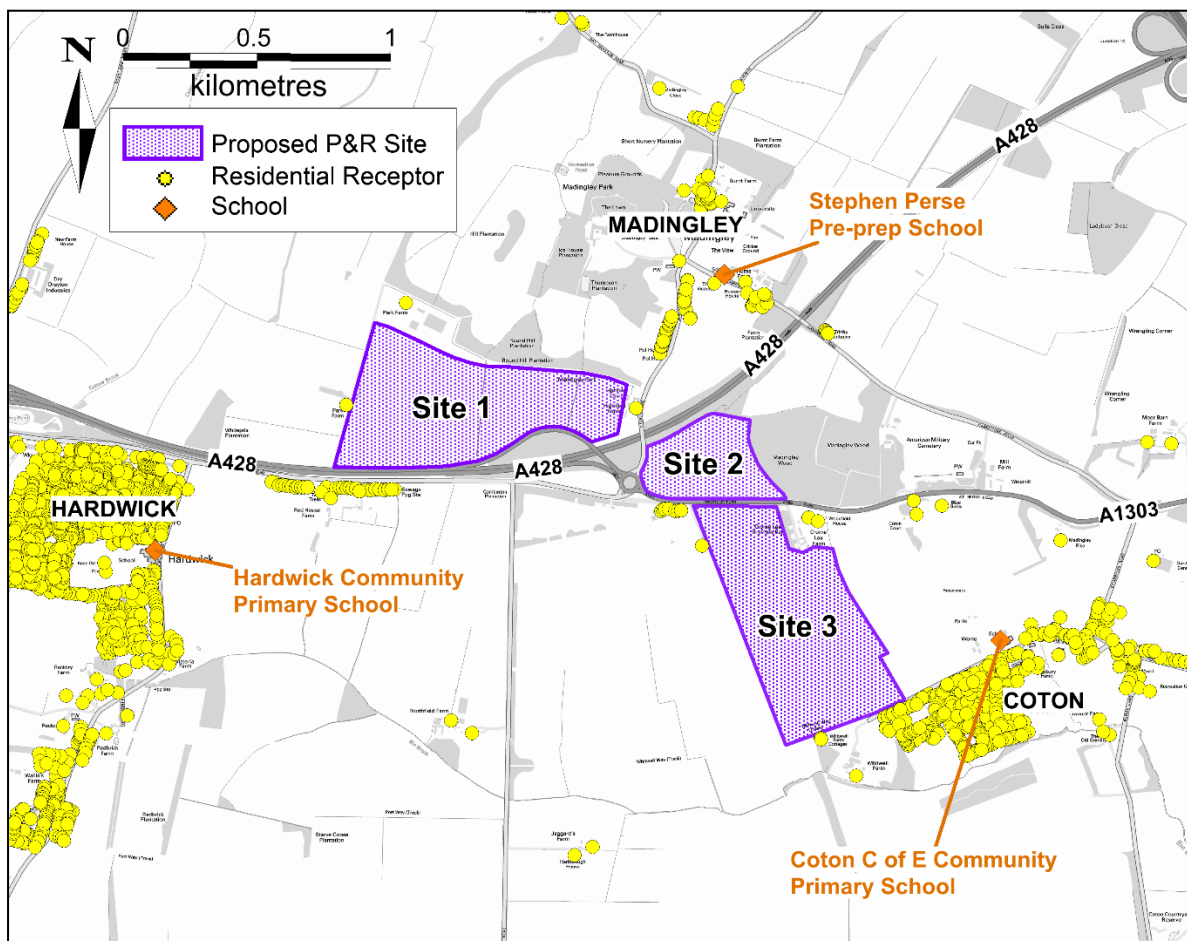
³ SCDC: [https://www.scams.gov.uk/sites/default/files/documents/Progress%20Report%20\(2014\).pdf](https://www.scams.gov.uk/sites/default/files/documents/Progress%20Report%20(2014).pdf)

CCC: <https://www.cambridge.gov.uk/sites/www.cambridge.gov.uk/files/documents/Air%20Quality%20Progress%20Report%202014%20%5BPDF%5D.pdf>

	Location 1		Location 2		Location 3	
	Number	Type	Number	Type	Number	Type
Receptors within 200 m	30	residential	11	residential	101	residential
Receptors within 1 km	496	residential	159	residential	385	residential
	2	schools	2	schools	2	schools

- 3.105. Location 2 has the least number of sensitive receptors within both distance buffers as it is the furthest away from Hardwick and Coton, the nearest, most populated villages to the proposed locations. The nearest receptor to Location 2 is also 34 m to the south, which is over double the distance to the closest receptors measured from the boundaries of Locations 1 and 3.
- 3.106. Locations 1 and 3 have more sensitive receptors within both 1 km and 200 m of the proposed site boundaries. Location 1 is approximately 70 m north of St Neots Road (that runs in parallel to the south of the A248) along which there are a number of residential properties. It is also only 500 m north east of Hardwick. The closest receptor to Location 1 is Park Farm which is located approximately 14 m to the west. Similarly, the southern boundary of Location 3 borders a number of residential properties on the edge of Coton, the closest of which is located approximately 15 m away. Location 3 has over three times as many receptors within 200 m as any other site, although the majority of these are south of the site and so the furthest away from the site entrance and from the A428 itself.
- 3.107. Figure 3-4 presents the locations of the sensitive receptors as discussed. The receptors have been mapped using OS address point data supplied to Atkins by SCDC.

Figure 3-4 Sensitive Receptors surrounding proposed P&R sites



3.108. Given that Location 2 has the least sensitive receptors within a 200 m and 1 km boundary, and that the closest receptor is the furthest distance away in comparison with Locations 1 and 3, Location 2 is considered the most suitable location for a Park and Ride site in terms of affecting the least receptors. However Location 3 is the furthest from the air pollution source of the A428, and does provide the capacity needed.

Ecological Sites

3.109. Madingley Ancient Woodland and SSSI is located on the eastern boundary of Location 2. It was designated for its rare ash-maple woodland habitat, the western section of which is of ancient origin. Given that increased traffic (NO₂) and construction dust pollution has the potential to impact on vegetation, it would not be preferable in terms of ecology, to opt for Location 2. Instead, it would be preferable to choose Location 3 which is approximately 50 m south west of Madingley Ancient Woodland and SSSI, or Location 1 which is the furthest distance away, approximately 470 m to the east.

Dust

3.110. Location 1 has a small amount of tree cover, and all three locations would require earthworks prior to development in order to account for ground level differences. Given that there are a number residential receptors that are within close proximity to the proposed

sites, a dust assessment in accordance with the 2014 IAQM Guidance on the Assessment of Dust from Demolition and Construction⁴, may be required.

- 3.111. Given that Location 2 has the least sensitive receptors within a 200 m and 1 km boundary, and that the closest receptor is more than double the distance away from the site compared with Sites 1 and 3; Location 2 is considered the most suitable location for a Park and Ride site in terms of dust from construction.

Summary

- 3.112. For the reasons outlined above, overall Location 2 would be the location with the least likely impact in terms of air quality. The impact on the designated ecological site (SSSI) to the east will need to be evaluated however before this can be confirmed.

⁴ <http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

4. Summary

Three possible Park and Ride locations in the vicinity of Madingley Mulch roundabout have been assessed at a high level according to a number of characteristics. The results of the investigation are summarised in Table 4-1 below.

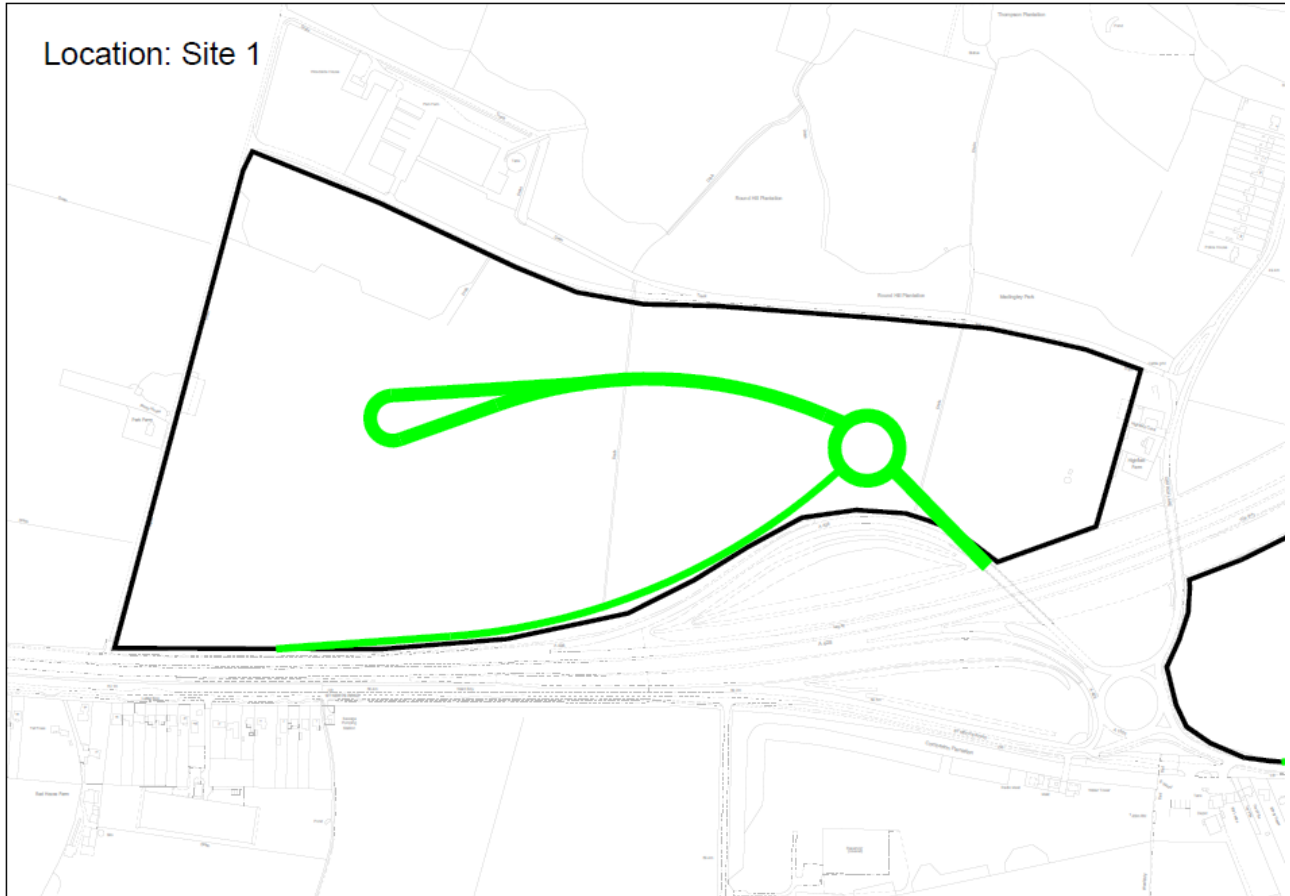
Table 4-1 Location Summary Matrix

Characteristic	Location 1	Location 2	Location 3
Capacity	Medium capacity (364,000 m ²). Space for future expansion. Difficult shape for development and western section would have limited access to the bus service.	Smallest but sufficient capacity (122,000 m ²) and constrained by Madingley Wood. Ideal shape for car park.	Greatest capacity (365,000 m ²) with room for future expansion and an ideal shape for a car park. Long walking distance for some users.
Accessibility	Dependent on access chosen. If slip road is chosen poor accessibility from north, east and south. Access from Church Lane: limited land, reduced forward visibility at junction, potential for long queues.	Could be a dedicated lane from the A428 to Cambridge preventing A1303 queues. Potential for a bus priority system.	Bus priority could be introduced. Could lead to delays from the A428 and traffic backing onto the Madingley Mulch roundabout.
Access Arrangements	Complex access utilising either access along Church Lane or through the northern access track or from the A428 slip.	Access via a signalised junction with bus priority.	Access via a signalised junction with bus priority.
Current Land Use	Grade 2 agricultural.	Grade 2 agricultural.	Grade 2 agricultural.
Environmental Impact	Ranks 2 nd for ecology, 2 nd for land quality, and is of a similar quality as Location 3 for planning policy, landscape characteristics, noise & vibration, water and air quality.	Ranks 1 st for land quality, landscape characteristics, water and air quality, 3 rd for ecology, of a similar quality as Location 1 for noise & vibration and of a similar quality as Sites 1 and 3 for planning policy.	Ranks 1 st for ecology, 3 rd for land quality, 3 rd for noise & vibration, and is of a similar quality as Location 1 for planning policy, landscape characteristics, water and air quality
Traffic Impact	All locations are expected to have similar traffic impacts.	All locations are expected to have similar traffic impacts.	All locations are expected to have similar traffic impacts.

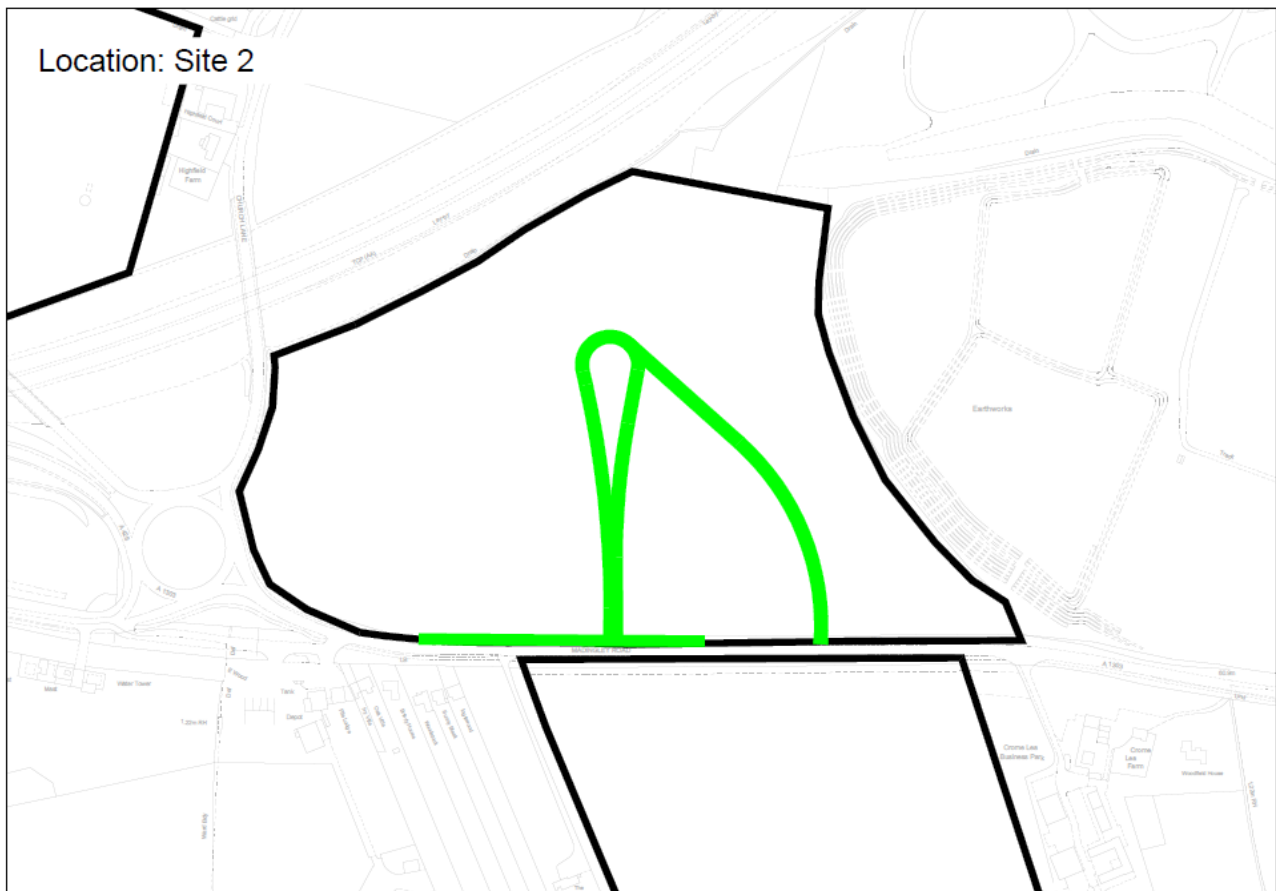
Appendix A. Engineering Input

A.1. Access Sites

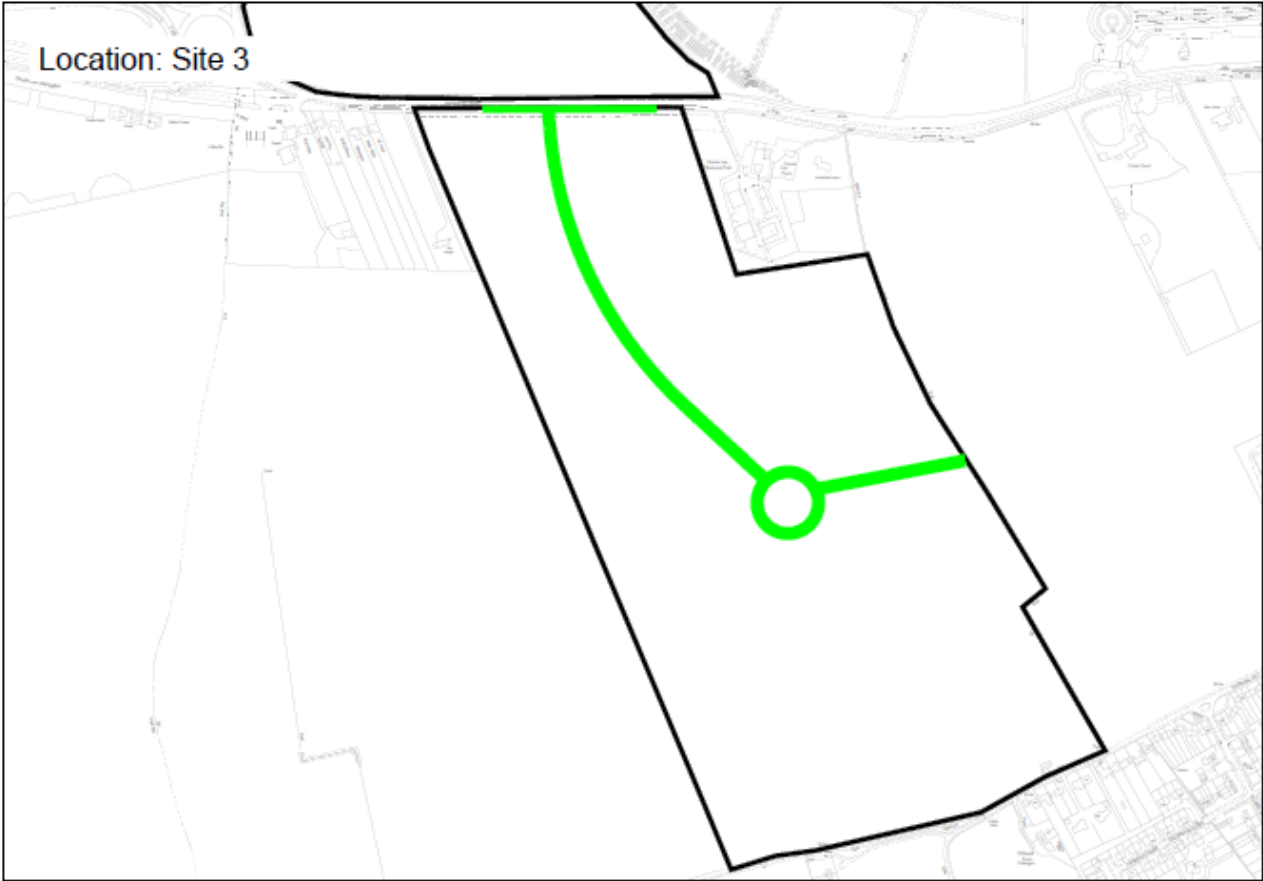
Access Location 1



Access Location 2



Access Location 3



DRAFT

Atkins Ltd
Unit 5, Wellbrook Court
Girton Road
Cambridge CB3 0NA

Elena Martinez
Email elena.martinez@atkinsglobal.com
Telephone 0121 483 5899

DRAFT