



WEST CAMBRIDGE

OUTLINE PLANNING APPLICATION

ENVIRONMENTAL STATEMENT ADDENDUM _ VOLUME 2

MAIN REPORT

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EIA Quality Mark

This Environmental Statement and the Environmental Impact Assessment (EIA) carried out to identify the significant environmental effects of the proposed development have been undertaken in line with our commitments as members of the EIA Quality Mark.

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1. Introduction

1.1 Background

1.1.1 The University of Cambridge (the applicant) submitted an outline planning application (planning reference 16/1134/OUT) for a new masterplan (referred to as the Proposed Development within this document) at the West Cambridge Site (referred to as the Site within this document) on the 16th June 2016. A full description of the planning application is shown in the box below. By virtue of its size and scale, the Proposed Development was classified as Environmental Impact Assessment (EIA) Development, under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended 2014), and accordingly an Environmental Statement (ES) was submitted with the outline planning application.

Outline planning permission with all matters reserved is sought for up to 383,300m² of development comprising up to 370,000m² of academic floorspace (Class D1 space), commercial/research institute floorspace (Class B1b and sui generis research uses), of which not more than 170,000m² will be commercial floorspace (Class B1b); up to 2,500m² nursery floorspace (Class D1); up to 1000m² of retail/food and drink floorspace (Classes A1-A5); up to 4,100m² and not less than 3,000m² for assembly and leisure floorspace (Class D2); up to 5,700m² of sui generis uses, including Energy Centre and Data Centre; associated infrastructure including roads (including adaptations to highway junctions on Madingley Road), pedestrian, cycle and vehicle routes, parking, drainage, open spaces, landscaping and earthworks; and demolition of existing buildings and breaking up of hardstanding.

1.1.2 During the consultation process on the planning application several concerns were raised about the potential landscape and visual effects and effects on the setting of built heritage assets. Taking these considerations into account the applicant has revised the Proposed Development, to reduce potential adverse effects, and has re-submitted the planning application.

1.2 Changes to the Proposed Development

1.2.1 The outline planning application defined the Proposed Development in two principal documents namely:

1. Parameter plans, and
2. Design guidelines.

1.2.2 The parameter plans define the basic principles of the Proposed Development including the proposed land use classification, quantum of development, maximum extent of the building envelope, minimum extents of public open space and landscaping, and access routes through the Site. The parameter plans submitted in the outline planning application were kept as simple as possible to define clearly what was being applied for. Consultation feedback commented that this made it difficult to read the parameter plans in conjunction with each other. The amended parameter plans now include areas of overlap to address these concerns so, for example, where minimum landscape requirements limit the extents of the building zones, this is now reflected in the building zone parameter plan.

1.2.3 To address the concerns over the potential effects to the landscape and visual receptors and the historic environment, the maximum heights of buildings, shown in the building heights parameter plan, have been reduced and the taller built elements have been removed. Particular attention has been directed to the heights of the building zones immediately surrounding the Schlumberger Gould Research Centre which has received a Grade II* listing since the previous planning application submission. Further refinements to the building heights have also been made through setbacks at the roof level and the building zones have been reduced to provide for more space at the site boundaries to allow the woodland buffers to grow to their full potential.

1.2.4 The Design Guidelines provide a framework of design principles that must be adhered to when undertaking detailed design. The Design Guidelines specify several measures which can be regarded as 'in built' environmental mitigation measures such as controls to building design to minimise the bulk and impact to the wider landscape, specifications for new planting and identification of existing planting that must be retained to soften the build development, and other measures to minimise the impact to the historic environment and maximise biodiversity on Site. The measures which are considered to be 'in built' mitigation are listed in Chapter 2.

1.2.5 The descriptions of the Proposed Development and the proposed quantum of development have not been amended and remain the same as the submitted outline planning application.

1.3 Implications for the Environmental Statement

1.3.1 The ES submitted with the outline planning application considered a worst case scenario where new buildings could potentially be built up to the maximum extents shown in the parameter plans. As the parameter plans have amended these extents, to lessen the potential adverse effects, the submitted ES now overestimates the extent of the potential effects from the revised parameter plans. The environmental assessments which are affected by the amendments to the Proposed Development are historic environment, landscape and visual effects, traffic and transport, air quality, noise and vibration, water environment, and ground conditions. These assessments have been amended to reflect the revised Proposed Development.

1.4 Purpose of this document

1.4.1 This document is an Addendum to the submitted ES, Volume 2, Main Report. The purpose of this document is to update the relevant chapters and sections of the submitted ES to reflect the changes to the Proposed Development. Table 1.1 shows the sections of the submitted ES which are supplemented by the content of this document.

Table 1.1 Sections of text in the submitted ES superseded by this document

ES addendum (this document) sections	Submitted ES sections
Chapter 2 Proposed Development	Chapter 3 Proposed Development
Chapter 4 Alternatives	Chapter 4 Alternatives
Chapter 7 Historic environment	Chapter 7 Historic environment – following sections only <ul style="list-style-type: none"> • 7.5 Impact assessment • 7.6 Mitigation measures • 7.7 Summary

ES addendum (this document) sections	Submitted ES sections
Chapter 8 Landscape and visual	Chapter 8 Landscape and visual – following sections only <ul style="list-style-type: none"> • 8.5 Impact assessment – Operational phase only. Construction phase effects remain unchanged • 8.6 Mitigation measures • 8.7 Summary
Chapter 10 Traffic and transport	Chapter 10 Traffic and transport
Chapter 11 Air quality	Chapter 11 Air quality – following sections only <ul style="list-style-type: none"> • 11.5 Impact assessment – Operational phase only. Construction phase effects remain unchanged • 11.7 Summary
Chapter 12 Noise and vibration	Chapter 12 Noise and vibration – following sections only <ul style="list-style-type: none"> • 12.5 Impact assessment – Operational phase only. Construction phase effects remain unchanged • 12.7 Summary
Chapter 13 Water environment	Chapter 13 Water environment – following sections only: <ul style="list-style-type: none"> • 13.6 Mitigation measures – operation only
Chapter 14 Ground conditions	Chapter 14 Ground conditions – following sections only <ul style="list-style-type: none"> • 14.5 Impact assessment • 14.6 Mitigation measures – construction phase only • 14.7 Summary
Chapter 15 Cumulative effects	Chapter 15 Cumulative effects – following sections only <ul style="list-style-type: none"> • 15.5 Impact assessment – Cumulative effects – Operational phase only • 15.7 Summary
Chapter 16 Schedule of mitigation	Chapter 16 Schedule of mitigation – Table 16.1 following rows only: <ul style="list-style-type: none"> • Historic environment • Landscape and visual • Traffic and transport • Ground conditions

1.4.2 Separate addenda have also been produced for ES Volume 1 Non-technical Summary and ES Volume 3 Appendices.

3. The Proposed Development

3.1 The vision

- 3.1.1 The University of Cambridge aspires to develop the Site into a high quality academic and research campus. The existing masterplan has led to individual plots being developed that do not provide the cohesive character required to optimise the Site or make it an attractive integrated part of the city.
- 3.1.2 The University of Cambridge has a vision for the Site that aspires to provide a high quality urban environment that is well integrated to the city centre and surrounding suburbs, as well as emerging developments such as the north west Cambridge development. The vision comprises five themes which collectively provide the purpose of the Proposed Development:
1. Optimise the amount of development on Site, supporting the city and region as a world leader in research and development.
 2. Support the commercialisation of knowledge through entrepreneurship and collaboration with industry.
 3. Create and sustain a high quality place by transforming the physical and social environment for Site users and neighbours across the city.
 4. Deliver adaptable and efficient space to support viability and long term value creation.
 5. Deliver sustainable development, proactively investing in the quality of place and integration within the city.

3.2 Role of the different documents

- 3.2.1 The Proposed Development is defined principally by the two separate documents listed below, both of which have been submitted for approval as part of the planning application:
- Parameter plans
 - Design guidelines
- 3.2.2 The parameter plans define the main principles of the Proposed Development and set the maximum and minimum extents for the different development parameters. The design guidelines define the style and form of the Proposed Development and specify detailed design measures that must be incorporated into the reserved matters applications to, amongst other things, ensure the specified environmental mitigation is incorporated into the design.

3.3 Parameter plans

- 3.3.1 The Proposed Development will support the delivery of the vision through a series of parameter plans, design guidelines and a broadly defined description. This will allow flexibility in the description of the development. This reflects a key aim of the Proposed Development, to build flexibility into the planning permission, so that the University can respond to changes in academic and commercial demand over the next twenty years or so, without needing to amend the outline planning permission or seek a fresh permission.

- 3.3.2 The parameters for the Proposed Development are described through five parameter plans and their accompanying statements. The plans are:

- Land use;
- Development zones;
- Building heights;
- Access and movement; and
- Open space and landscape.

Land use

- 3.3.3 Built development would comprise the three land use areas shown in Figure 3.1. The Proposed Development includes the existing land uses on the Site and does not seek to introduce new land uses. It does seek to amend the extent to which permitted land uses are present on the Site. The largest land use area comprises a mix of academic and commercial uses and includes the existing British Antarctic Survey, Schlumberger and Aveva plots as well as the existing Computer Laboratory, Roger Needham Building, CAPE Building and the Physics of Medicine and Maxwell Centre, all of which would be retained.
- 3.3.4 The mixed use zone comprises planning use classes A1-A5 (shops, financial and professional services, restaurants and cafes, drinking establishments, and hot food takeaways), B1b (commercial research / research institutes) and D1 (non-residential institutions). The mixed use zone includes the South Residences, North Residences and nursery, Hauser Forum and Broers Building, Institute for Manufacturing, Chemical Engineering / Biotech Building, Materials Science and Metallurgy Building and the Innes Building, all of which will be retained.
- 3.3.5 The smallest zone is for community uses and comprises land use planning classes D1 (non-residential institutions) and D2 (assembly and leisure). This zone includes the existing sports centre which will be retained.

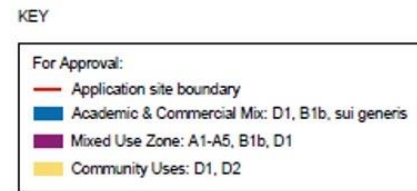


Figure 3.1 Proposed land use

Buildings

3.3.6 Maximum building heights are shown on Figure 3.2. The general building height across the Site will be four storeys for academic / commercial use. Building plant must be included within the height parameters set out on the plan but exhaust flues may extend above these heights.

3.3.7 The Proposed Development comprises four development zones as shown on Figure 3.3. Each development zone is made up of building zones which are the areas of the Site within which buildings can be located. The building zones exclude existing roads and open spaces which would be retained as part of the Proposed Development and proposed safeguarded access routes and open spaces. Table 3.1 shows the maximum developable floor spaces for each development zone and use class.

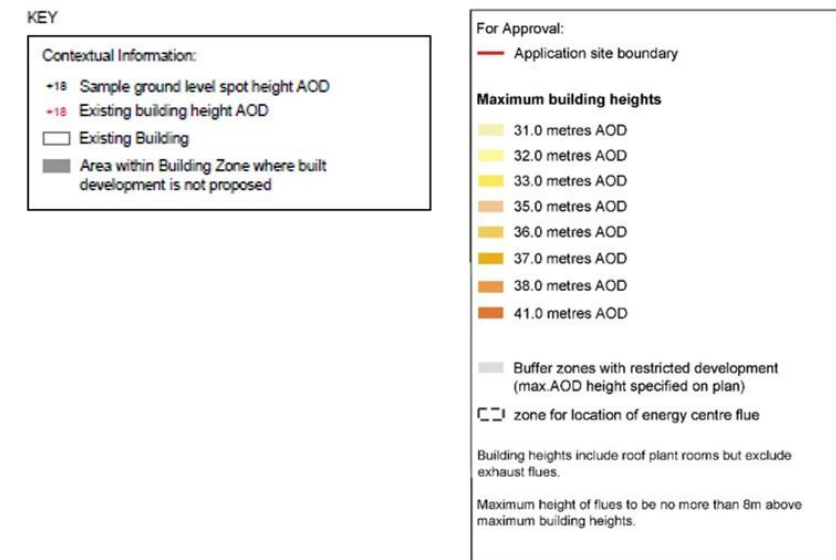


Figure 3.2 Maximum proposed building heights

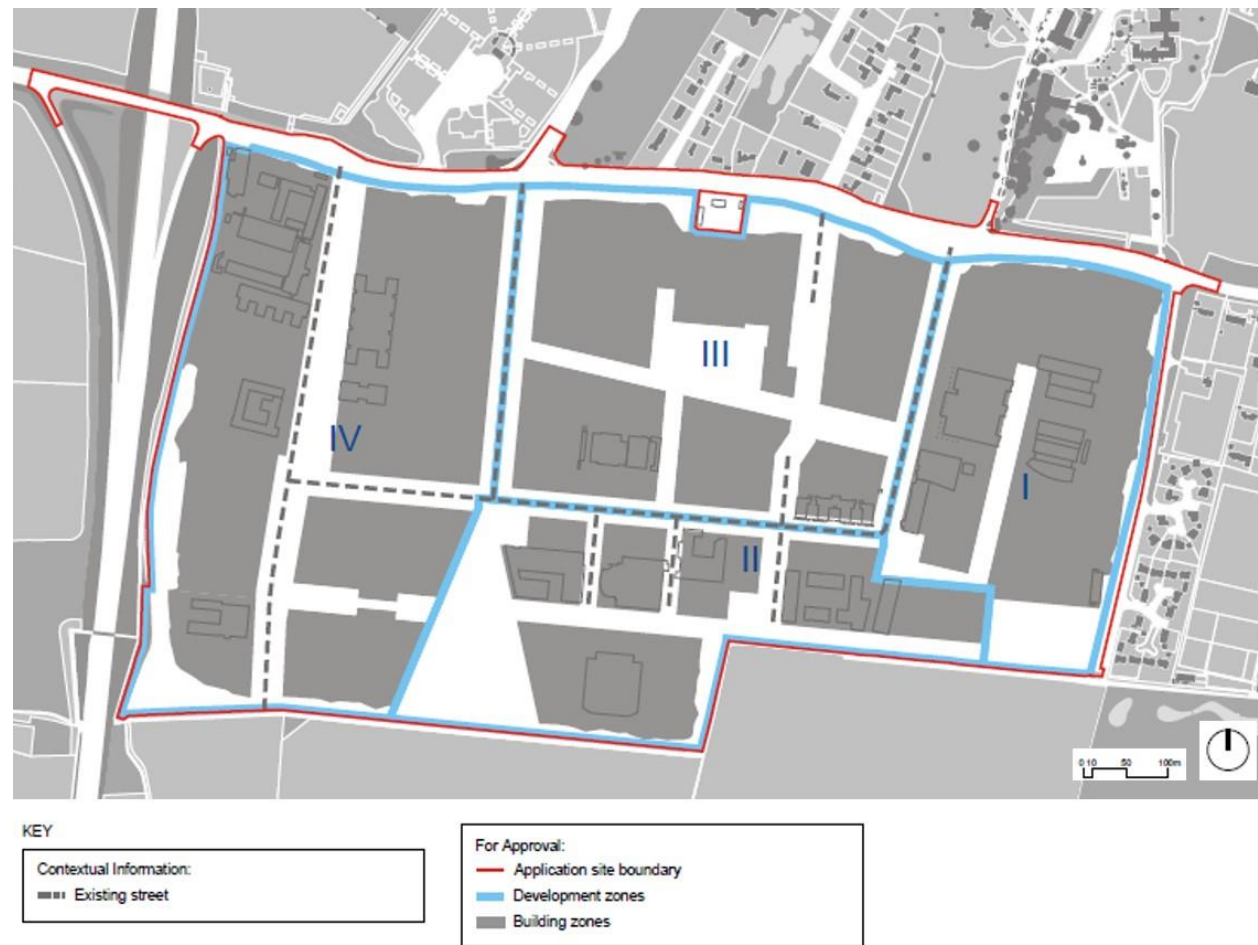


Figure 3.3 Development zones

Table 3.1 Maximum floorspace (m²) for each use class and development zone

Land use	Academic research	Nursery	Commercial research / research institutes	Shop, café, restaurant, public house	Assembly & leisure (sports)	Ancillary infrastructure (data centre, energy centre)	Total proposed floor space
Use Class	D1	D1	B1b / sui generis	A1 – A5	D2	Sui generis	
Building Zone I	Up to 77,000	Up to 1,500	Up to 21,900	Up to 500	0	0	Up to 77,000
Building Zone II	Up to 38,600	Up to 1,500	Up to 38,600	Up to 300	Up to 4,100	0	Up to 44,500
Building Zone III	Up to 178,400	Up to 1,500	Up to 51,700	Up to 200	0	Up to 2,000	Up to 182,100
Building Zone IV	Up to 104,000	Up to 1,500	Up to 104,000	Up to 500	0	Up to 4,500	Up to 110,500
Total proposed floorspace	Up to 370,000	Up to 2,500	Up to 170,000	Up to 1,000	Up to 4,100	Up to 5,700	Up to 383,300

All figures quoted are Gross Floor Area, m²

Access and movement

- 3.3.8 The access and movement strategy is summarised in Figure 3.4. Access to the main Site would be from the north off Madingley Road and to a 540 space multi storey car park from the northern end of Clerk Maxwell Road. The four main roads on Site (JJ Thompson Avenue, Charles Babbage Road, High Cross, and Western Access Road / Ada Lovelace Road) would all be retained and used as the principal means for vehicular access to and across the Site. Additional secondary roads would be constructed to increase vehicular connectivity across the Site. All existing and new vehicle routes and accesses would also allow for pedestrian and cycle movements.
- 3.3.9 A new pedestrian and cycle access point will be created off Madingley Road. The existing pedestrian and cycle access points along Clerk Maxwell Road will be maintained and will be the main arrival points for cyclists and pedestrians travelling from the city centre. The primary pedestrian and cycle routes through the Site include the existing pedestrian and cycle path running adjacent to the southern boundary (Coton footpath). This would be extended to continue across the Site to the western boundary. A second east-west pedestrian and cycle route would access the Site from the existing entrance approximately half way along Clerk Maxwell Road, continuing westwards across JJ Thompson Avenue and through a new open space corridor linking up with High Cross. A north-south route would extend from the West Forum and along High Cross where the route would continue northwards towards the north west Cambridge development. Additional secondary pedestrian and cycle routes would increase connectivity through the Site.
- 3.3.10 The flexible zones shown in Figure 3.4 illustrate where the proposed routes could go. They provide flexibility in detailed design for landscape and building setbacks which are not currently known but will dictate the precise location of the proposed routes. The flexible zones are not intended to suggest that the routes will not be provided as they are a committed element of the Proposed Development.

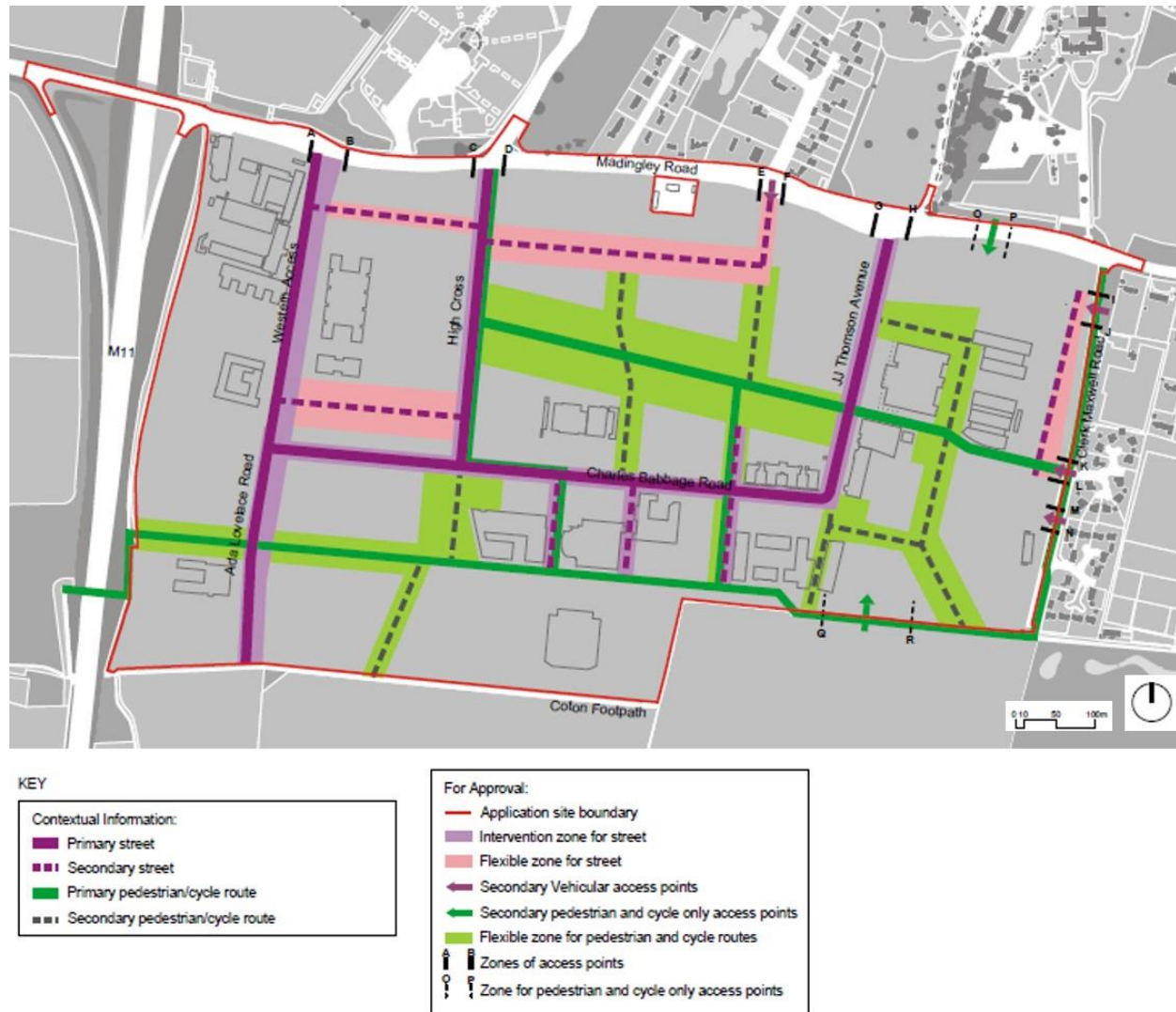


Figure 3.4 Access and movement strategy

Open space and landscape

- 3.3.11 A series of open spaces and corridors will cross the Site as shown in Figure 3.5. The open space network will provide a variety of uses including informal recreation and outdoor entertainment, landscaping, surface water drainage, nature conservation, and pedestrian and cycle routes.
- 3.3.12 Detailed design of the open space areas will be agreed through the submission of reserved matters applications pursuant to the outline planning application.
- 3.3.13 The flexible zones shown in Figure 3.5 illustrate where the proposed landscaping could go on the Site. They provide flexibility in detailed design for building setbacks and plot locations which are not currently known but will dictate the precise location of the landscaped areas. The flexible zones are not intended to suggest that the landscaped areas will not be provided as they are a committed element of the Proposed Development.

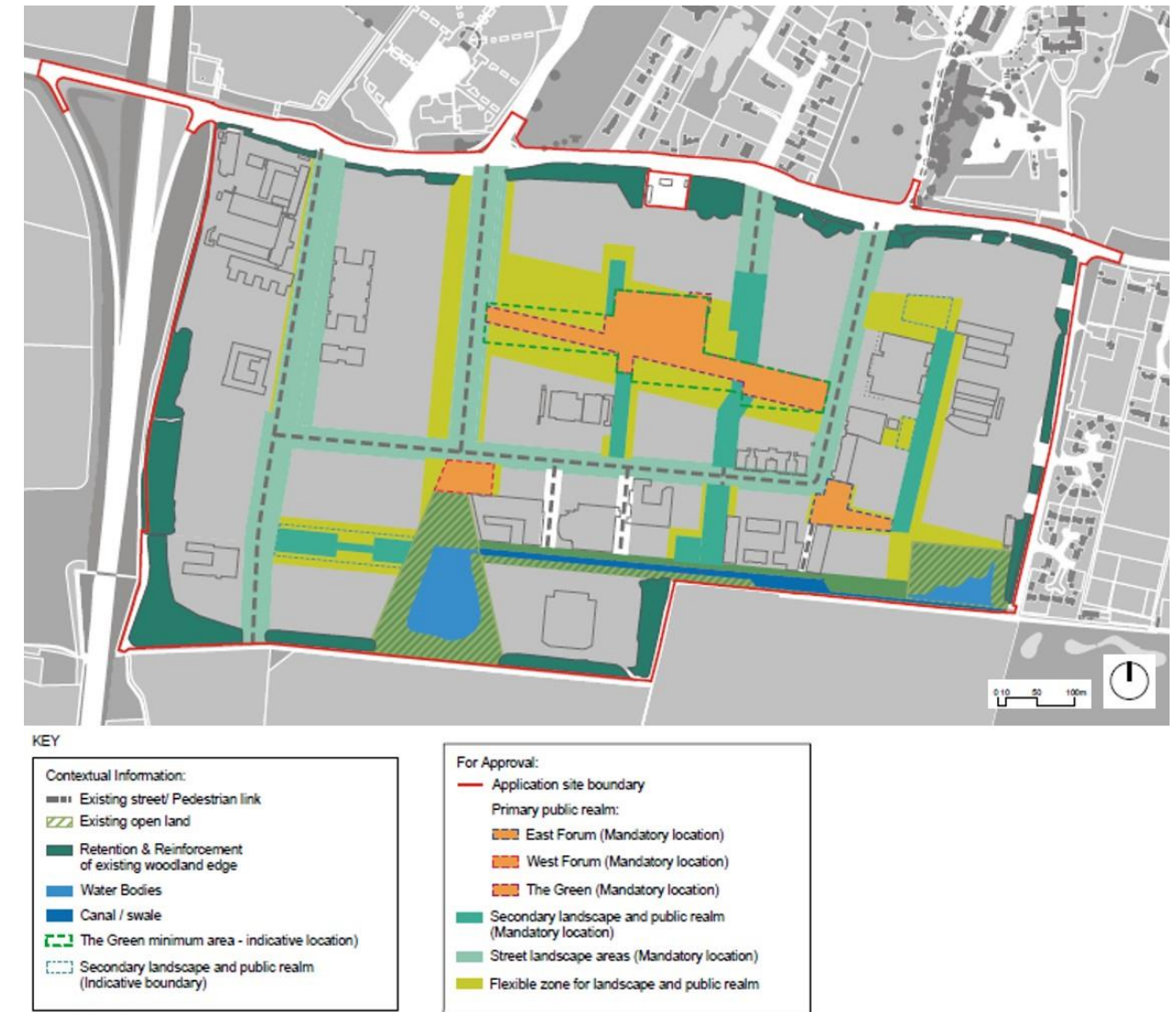


Figure 3.5 Open space and landscape strategy

Sustainability framework

- 3.3.14 A sustainability strategy has been produced for the Proposed Development which sets out an ambitious sustainable vision. Two of the key drivers for the masterplanning of the Site are major sustainability themes:
- To substantially improve the social realm and hence increase the well-being of those working and living on the Site;
 - To improve pedestrian and cycle access to the Site and to radically improve public transport provision which enables building on the existing car parks, densifying the Site and making it more attractive to cyclists and pedestrians.
- 3.3.15 A sustainability framework has been developed which is a key document for guiding the Proposed Development. The framework identifies 12 sustainability objectives which are grouped into four categories as shown in Table 3.2.

Table 3.2 Sustainability principles

Category	Sustainability principle
Resources and climate change	<ul style="list-style-type: none"> • Energy and climate change • Water • Materials • Waste
Transport and local connectivity	<ul style="list-style-type: none"> • Transport and mobility
Peoples health, social, and economic wellbeing	<ul style="list-style-type: none"> • Health and well being • Collaboration and inclusion • Education and knowledge transfer • Employment opportunities
Land use, ecology, and local impact	<ul style="list-style-type: none"> • Biodiversity and ecology • Pollution and local environment • Reputation, heritage and the city

3.3.16 Each of these sustainability principles has a series of aims and objectives which guide the development of the Proposed Development to ensure that the sustainability strategy is adhered to.

3.4 Design guidelines

3.4.1 In addition to the parameter plans the emerging Proposed Development will be controlled through the Design Guidelines. These are a set of design principles which form part of the planning application and are for approval. The guidelines seek to provide consistency in design across the whole Proposed Development.

3.4.2 The Design Guidelines set out several environmental mitigation measures that are ‘built-in’ to the Proposed Development and which will be secured through the planning permission. The Design Guidelines include measures that are mandatory and measures that are desirable but not compulsory. To ensure that the EIA considers a ‘worst case’ scenario only those measures which are mandatory have been assumed to be implemented. These have been divided into the following categories:

- Controls on building design,
- Controls on planting and retention of existing vegetation across the Site,
- Measures to increase biodiversity across the Site,
- Controls on plant and storage,
- Controls on artificial lighting,
- Controls to protect built heritage,

Controls on building design

- Existing north-south streets shall be further greened using development setbacks and landscaped areas formed alongside High Cross and Western Access/Ada Lovelace Road;
- The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m;

- The frontages longer than 50m shall employ at least one of the strategies described in Figure 24 of the Design Guidelines for breaking the long frontages. The choice of one or more of the strategies will depend on the location on the site: some strategies will be better suited for the site edges (for example using planting adjacent to woodland buffers) others will be required along streets or key spaces (for example varying roof lines and building lines);
- Lengths of unbroken frontages on multi storey car parks shall be limited to 50m;
- Frontage lengths of multi storey car parks longer than 50m shall be broken by introducing one or more of the strategies and/or other measures described in in Figure 25 of the Design Guidelines, which achieve the effect of introducing variety and breaking down the frontage length;
- Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials;
- The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents;
- Development along the Southern Edge shall respond to long distance views. Long frontages here shall be broken/varied and additional tree planting and landscape shall be introduced to provide a softer, woodland edge;
- The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m;
- Maximum build-to lines along High Cross Avenue shall be setback from the road corridor by at least 8m on the eastern side and by at least 5m on the western side of the street (thus, together with the road corridor of 25.3m, the width between buildings along High Cross shall be minimum 38.3m in the south and 44.8m minimum in the north);
- At the southern end of High Cross Avenue, an additional frontage height restriction of 33m AOD (to the west) and 35m AOD (to the east) shall be applied. Any development above these heights shall be set back by a minimum of 5m from the primary frontage line;
- Building Zones along JJ Thomson Avenue are set to allow for a 10m buffer between the stems of the existing trees and the proposed building faces (maximum Build to Line). This provides an additional zone of minimum 4m between the edge of the road corridor and the building faces on each side. Thus, together with the road corridor width of 25.3m, the width between buildings along JJ Thomson Avenue shall be minimum 33.3m;
- An additional frontage height restriction of 33m AOD shall apply along the Western Access Road and any development above this height shall be set back by a minimum of 5m from the predominant building frontage;
- Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD;
- At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within an envelope rising by 45° angle to the parameter height of 31m AOD;
- Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development;

- Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing;
- Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting;
- Treatment of façades shall be sensitive in scale and the use of materials;
- Materials for less visible façades shall be robust and designed to age well;
- Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site;
- Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location.

Controls on planting and retention of existing vegetation across the Site

- Mandatory Trees and Hedgerows shall be retained, their root protection area uncompromised and the appropriate buffer zone (as set out in the Arboriculture Impact Assessment Report, Appendix 8.1, Volume 3) shall be provided to building edge;
- Woodland infill planting at the site edges shall be native trees and shrubs and shall be in accordance with the Woodland Management Plan, Appendix 8.4, Volume 3;
- Selective Removals: The design of new access points and service routes will require the selective removal of trees. Selective removal shall be carefully considered and designers shall demonstrate a sympathetic approach to the layout of any development for minimal tree removal. Any tree removals shall be assessed on an individual basis and addressed during reserved matters applications;
- Avenue trees to High Cross, Charles Babbage Road, JJ Thomson Avenue and Western Access / Ada Lovelace are mandatory to be retained but shall require selective removals to facilitate access to the plots or replace trees in ill health. Street tree removals shall be assessed on an individual basis and addressed during reserved matters applications and where trees are removed due to ill health planting conditions shall be improved before new planting is introduced;
- Planting at the West Forum shall reinforce the visual connection from the upper areas to the wider landscape and the Southern Ecological Corridor;
- Existing mature planting and hedgerows within the East Pond area and along the Southern edge shall be maintained with the appropriate tree buffer zone. New tree planting shall be accommodated within the East Pond space (to the north of the pond) to ensure that new development is set within landscape;
- Large feature tree planting shall be provided at a minimum of 5 key locations within The Green public open space area, such as at the gateways to The Green or key nodes within the space. Where large trees are planted, they shall be given the proper environmental conditions and space to grow to maturity;
- Large feature tree planting shall be provided at a minimum of 5 key locations along the Southern edge. Where these trees are planted, they shall be given the proper environmental conditions and space to grow to maturity and shall be provided with a 15m buffer, in accordance with the Woodland Management Plan (Appendix 8.4, Volume 3);

- Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside. Long views from the West Forum and Green Links to the southern countryside should be carefully crafted;
- Large feature tree planting shall be incorporated at key locations along High Cross, such as: the gateway to Madingley Road and the interface with The Green. Large tree species must be given the proper environmental conditions and space to grow to maturity;
- Large feature tree planting shall be incorporated at key spaces along JJ Thompson Avenue such as the gateway to Madingley Road and the interface with The Green. Large tree species shall be given the proper environmental conditions and space to grow to maturity;
- The Design Guidelines shall be read in conjunction with the Arboriculture Impact Assessment (Appendix 8.1, Volume 3) and the Woodland Management Plan (Appendix 8.4, Volume 3) and the recommendations shall be implemented;
- The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3);
- Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge.

Measures to increase biodiversity across the Site

- In appropriate locations, the public realm design shall include facilities and/or measures which allow site occupants to engage with biodiversity and ecology. These facilities may include signage and displays; educational measures and features; community gardens; rooftop gardens; and/or water features;
- Any new planting along the Southern Ecological Corridor shall be indigenous;
- To the water body edges, marginal planting shall be provided to create a natural look, increase biodiversity and provide a range of appropriate habitats. This planting shall be appropriate to the soil and environmental conditions at the water edges;
- The hedgerow alongside the Schlumberger Research Building shall be retained and, where needed, reinforced with a variety of species to create a continuous, bio-diverse hedge;
- Any new landscaped gaps between buildings along the western edge shall be a minimum of 20m from building face to building face.

Controls on plant and storage

- Rooftop plant areas shall be within the height parameters set in the height parameter plan (Figure 2.2 above);
- The impact of plant (and rooftop plant in particular) on building design and on open spaces shall be carefully considered from the concept stage of design;
- Wherever possible, plant shall be placed on roofs in locations where it will not be visible from the public realm;
- Any plant required to be provided as a separate structure shall not be located next to or within the key open spaces;

- Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter;
- Long distance views shall be considered in the location of plant;
- Plant should be considered as a way to add variation and interest in the roofscape;
- Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials;
- Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines;
- Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment;
- If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that do not overwhelm key open spaces;
- Consideration shall be made so that rooftop plant spaces do not dominate the views from within the Southern Ecological Corridor: plant shall be set back, screened, treated as part of the facade or otherwise carefully treated to minimise visual impact;
- Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed;
- Rooftop plant shall not be located within the 32m AOD zone along Madingley Road;
- Any rooftop plant within 20m of the Southern edge of the woodland buffer shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road;
- Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road;
- Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south;

- Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened.

Controls on artificial lighting

- Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone;
- An artificial lighting scheme shall be submitted with each reserved matters application.

Controls to protect built heritage:

- The Listed Schlumberger Research building shall remain the primary landmark for the site. New development and spaces shall work together to define a new and appropriate setting for this building;
- A view corridor with a minimum 20m width will be preserved between JJ Thomson Avenue and High Cross to protect views through the Site of the Schlumberger Research Building;
- On the west side of High Cross, the Listed Schlumberger Research building shall remain visible as a key site landmark;
- In the central part of High Cross Avenue, a zone of lower development height shall be established to maintain the views of the Schlumberger Research building roof structure. The exact positioning of this lower zone shall be such to allow views of the roof-line (tent structure) from The Green;
- External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings;

Trees to be retained

- 3.4.3 The Design Guidelines specify several trees that are key to the landscape of the Site due to their age, condition, or prominence and must be retained. These are shown on Figure 3.6. The Arboricultural Impact Assessment in Volume 3 Appendices details the individual trees which will be retained.

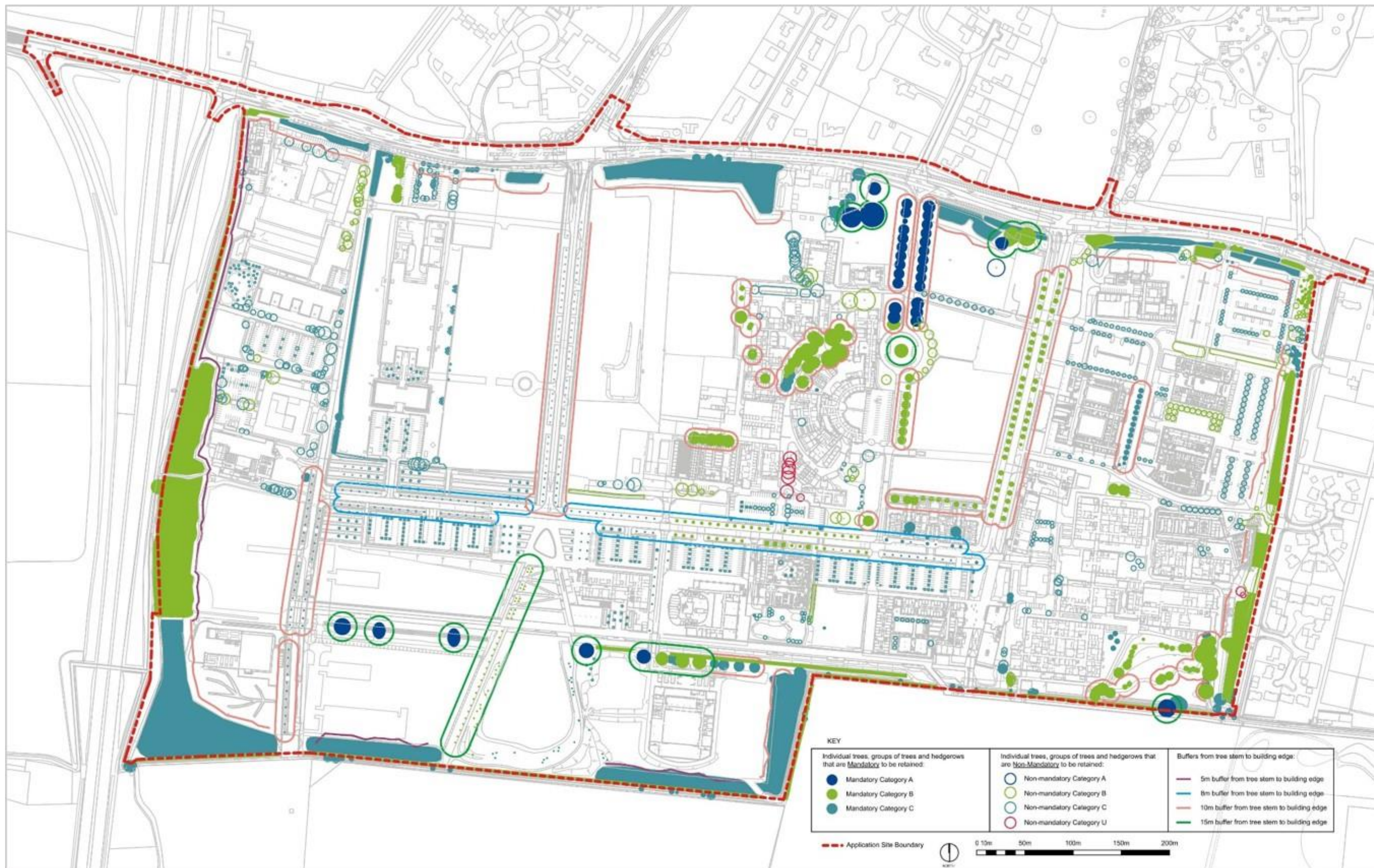


Figure 3.6 Trees to be retained

3.5 Woodland Management Plan

3.5.1 In addition to the Design Guidelines, there is a Woodland Management Plan (Volume 3, Appendices) which details management measures to promote the woodland buffers on the boundaries of the Site. The general principles are to manage the woodland buffers to promote screening and limit visibility into the site where there are near views, such as along Madingley Road, and promote legacy trees in areas where long distance views are more sensitive such as along the southern boundary.

3.6 Energy strategy

3.6.1 The energy strategy has been updated to allow for greater flexibility. The energy strategy is now based on a hierarchical approach with the preferential solution to be a site-wide heat and power network. If this is not possible the next preferential solution is to adopt a cluster approach where buildings are grouped together and smaller heat and power networks are established within the clusters. If this not possible then the next favourable solution is to adopt a building by building approach where each building generates its own heat and power requirements.

3.6.2 The site wide solution remains as put forward in the planning application in 2016, with the buildings linked together via a heat network and a single large energy centre proposed to deliver most of the heat to the Site. This would be served by gas CHP in the short to medium term, but with the option to replace this with another technology at a later date when this becomes preferable. These solutions could include ground or air source heat pumps.

3.6.3 The cluster or precinct solution recognises the benefit of linking several buildings together. These apply particularly where they are close together and ideally having differences in their requirements for heat and cooling that may enable further efficiency savings. There could be options to serve these clusters either with gas CHP or heat pumps supplemented with gas fired boilers.

3.6.4 The individual building approach may make sense for some particular buildings which are further away from others and have very low energy demands. This may mean that the benefits of linking them to others would not be sufficient to overcome the cost of the physical link between them. Individual buildings could utilise either ground or air source heat pumps, or gas fired boilers depending on demand and other conditions.

CHP energy centre

3.6.5 The Site wide solution with a central Combined Heat and Power (CHP) energy centre is the same as the energy strategy proposed in the 2016 planning application. This will comprise a gas fired combined heat and power plant with heat storage capacity. The proposed location for the energy centre is shown on the building heights parameter plan by reference to the potential location of the energy centre flue (Figure 2.2).

3.6.6 The Energy Centre has not yet been designed, so several assumptions based on similar developments elsewhere have been used for the purposes of the EIA. This enables the air quality and noise and vibration assessments to determine the likely effects and any mitigation that may be required. The assumptions for the Energy Centre are as follows:

- The energy centre will have 3 CHP engines together with gas fired boilers to provide supplementary heat and to cover peak demand when the CHP is unavailable.
 - Illustrative CHP plant – 3 no. 2.6 MW Jenbacher Type 6.

- Illustrative boiler plant – 3 no. 10MW and 1 no. 5MW Cochran Thermax.

- The CHP will operate for up to 17 hours per day.
- Two operational modes as follows:
 - Mode 1 – 34MW boiler capacity, no CHP capacity to represent a situation of peak winter demand with all CHP engines being off line.
 - Mode 2 – 7.8MWth CHP capacity (all three engines) and 26.2 MW boiler capacity to represent a peak winter demand with all engines operating.
- Total operating capacity will be kept below the 50MW thermal input threshold for Pollution Prevention Control (PPC) permitting.

Air source heat pumps

3.6.7 Air source heat pumps are roof top plant that extract heat from the surrounding air. The system requires a large amount of roof space to achieve sufficient heat exchange and have fans which can be noisy. For the purposes of the EIA the following specifications have been assumed for the purposes of noise impact assessment:

- One air source heat pump has been assumed on top of each building which is located within 500m of the receptors.
- For the purposes of the assessment it has been assumed that Güntner Axial drycoolers 067B/2X4 will be used. Page 6 of the data sheet specifies a sound pressure level of 55dB at 10m. This is the worst case noise level from the plant options and the final design may differ.
- It has been assumed that there will be no noise shielding of the air source heat pumps which will be located on the edge of the roof.

Ground source heat pumps

3.6.8 There are two types of ground source heat pump which will be considered in the energy strategy:

- Open loop system
- Closed loop system

3.6.9 The open loop system comprises a borehole drilled down to reach a large body of water (aquifer). Water is then pumped up to the surface and used to warm the cold side of the heat pump. The cooled water is then re-injected into the ground through a second borehole at sufficient distance from the first to avoid a 'short-circuit' with the same water being made colder and colder.

3.6.10 The closed loop system comprises several boreholes drilled to depth and pipes inserted. A fluid is passed through these to extract warmth from the ground, and this fluid is used to warm the cold side of the heat pump.

3.6.11 In contrast to the air source heat pump there is in general no requirement to use space on the roof for heat exchange and the plant can be located wherever is most appropriate. There must be a connection to the boreholes (known as the ground loop), but this can all be hidden below ground.

3.7 Surface water drainage

- 3.7.1 The topography of the Site falls from the ridgeline that runs east-west through the Site. Surface water to the north of the ridgeline is directed to Madingley Road and south of the ridgeline to the ecological corridor. The existing drainage network will be used as far as possible to minimise the need to construct new infrastructure.
- 3.7.2 Post submission discussions with officers identified concerns from the Local Lead Flood Authority regarding the potential effect of development on water quality. These discussions evolved around the effectiveness of the proposed SuDs measures to treat post development run off. The original FRA and Drainage Strategy proposed the use of bio retention zones for treatment of highway run off. Lakes and Ponds were to incorporate fore bays.
- 3.7.3 Discussions with the Local Planning Authority on proposed public realm treatments and landscaping resulted in modified landscaping proposals being submitted. As part of this exercise, it was considered that the extent of bio retention zones could be rationalised. The construction of fore bays to the Western Lake and Payne's pond were also reviewed as they could impact upon ecology of the Western Lake, Canal and Payne's pond.
- 3.7.4 A Technical Note was prepared which assessed the likely pollution risks from development. Where car parks are proposed, the existing SuDs measures will be supplemented by the use of proprietary systems such as Class 1 Oil by pass separators. Using the Simple Index approach set out in CIRIA C 753 The SuDs Manual it was demonstrated that the use of linked SuDs features in series, as proposed, would enable post development flows to be treated and provide the required levels of pollution mitigation without the need for sediment fore bays.
- 3.7.5 A site-wide SuDs drainage strategy will be developed which integrates with existing infrastructure. It is intended to incorporate rain gardens as part of the integrated street-scape drainage and landscape strategy, wherever this is possible given the existing trees and underground service constraints. Where SuDs can be provided, water will be integral to the landscape design and provide amenity and bio-diversity benefits.
- 3.7.6 The following are the mandatory guidelines for the site wide SuDs approach:
- Site-wide SuDs infrastructure shall be incorporated in the external space in a manner which helps inform and educate occupants and visitors;
 - Road side rain gardens shall be a minimum of 1.5m wide and 6m in length;
 - Detailed designs for rain gardens shall be considered in the general locations shown in Section 03 of the Design Guidelines and shall be brought forward unless it is demonstrated that this is not technically possible or cost effective;
 - Rain garden features shall be considered on a plot by plot basis for bio-retention and brought forward during detail design;
 - Individual SuDs strategies for each reserved matters application shall be carried out for the benefit of water quality, biodiversity and the landscape provision. The strategies held within individual plots shall integrate with the site wide SuDs strategy;
 - Engineered soils (gravel & sand layers) and enhanced vegetation shall be considered to improve treatment performance;

- Rain garden features shall be planted with a variety species appropriate for the conditions and the expected saturation level. Species shall be robust, drought tolerant, salt tolerant and preferably native grasses. Grasses with a soil-binding root structure shall be favoured along the bottom of the rain garden for their ability to aid in the filtration of pollutants and stabilize soils;
- Site wide infrastructure shall meet best practice guidance such as the Ciria SuDs Manual (C753).

3.8 Construction phase

- 3.8.1 Construction of the Proposed Development will occur in phases, which will be determined at a later stage depending on demand. Due to the long time frame that the Proposed Development will be developed over, a contractor has not yet been appointed. As each phase is developed a contractor will be commissioned and they will devise the relevant construction plan.

Construction activities

- 3.8.2 As no contractor has been commissioned yet the list of construction activities below is based on experience of the types of construction activities that would occur on any large construction site for this type of development. This is not an exhaustive description of all the construction activities that could occur but is sufficient to provide the assumptions for the impact assessments:
- Enabling works including Site clearance, establishment of a construction compound and worksites;
 - Building demolition;
 - Contaminated land remediation (if required);
 - Earthworks to obtain the desired ground level (these are likely to be minimal);
 - Excavation for foundations, services, basements etc;
 - Import of construction materials, plant, and workers;
 - Stockpiling and storage of construction materials and plant including fuels and chemicals;
 - Concrete batching;
 - Installation of new services;
 - Erection of new structures and buildings;
 - Piling for some structures and building foundations;
 - Export of construction waste; and
 - Landscaping including planting of soft landscaped areas and areas for ecological mitigation.
- 3.8.3 The Proposed Development will be constructed in phases likely to be over a 14 year period. The assumed opening date for all construction to be complete and the Proposed Development to be fully built out is 2031.

Building demolition

3.8.4 Many of the aging buildings on the Site do not contribute to the emerging masterplan. These buildings will require demolition to release the land for more appropriate and denser development of contemporary buildings that are constructed to modern standards. The buildings scheduled for demolition are listed below and shown on Figure 3.7:

- Cavendish Laboratory complex;
- Whittle Laboratory buildings;
- Department for Veterinary Medicine complex;
- University stores; and
- Merton Hall Farmhouse.

3.8.5 All other existing buildings on Site will be retained and integrated into the Proposed Development.

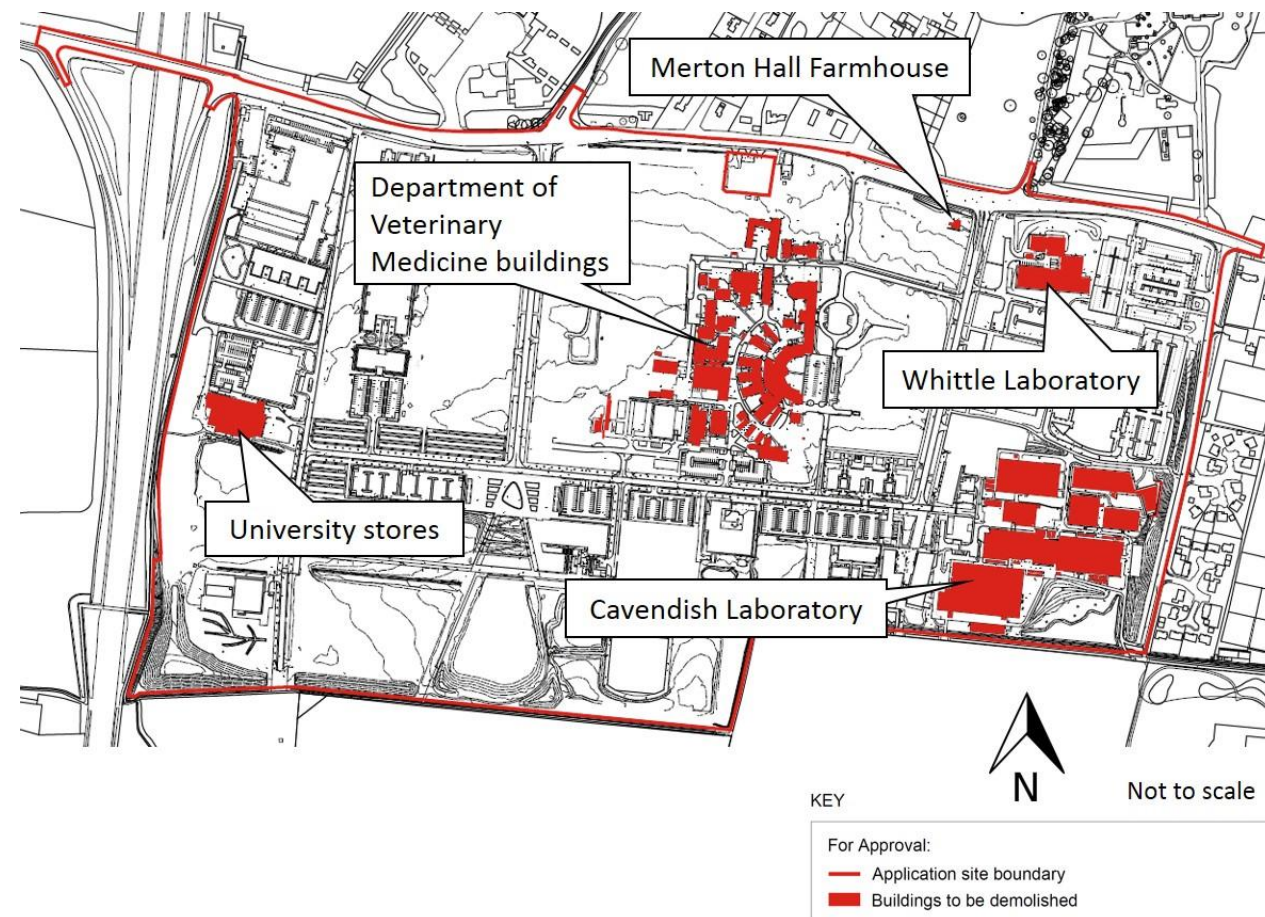


Figure 3.7 Buildings scheduled for demolition

Phasing

3.8.6 Because the Proposed Development will be built out over a 14 year period, depending on market demand, a phasing plan is currently not available. For the purposes of the transport, air quality, and noise and vibration assessments in this ES it has been assumed that the first phase will comprise several priority projects comprising the ground floor areas shown in Table 3.3.

Table 3.3 New and existing ground floor area for the first phase of the Proposed Development

Proposed land use	Ground floor area (m ²)
Academic Research (m ²)	168,259 (+ 66,000)
Commercial Research and Research Institute (m ²)	92,386 (+52,000)
Nursery (m ²)	1,900
Shop, Café Restaurant, Pub - A1-A5 (m ²)	350
Assembly and Leisure	6,060
Residential (m ²)	10,680
Ancillary Infrastructure (data centre, energy centre)	7,675 (+ 3,160)
Total (m ²)	287,310
Car Parking (spaces)	2,571

Construction Environment Management Plan (CEMP)

3.8.7 A Construction Environmental Management Plan (CEMP) has been submitted in support of the outline planning application. This sets out how mitigation measures for the construction phase identified in the ES. When a contractor is appointed for the first development on site a detailed CEMP will be prepared to cover that development. Additional CEMPs will follow for later detailed proposals and will include as a minimum:

- Site wide construction and phasing programme;
- Access arrangements for construction vehicles, plant and personnel;
- Construction hours;
- Construction delivery times;
- Soil management strategy;
- Noise and vibration monitoring requirements;
- Maximum noise levels for construction vehicles, plant and equipment;
- Maximum vibration levels;
- Dust management strategy;
- Site lighting details;
- Drainage control measures;
- Screening and hoarding details;
- Access and protection arrangements around the site for pedestrians, cyclists and road users;
- Procedures for interference with public highways including public rights of way;
- External safety and information signing and notices;
- Liaison, consultation and publicity arrangements;

- Consideration of sensitive receptors;
- Prior notice and agreement procedures for works outside agreed limits;
- Complaints procedure; and
- Location of compound and method of moving materials, plant and equipment around the site.

3.8.8 As part of the outline planning application, a Site Waste Management Plan (SWMP) has been submitted. The SWMP sets out the framework for the management of construction waste using indicative volumes and types of waste arisings calculated from the parameter plans. At the reserved matters stage, subsequent applications will be accompanied by a Detailed Waste Management and Minimisation Plan (DWMMP) for the construction phase. The DWMMP will include as a minimum:

- Construction waste infrastructure to be used on Site during construction;
- Measures and protocols to ensure effective segregation of waste at source;
- Any other steps to ensure the minimisation of waste during construction;
- Location and timing of on Site waste facilities;
- Proposed monitoring and timing of monitoring report submissions;
- Proposed timing of the submission of a Waste Management Closure Report;
- Recycling in Cambridgeshire and Peterborough (RECAP) Waste Design Guide 2012 toolkit completed with supporting reference material; and
- Proposals for the management of municipal waste generated during the occupation phase of the Proposed Development.

4. Alternatives

4.1 Submitted Proposed Development

- 4.1.1 The submitted ES included several alternatives which were considered throughout the design process. Now that the parameter plans and Design Guidelines have been updated, the submitted Proposed Development should now be considered an alternative.
- 4.1.2 A full description of the submitted Proposed Development can be found in Chapter 3 of the submitted ES and a summary of the main differences to the amended Proposed Development is provided in Section 1.2 of this document.
- 4.1.3 The key reason for discounting the submitted Proposed Development was the potential impacts to the landscape and visual receptors and the historic environment. The amended Proposed Development has been updated specifically to address these concerns by reducing the maximum height and massing that could be achieved on the Site and strengthening the woodland boundaries to provide better screening through a specific Woodland Management Plan (see Volume 3, appendices).

4.2 Alternative height parameter plan

- 4.2.1 Following the submission of the planning application the first amended height parameter plan (Figure 4.1) showed a general reduction in heights, the removal of the taller built elements, increased margins at the Site boundaries, increased north-south corridor widths, and a further reduction in height to building zones adjacent to the Site boundaries. This proposal was presented to Cambridge City Council officers and the Historic England case officer for discussion. Concerns were raised about the impact of the heights of the building zones immediately adjacent to the recently Grade II* listed Schlumberger Gould Research Centre, where it was stated that building heights on the Schlumberger plot should not exceed the height of the fabric element of the existing Schlumberger Gould Research Centre, which is 36.5m AOD. The Proposed Development has reduced the height of the entire building zone to 36m AOD to minimise the impact on the setting of the Schlumberger Gould Research Centre. Subsequent comments raised concerns about the impact on the setting of the Conservation Area. In response to these concerns, the heights of the buildings opposite the Conservation Area were reduced and stepped towards the centre of the Site to minimise the impact on the Conservation Area setting,

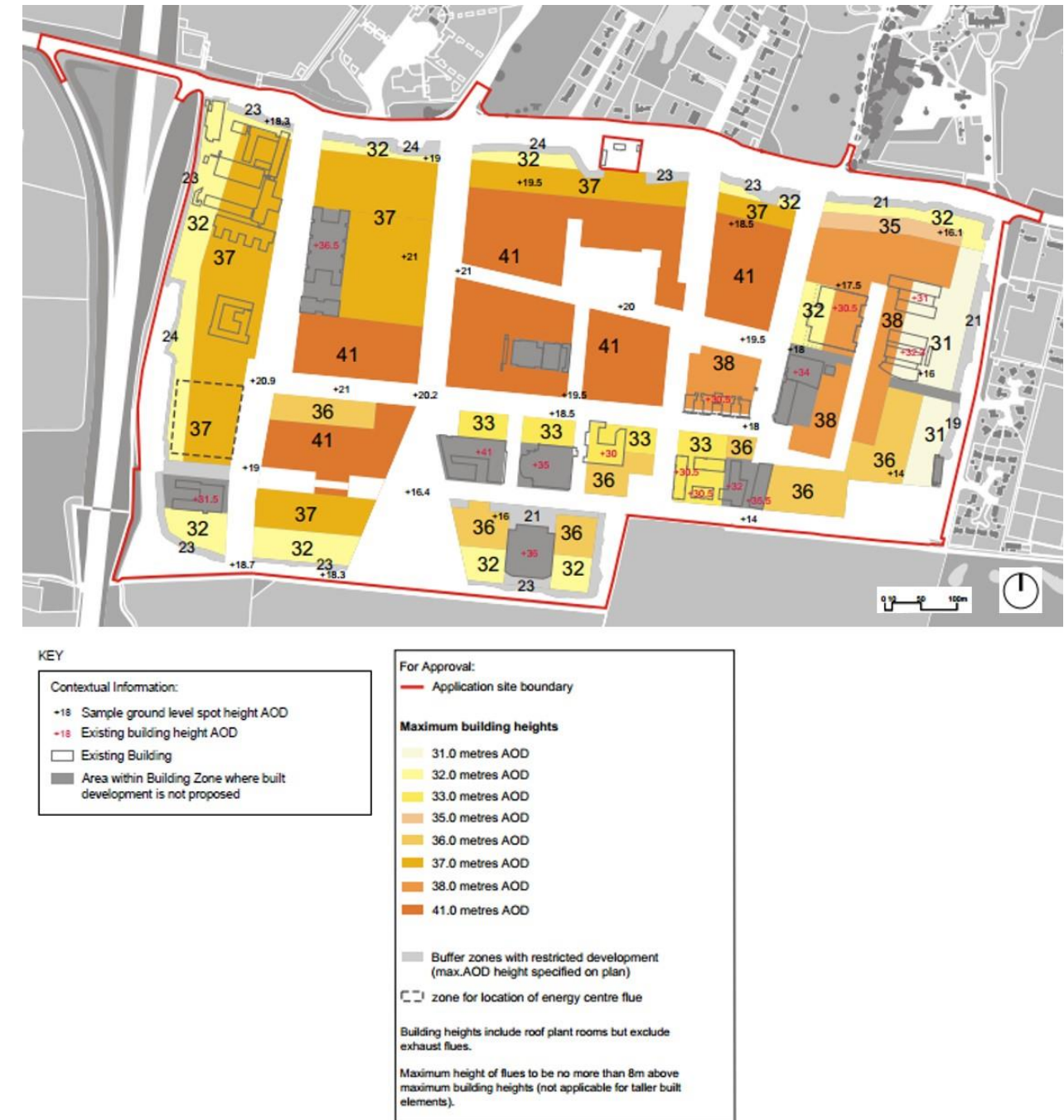


Figure 4.1 Initial amended height parameter plan considered after submission of the planning application and subsequently amended to respond to the listing of the Schlumberger Gould Research Centre

7. Historic environment

7.1 Introduction

7.1.1 This chapter provides an update to the Historic environment assessment that sets out the changes from the submitted ES that have resulted from the listing of the Schlumberger Gould Research Centre (at grade II*) and the amendment of the Proposed Development in response to comments from consultees, including Historic England and Cambridge City Council and comments received from the County Archaeologist. The aim of the amendments of the Proposed Development has been to reduce the massing of the proposed buildings and better respond to the setting of the Schlumberger Gould Research Centre. The following sections remain unchanged from the submitted ES and have not been replicated within this document.

- Scope of assessment;
- Relevant legislation and policy;
- Method of assessment.

7.1.2 A new section has been added summarizing the recent key design changes to the Proposed Development, in relation to the historic environment.

7.1.3 The baseline conditions section is amended by the addition of more detail concerning some heritage assets where it is considered that this is necessary to provide a clearer analysis of their settings and significance. Only the altered baseline descriptions for those particular heritage assets have been included in this Addendum.

7.1.4 Those heritage assets for which amended baseline descriptions are included here are:

- White House;
- The Observatory & Northumberland Dome at the Observatory;
- Conduit Head Road Conservation Area;
- West Cambridge Conservation Area and its constituent listed buildings;
- The Schlumberger Gould Research Centre;
- Merton Hall Farmhouse.

7.1.5 The following sections have been updated below to reflect the listing of the Schlumberger Gould Research Centre, further research into its significance and the amendments to the Proposed Development, that have been introduced to reduce the massing of the proposals and safeguard the settings of the heritage assets, and due to comments received from the County Archaeologist:

- Impact assessment;
- Mitigation measures;
- Summary.

7.2 Recent changes to the Proposed Development

7.2.1 In response to consultation comments, including those provided by Historic England in a letter of 12th August 2016 and discussions at a meeting with on 9th May 2017, there has been some revision to the Proposed Development as set out in Chapter 2.

7.2.2 The revisions relating to the historic environment assessment include:

- Maximum heights, especially around the peripheral blocks, have been reduced;
- There are no longer 8m high taller built elements proposed that rise above the general building heights;
- Central roadways and open space have been refined to maintain and provide long views of the Schlumberger Gould Research Centre from the west;
- Blocks adjacent to the Schlumberger Gould Research Centre have been reduced in height to ensure that the Schlumberger Gould Research Centre is taller.

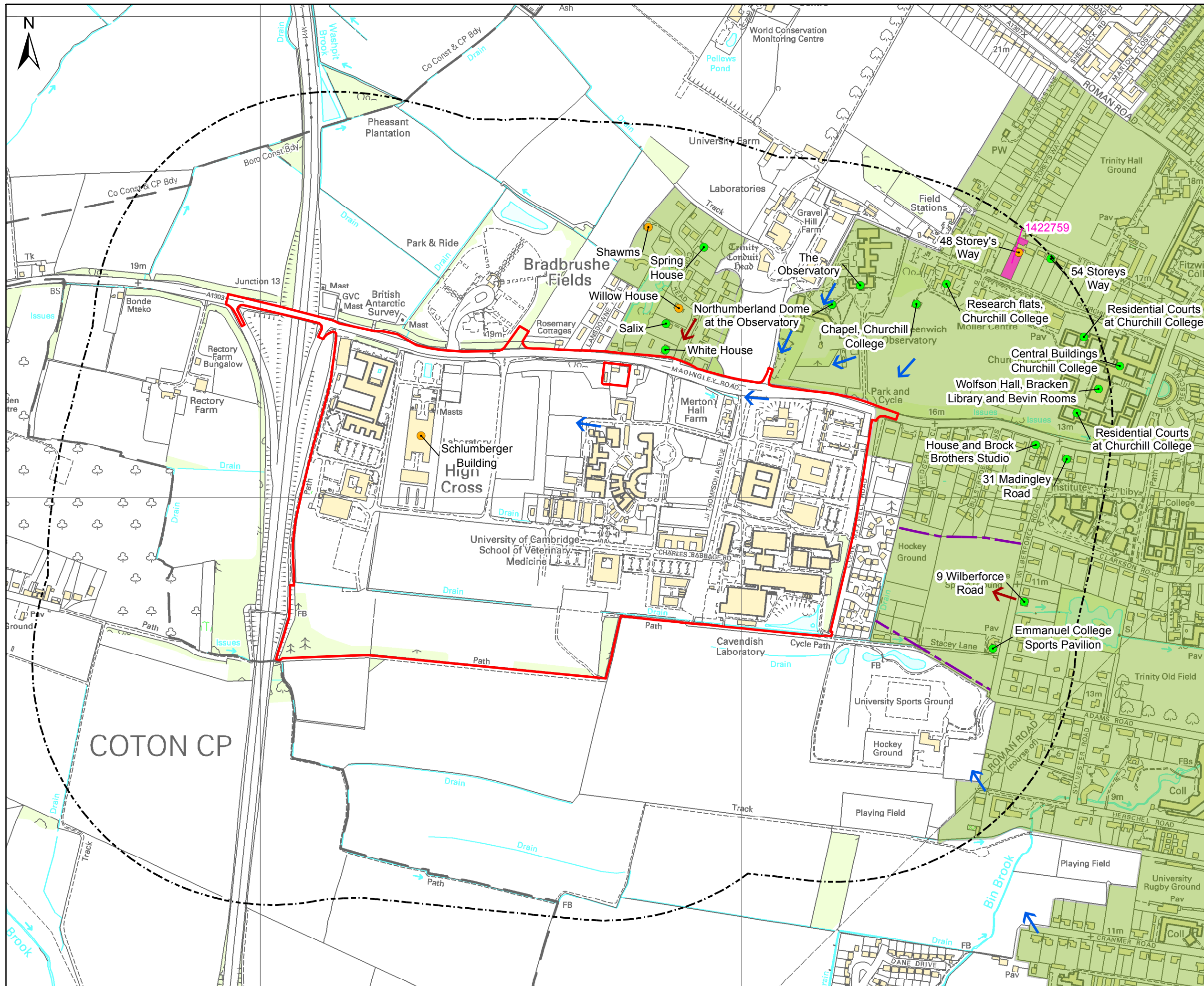
7.2.3 There is no proposed development block on the site that has more storeys than buildings that are already on the site.

7.3 Amended baseline conditions

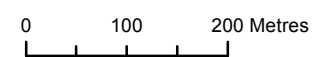
7.3.1 Updated descriptions of the significance and setting of the heritage assets listed in Section 7.1 are set out below. Figure 7.1 (Figure 7.2 in the submitted ES) has been amended to show the additional analysis with regards to views and settings associated with the built heritage assets.

White House

7.3.2 The White House is a grade II listed two storey house with a third storey set back at the centre of a roof terrace, built in 1930 by George Checkley in the International Modern style. The house has a rectangular plan with central entrance hall. The facades are white painted brick and the roof is flat concrete. It is the southernmost building in Conduit Head Road Conservation Area. It is visible and accessed from its drive gate on Conduit Head Road. The property boundary is heavily screened to the south and south east by an evergreen tree screen and dense hedges. This screening contains the landscaped gardens that are hidden from view from Madingley Road to the south and are mostly screened from Conduit Head Road to the east. The roadway in front of the house and the suburban character of Conduit Head Road also form part of the setting of the White House and make a moderate contribution to its significance. The proposed development site is visible from the roadway of Conduit Head Road, in front of the White House's gates behind a tree screen that partly closes the views southwards. Figure 7.2 shows the heavy screening from Madingley Road.



- Site boundary
 - 500m Built Heritage Study
 - ➔ Key Views Discussed
 - ➔ Views Discussed
 - Boundary Road Views from Wilberforce Road
- Listed Buildings**
- Grade II*
 - Grade II
 - Registered Park & Garden
 - Conservation



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Client
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Project
West Cambridge Masterplan EIA

Title
**Built Heritage Assets
Figure 4.2**

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:7,500	SD	HM	DP
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Figure 7.2 Close up view towards White House from the north edge of Madingley Road's north carriageway showing the density of the planting in Winter

The Observatory & Northumberland Dome at the Observatory

7.3.3 The Observatory and the Northumberland Dome are both grade II listed. The Observatory was commenced in 1822 by the architect John Clement Mead. The Neo-Greek style, two storey building is ashlar stone faced and has slate and lead roofs. Built on a half H shaped plan, with wings extending northwards, it has a southern projecting central tetrastyle Doric entrance portico. It has a small movable dome located in the centre of the building. The slightly later Northumberland Dome was constructed around 1838 and is faced in white brick with a movable copper dome and has since been reconstructed. It is located in the grounds of the Observatory. Both buildings are heavily screened from the Proposed Development site by tree plantations. Beyond the screening, along the western side of the Observatory site there are modern research buildings. This area plays no visual role in the settings of the listed buildings. Although there are views from the western part of the site towards the Proposed Development these, make no contribution to the listed buildings' significance. The main drive from the Observatory's central portico to Madingley Road is narrow and orientated north-north west to south-south-east, effectively aligned so that constricted views are away from the Proposed Development to its north-east corner. Figure 7.3 shows the tree view towards the Proposed Development from the area of modern research buildings along the west edge of the Observatory site. Figure 7.4 shows one of the tree screens south west of the Northumberland Dome. Figure 7.5 shows the view along the driveway from The Observatory, towards the Proposed Development.



Figure 7.3 View towards the proposed development site from the modern western edge of the Observatory site



Figure 7.4 Part of the heavy conifer tree screening south west of the Northumberland Dome (winter)



Figure 7.5 View looking SSE along the Observatory's access drive, near its junction with Madingley Road.

Conduit Head Road Conservation Area

7.3.4 The Conservation Area comprises 20th century suburban residential development, built in a piecemeal fashion from approximately 1914. Its significant elements lie to the west of the main straight, southern part of Conduit Head Road, that extends north from Madingley Road. The western part of the Conservation Area contains all of its five listed buildings. Of particular interest are the Modernist, White House, Salix House and Willow House, all set within their private grounds, which are generally bounded by thick vegetation, including the 'Wilderness', an area of dense tree growth to the west of these houses. The area to the east of the main straight, southern part of Conduit Head Road is included in the Conservation Area. However, its buildings are of no architectural or historic interest (dating to the 1990s), and they appear to contribute to the character and appearance of the Conservation Area only in as far as they preserve the suburban nature of Conduit Head Road adjacent to three of its five listed buildings.

7.3.5 The area outside of the Conservation Area to the south and east of these 1990s buildings therefore plays little to no part in the significance and therefore the setting of the Conservation Area, other than providing a suburban buffer of domestic scale houses to the core of the Conservation Area. The fields to the north and west of the Conservation Area contribute strongly to its setting and the field to the east of the 1990s buildings protects the buffering effect of those buildings where there are limited views eastwards between the 1990s buildings from the roadways in front of Willow House, Salix House and White House. The southern boundary of the White House, the nearest of the Conservation Area's significant buildings to the Proposed Development, is heavily screened from Madingley Road. The only element of the setting of Conduit Head Road Conservation Area that includes the Proposed Development where there is sensitivity, is at the southern end of Conduit Head Road, where the tree screens along the south side of Madingley Road thin out locally, although they (and the Veterinary School) partly close the views southward from in front of the listed buildings. This makes a moderate contribution to the significance of the Conservation Area as a whole. In relation to approaches towards the road junction of Madingley Road and Conduit Head Road, along Madingley Road from both directions the tree screens, with some thin areas, along the south side of Madingley road make a small to moderate contribution to the Conservation Area's significance, as there are tree screens on both sides of the main road, preserving its largely suburban nature, although the presence of the Observatory Site and the West Cambridge Site mean that that the Conservation Area has always sat between areas with a distinct and strong collegiate character, partly defined by the larger scale university buildings. Figure 7.6 shows winter views along Conduit Head Road looking towards the Proposed Development.



Figure 7.6 View looking south along the straight part of Conduit Head Road towards the Proposed Development Site.

West Cambridge Conservation Area and its constituent listed buildings

- 7.3.6 The Conservation Area is notable for its spacious residential streets lined with large mainly detached 19th and 20th century houses. A variety of college and university buildings are included in the Conservation Area. Despite the differences in the form, scale and materials between the residential and collegiate buildings the very high quality of nearly all the structures ensures that the area retains spatial cohesion. Green open spaces, including agricultural land and the college playing fields and tennis courts also contribute to the Conservation Area's significance. The Conservation Area is located to the east, south east and north of the Proposed Development Site.
- 7.3.7 The relationship between the significant areas of the westernmost part of the Conservation Area, north of Madingley Road (Consisting of the Observatory site) and the Site are discussed in Section 7.3, and it is concluded that the Site plays little role in the setting of this part of the Conservation Area. East of the Observatory is Churchill College. Its main buildings are some distance from the Site. However, there are fairly clear views across its land towards the Site. These views are of the current sparse tree screen in the Site's north east corner and the quite dense late 20th/early 21st century University buildings on its west edge.
- 7.3.8 To the south of Madingley Road the residential development within the Conservation Area to the north of Emmanuel College Sports Ground is generally two storeys high, on narrow, intimate roads with mature gardens with mature trees, with few or no views of the Site. The listed buildings in this area have no setting relationships with the Site. The western edge of the Conservation Area is generally poor where it adjoins the Site on Clerk Maxwell Road.
- 7.3.9 There are views towards the Site along Wilberforce Road, to the south of its junction with the north boundary of Emmanuel College Sports Ground and from the land to the West of this part of Wilberforce Road, which mostly consists of the sports ground itself (for the extent of these views from Wilberforce Road and the land within the Conservation Area to its west, see Figure 7.1 and Figure 7.7, and View Point 6 in the ES). There are two listed buildings in this area: 9 Wilberforce Road, a 1930's modernist brick house; and Emmanuel College Sports Pavilion. The views within this part of the Conservation Area, which characterise its local setting, consist of two storey modern housing beyond the boundary of the Conservation Area, above which rises the university buildings of the Site beyond. Further south than the junction of Adam Road, views are limited from within the Conservation Area, with the buildings and planting of the Hockey Ground and residential development to the west of Bin Brook interrupting views, which generally only exist patchily on the very edge of the Conservation Area.
- 7.3.10 The Conservation Area Appraisal explains that the Conservation Area is centred on the spine of Grange Road and that the contrast between the Conservation Area's domestic buildings and its large university buildings is an important element of its character.
- 7.3.11 In terms of setting, the Conservation Area Appraisal (pp. 12-13) states that:
- The setting to the west of the Conservation Area consists of open fields, woodlands or sports fields with some areas of modern development accessed from Madingley Road,
 - The Cambridge Landscape Character Assessment describes the high quality of the urban edge between the Conservation Area and the countryside where the west edge is rural,

- The West Cambridge University site has cutting edge 21st century buildings,
- The domestic scale of much of the Conservation Area provides an important contrast with the large scale university buildings.

- 7.3.12 In relation to the analysis in the Conservation Area Appraisal, the setting of the western edge of the West Cambridge Conservation Area, along the west edge of Emmanuel College Sports Ground, is not open fields, sports fields or woodland. The contrast between the University buildings on the Site and the domestic buildings within the Conservation Area is characteristic of the contrast between university buildings and domestic housing found throughout the Conservation Area.



Figure 7.7 View from the corner of Adams Road and Wilberforce Road towards the West Cambridge site, over Emmanuel College Sports Ground

Schlumberger Gould Research Centre

- 7.3.13 The Schlumberger Gould Research Centre was designed by Michael Hopkins. The main tented structure was built in 1985 with a new building was added in 1992. It has recently been listed grade II*. It is one of several Hopkins' tented structures. It is set within the Masterplan site, near its western edge. The building has three fibreglass 'tents' supported by a skeletal external framework. To its west is the British Antarctic Survey, which predated the Schlumberger Gould Research Centre, and another building to the former's south. It is set in open fields to its west, beyond which are the university buildings comprising the Department of Veterinary Medicine. D Jenkins¹ mentioned that it was Hopkins' task to find the site. His practice looked at several sites around Cambridge and chose the site for its:
- Proximity to transportation links (the M11),
 - Location on a designated science park, owned by the university, and

¹ D Jenkins, "Architecture in Detail: Schlumberger Cambridge research Centre", Phaidon (London) 1993

- Its proximity to other established research establishments (e.g. the British Antarctic Survey)

7.3.14 The choice of site was therefore practical rather than related to its setting.

7.3.15 An extended essay of October 1992² discussed the early 1990s extension to the building. In the Architect's account section, written by Michael Hopkins, Hopkins noted that the nature of the research techniques had changed from experimentation to theoretical and computer based studies. This reduced the need for related buildings to be connected, which led to the establishment of a masterplan for the future development of the High Cross site based on a campus design of separate and related buildings. In the same essay, John Winter in his Appraisal section describes the Site as a typical 1980s urban fringe business park. He mentions that Hopkins resolved the fact that the building makes a statement but has no frontage, by turning the site into an embryo campus with the eastern two thirds of the site left free for future buildings and sports facilities.

7.3.16 The existing setting, with the building sitting with open space to one side, was therefore not the design intent for the building.

7.3.17 Although there are long views of the building from within the Site (to the west of the Veterinary School), there are no longer views from further east within and to the east of the Site, within West Cambridge Conservation Area. There are, however, some oblique views from the south. The setting relationship with the British Antarctic Survey is therefore significant, as the relationship was one reason for the choice of the site, and the fact that the building can be discerned as being Architecturally distinct among the surrounding buildings of the developing campus is also a contributing element of its setting. The wide open spaces to the east of the building, however, were never intended and contribute little to the building's significance, other than making it visible within the campus

Merton Hall Farmhouse

7.3.18 The farmhouse is of low significance. It is a standard white brick double fronted two storey mid-19th century farmhouse. The building is a common type both regionally and nationally. The building has been much altered internally and its rear extensions are poor quality. It is largely screened from Madingley Road by trees. The frontage of the building faces east and it is in views from the east that it maintains its relationship with Madingley Road. Historically there were ranges of buildings forming a courtyard to its south that were demolished in the 1950s and replaced by new buildings. These were themselves demolished in the early 2000s and replaced with a temporary catering facility that was cruciform in plan. This building was demolished in 2013/2014. The Farmhouse is therefore out of its historic context, as it now stands alone with a grassed area where the associated buildings once stood.

7.4 Impact assessment

Construction phase

7.4.1 With regards to the construction phase the only change is to the value of the Schlumberger Gould Research Centre due to the recent grade II* listing. All other impacts remain the same as the submitted ES. Table 7.1 provides an updated construction assessment for the Schlumberger Gould Research Centre

² Various Authors, "Building Study: Technology Stretching High-Tech" *The Architects' Journal* Vol. 196 28th October 1992, 31-42

Table 7.1 Construction phase impact assessment for the Schlumberger Gould Research Centre only.

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Archaeology						
Site 1 (Iron Age)	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	<ul style="list-style-type: none"> Through the 2015 field evaluation already undertaken, Site 1 has been sufficiently excavated and a written record of the asset has already been produced. No further mitigation is required to preserve the site's heritage significance. 	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset has been preserved through a written record produced during the field evaluation	Slight Not significant
Site 2 (Iron Age)	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	<ul style="list-style-type: none"> In addition to the written record produced during the 2015 field evaluation, a full open area excavation will be undertaken prior to construction works commencing. This will be agreed with the County Council's Historic Environment Team (CHET). Dissemination and Post-Excavation – In conjunction with the excavations there will be a full programme of post-excavation, including site-by-site assessment reportage and, following analysis, appropriate publication of the results (as agreed with CHET); the archive, along with the finds, will be deposited in the County Council store. In terms of public outreach, regular fieldwork-update bulletins will be issued on the project's web-site and there will be a public open-day held at Site 2. 	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a written record from a full open area excavation.	Slight Not significant
Site 3 (Iron Age/Roman)	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	<ul style="list-style-type: none"> Mitigation for Site 2 will further expose the field system which will be recorded. Additional trenching will be undertaken to establish the system's basic layout and, locally, there will be open-area excavation to detail its layout; Written Scheme of Investigation to be agreed with CHET. Dissemination and Post-Excavation – In conjunction with the excavations there will be a full programme of post-excavation, including site-by-site assessment reportage and, following analysis, appropriate publication of the results (as agreed with CHET); the archive, along with the finds, will be deposited in the County Council store. In terms of public outreach, regular fieldwork-update bulletins will be issued on the project's web-site and there will be a public open-day held at Site 2. 	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a written record from mitigation undertaken for site 2 combined with additional trenching if required.	Slight Not significant
Vicar's Farm	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	<ul style="list-style-type: none"> Preservation by record will occur by adhering to a suitable Written Scheme of Investigation to be agreed with CHET. Dissemination and Post-Excavation – In conjunction with the excavations there will be a full programme of post-excavation, including site-by-site assessment reportage and, following analysis, appropriate publication of the results (as agreed with CHET); the archive, along with the finds, will be deposited in the County Council store. In terms of public outreach, regular fieldwork-update bulletins will be issued on the project's web-site and there will be a public open-day held at Site 2. 	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a Written Scheme Investigation to be agreed with CHET.	Slight Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Nano Fabrication Building Site	High	Construction and landscaping activities that require excavations for basements, foundations, services, drainage or changes to ground levels will adversely affect the heritage assets within the site through physical disturbance resulting in the loss of the asset.	<ul style="list-style-type: none"> • Preservation by record will occur by adhering to a suitable Written Scheme of Investigation to be agreed with CHET. • Dissemination and Post-Excavation – In conjunction with the excavations there will be a full programme of post-excavation, including site-by-site assessment reportage and, following analysis, appropriate publication of the results (as agreed with CHET); the archive, along with the finds, will be deposited in the County Council store. In terms of public outreach, regular fieldwork-update bulletins will be issued on the project's web-site and there will be a public open-day held at Site 2. 	Minor	Construction and landscaping activities that involve groundworks will result in the loss of buried assets. The significance of the asset will be preserved through a Written Scheme Investigation to be agreed with CHET.	Slight Not significant
Built heritage						
Schlumberger Gould Research Centre Commercial research centre and office designed by Michael Hopkins and completed in 1985. The building is a tented structure suspended between a 'cat's cradle' arrangement of struts and supports. The building is both technically innovative, and a highly sculptural treatment for a late 20th century commercial building.	High	<p>The significance of the Schlumberger Gould Research Centre lies in its position as an early and highly articulate example of a High-Tech building, by one of that style's leading British proponents. The technical innovation embodied in its design also contributes to the building's significance. Setting makes a limited contribution to the significance of the building.</p> <p>The construction will envelope the building on all sides, altering its currently relatively tranquil, semi-rural setting. This will hamper the appreciation of the building</p> <p>The architectural significance of the building will remain unaffected.</p>	<ul style="list-style-type: none"> • No mitigation is proposed 	Minor Adverse	Construction activities will reduce the appreciation of the building by limiting existing views resulting in a temporary adverse effect.	Moderate adverse Significant

Operational phase

7.4.2 Table 7.2 details the impacts and effects on built heritage assets during operation only as no effects will occur to archaeology. For the built environment, only those assets which will receive adverse or beneficial effects are shown in the Table 7.2. For the full assessment on all historic environment assets see Appendix 7.2, Volume 3 of the ES.

Table 7.2 Operational phase effects

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<p>Central Cambridge Conservation Area and designated assets within the Conservation Area boundary.</p> <p>The central Conservation Area covers the historic core of the city, open spaces including the college backs, Jesus Green, Midsummer Common and the Botanic Garden. The Conservation Area appraisal states that this 'interplay of grand college buildings and verdant landscape is perhaps the most enduring image of central Cambridge.'</p> <p>The central Conservation Area also includes some fine examples of 19th century domestic development, particularly surrounding the railway station.</p>	High	<p>The Proposed Development will be largely not be visible from most of the Conservation Area, which due to the nature of its topography and tight urban grain has constrained outward views. It will not feature in views from the Backs, for example, or from any of the college courts, which are highly significant open spaces within the Conservation Area.</p> <p>However, some taller elements of the Proposed Development, may be visible from limited elevated points within the Conservation Area, particularly from Castle Hill. In these views, it will appear as a distant element and very small element in views, which will be dominated by the architecture of central Cambridge, such as Kings College, Great St Mary's Church and the university library towers. The Tall Buildings Study identifies some key views of Cambridge from the south, particularly from the Gog MaGog hills. Any tall visible elements will form a very small element in the views compared with the architecture of central Cambridge.</p> <p>In relation to the significance of the Conservation Area as a whole, which is wide and multi-faceted, the setting impact would be negligible.</p>	<ul style="list-style-type: none"> At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; Woodland infill planting at the site edges shall be native trees and shrubs and shall be in accordance with the Woodland Management Plan, Appendix 8.4, Volume 3; Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened. 	Negligible to Minor Adverse	<p>Some glimpsed views of the few tall elements of the Proposed Development would be visible from limited elevated points within the Conservation Area, although they would be subordinate in views to nearer and prominent buildings in the centre of Cambridge.</p> <p>This would result in a permanent adverse effect.</p>	<p>Negligible to Slight Adverse</p> <p>Not significant</p>

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<p>Shawms (1268363) Grade II* listed.</p> <p>Two storey house in the Modern Movement style with a single storey roof conservatory. The entrance has a projecting porch hood supported on two steel posts.</p>	High	<p>Shawms features extensive glazing to its south front, which faces over landscaped grounds to the Site. Views to the south are largely blocked by mature planting and intervening buildings. However, the Proposed Development will feature in restricted views to the south west, slightly altering the setting of the asset.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge. External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings; Rooftop plant shall not be located within the 32m AOD zone along Madingley Road. 	Minor Adverse	<p>Glimpsed views of the Proposed Development will result in a permanent adverse effect to the setting of the building.</p>	<p>Slight Adverse Not significant</p>

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
White House (1126037) Grade II listed. See Section 7.3.	Medium	Views to the Site are largely screened by boundary planting, however the Proposed Development will feature in the setting of the asset, especially in views from the roadway in front of the building. The presence of large University buildings on the West Cambridge site currently forms part of the setting of the building, with a very light boundary tree screen on the south side of Madingley Road within the views along Conduit Head Road. With the denser proposed planting buffer on the Proposed Development site boundary on Madingley Road and the new buildings closer to the Madingley Road Boundary, the new buildings would be visible above the buffer screen, so the university buildings will be more imposing within the setting than currently.	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge; External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings; Rooftop plant shall not be located within the 32m AOD zone along Madingley Road; Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road. 	Moderate Adverse	Closer views of the Proposed Development will result in a permanent adverse effect to the setting of the building, which will be partly offset by the thickened planting screen.	Moderate Adverse Significant effect

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
The Observatory (1126156) Grade II listed See Section 7.3.	Medium	The Observatory's two listed buildings are screened from view from the Proposed Development. The modern western fringe of the Observatory site has views of the Masterplan site and these contribute little to the buildings' significance. Restricted, narrow views along the access drive will largely be towards the thickened tree/planting screen in the north east corner of the site. The setting's contribution to the significance of the buildings will therefore be slightly affected	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge; External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings; Rooftop plant shall not be located within the 32m AOD zone along Madingley Road; Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road. 	Minor adverse	Views along the narrow access road will be slightly altered with a permanent adverse effect to the setting of the Northumberland Dome.	Slight adverse Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Northumberland Dome at the Observatory (1126157) Grade II listed. See Section 7.3.	Medium	The Observatory's two listed buildings are screened from view from the Proposed Development. The modern western fringe of the Observatory site has views of the Masterplan site and these contribute little to the buildings' significance. Restricted, narrow views along the access drive will largely be towards the thickened tree/planting screen in the north east corner of the site. The setting's contribution to the significance of the buildings will therefore be slightly affected	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge; External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings; Rooftop plant shall not be located within the 32m AOD zone along Madingley Road; Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road. 	Minor adverse	Negligible effect, as the building has no setting relationship with the development site.	Slight adverse Not Significant
9 Wilberforce Road (1268352) Grade II listed. Two storey Modern Movement house built in 1937 by D. Cosens. The building is constructed from whitewashed brick laid in Flemish bond with a bituminous felt roof. Rectangular plan with a recessed corner section at south east corner.	Medium	The house is located opposite the Emmanuel College Sports Pitches, with the existing buildings on the Site visible beyond the trees lining Clerk Maxwell Road. As currently, the rooftops and taller elements of the Proposed Development will be visible, rising above the modern two storey housing in distant views to the west over the Emmanuel College sports pitches. However, the buildings will rise slightly higher than currently, slightly altering views from the asset.	<ul style="list-style-type: none"> External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings; At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; Woodland infill planting at the site edges shall be native trees and shrubs and shall be in accordance with the Woodland Management Plan, Appendix 8.4, Volume 3; Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened. 	Minor Adverse	The University Buildings rising slightly higher above the two storey housing in views to the west than at present will result in permanent adverse effects to the setting of the house.	Slight Adverse Not Significant
Emmanuel College Sports Pavilion, including grounds man's house and stables (1422595) Grade II listed. Sports pavilion with attached Groundsman's House and separate stable, built for Emmanuel College in 1910. Complex roofscape of steep, sweeping pitches and hipped roof surmounted by a decorative copper cupola which has a polygonal base and a weathervane.	Medium	As currently, the rooftops and taller elements of the Proposed Development will be visible, rising above the modern two storey housing in distant views to the west over the Emmanuel College sports pitches. However, the buildings will rise slightly higher than currently, slightly altering views from the asset.	<ul style="list-style-type: none"> Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; Woodland infill planting at the site edges shall be native trees and shrubs and shall be in accordance with the Woodland Management Plan, Appendix 8.4, Volume 3; Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened. 	Minor Adverse	The University Buildings rising slightly higher above the two storey housing in views to the west than at present will result in permanent adverse effects to the setting of the pavilion and house.	Slight Adverse Not Significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Conduit Head Road Conservation Area See Section 7.3.	Medium	<p>The presence of University buildings closer to Madingley Road than at present will impact on the views south along Conduit Head Road. However, the planting/tree screen along south side of Madingley Road will be thickened. In other respects, the screening to the south of the White House and the relative lack of sensitivity of the setting to the south and south west of the part of the Conservation Area to the east of the southern part of Conduit Head Road, means that the setting of the Conservation Area is quite robust.</p> <p>Also, the presence of university buildings on two sides of the Conservation Area is part of its existing setting.</p> <p>There will therefore be a minor to moderate adverse change to the setting of the Conservation Area overall.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge. External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings. Rooftop plant shall not be located within the 32m AOD zone along Madingley Road; Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road. 	Minor-Moderate Adverse	Close views of the Proposed buildings from the southern end of the Conservation Area will be partly offset by the thickened planting/tree screen, but would result in permanent adverse effects to the setting of the Conservation Area.	Minor to Moderate Adverse Significant Effect

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
West Cambridge Conservation Area See Section 7.3.	Medium	<p>The Proposed Development will not impact significantly on the Conservation Area's setting in relation to the Observatory Site. The existing presence of the university buildings along the western part of the Masterplan Site in the setting of Churchill College will be accentuated, although there will be improved planting/tree screening.</p> <p>There will be little impact on the significance of the built up area on the west edge of the Conservation Area south of Madingley Road and north of Emmanuel College Sports Ground, due to the minor contribution of setting here and the intimate nature of this area.</p> <p>In relation to Emmanuel College Sports Ground and the stretch of Wilberforce Road from the north side of the sports ground to the junction with Adams Road, the new buildings will rise slightly higher behind the modern housing in the setting of the Conservation Area. This will have a minor to moderate impact locally.</p> <p>In relation to the Conservation Area as a whole, the West Cambridge site currently makes very little contribution the significance of the Conservation Area, and overall there will be a minor adverse impact, although in relation to Emmanuel College Sports Ground and a stretch of Wilberforce road this will be slightly elevated locally to moderate adverse.</p> <p>The presence of university buildings of good quality is a positive element of the character of the Conservation Area in the Conservation Area Appraisal.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Treatment of façades shall be sensitive in scale and the use of materials; Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge. The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Woodland infill planting at the site edges shall be native trees and shrubs and shall be in accordance with the Woodland Management Plan, Appendix 8.4, Volume 3; External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings. 	Minor adverse overall	The university buildings will appear bulkier in the setting of the Conservation Area resulting in permanent adverse effects on its setting.	Minor Adverse Not Significant
Schlumberger Gould Research Centre See Section 4.3.	High	<p>The Proposed Development will result in filling the site to the east of the building, as intended by Hopkins. However, the blocks around will remain lower than the listed building and the linear open space within the masterplan means that there will remain views from the west from within the site.</p> <p>The architectural significances of the building will remain unaltered by the development in its setting. Although the setting will be substantially altered the contribution of the setting to the building's significance will be largely retained, as it was always meant to be part of a campus, and was intended to be a feature building, which it will remain.</p>	<ul style="list-style-type: none"> The Listed Schlumberger Research building shall remain the primary landmark for the site. New development and spaces shall work together to define a new and appropriate setting for this building; A view corridor with a minimum 20m width will be preserved between JJ Thomson Avenue and High Cross to protect views through the Site of the Schlumberger Research Building; On the west side of High Cross, the Listed Schlumberger Research building shall remain visible as a key site landmark; In the central part of High Cross Avenue, a zone of lower development height shall be established to maintain the views of the Schlumberger Research building roof structure. The exact positioning of this lower zone shall be such to allow views of the roof-line (tent structure) from The Green. 	Minor to moderate adverse	The setting will be altered but its contribution to the building's significance will largely be retained, as it was meant to be part of a campus.	Moderate adverse Significant Effect

7.5 Mitigation measures

Archaeology

7.5.1 Following the 2015 field evaluation for the Proposed Development a number of areas will require further fieldwork. These areas are discussed below.

Site 1 (Iron Age)

7.5.2 Site 1 has already been excavated having therefore already effectively been mitigated (see baseline section), it is only the area of Site 2 that will require full open-area excavation when development proceeds there. The further investigation of the Site 3 field system and trackway – aside from its incidental exposure in Site 2 – can, within Field 1, be limited to the area of new major building footprints and any further areas that will be disturbed through excavation, augmented by additional trenching.

Site 2 (Iron Age)

7.5.3 In addition to the written record produced during the 2015 field evaluation, a full open area excavation of Site 2 will be undertaken prior to construction works commencing. This will involve an area of not less than 1.2ha, with there being provision for a further 0.5ha expansion should the results warrant it

Site 3 (Iron Age/Roman)

7.5.4 Mitigation for Site 2 will further expose the field system which will be recorded. Additional trenching will be undertaken to establish the system's basic layout and, based on its results, it is anticipated that there will be up to 1ha of open-area excavation to further detail the system's layout, operations and date. This will be agreed with the County Council's Historic Environment Team (CHET).

Vicar's Farm

7.5.5 As confirmed by the 2011 Whittle Laboratory excavations (Slater 2011), the north western side of the Vicar's Farm Roman settlement extends into the eastern portion of that facility's grounds. This will require excavation over approximately 3,375m². Of this, excluding the 2011-area, approximately 2,100m² lie exterior to that building's footprint and will require full excavation prior to the Laboratory's demolition; occurring within the footprint-area, the excavation methods employed on the remaining portion (approximately 1,275m²) will be dependent upon the degree of preservation found following the Laboratory's demolition.

Nano Fabrication Building Site

7.5.6 A limited degree of Iron Age occupation evidence was found during the course of the 2001 investigations²⁰. The settlement is likely to have extended across at least part of the area of the Cavendish Laboratory complex, but where it was unfeasible to cut any trial trenches during the 2015 evaluation programme. Accordingly, upon vacating the Laboratory buildings (but prior to their demolition), a limited trenching programme will be conducted within the grounds; should further evidence of early settlement be recovered (and dependent upon their degree of preservation), then an appropriate excavation programme will occur in conjunction with the demolition works. This will be agreed with CHET.

7.5.7 Dissemination and Post-Excavation – In conjunction with the excavations there will be a full programme of post-excavation, including site-by-site assessment reportage and, following analysis, appropriate publication of the results (as agreed with CHET); the archive, along with the finds, will be deposited in the County Council store. In terms of public outreach, regular fieldwork-update bulletins will be issued on the project's web-site and there will be a public open-day held at Site 2.

Built heritage

7.5.8 The following mitigation measures are specified in the Design Guidelines to minimise visual and setting impacts to built heritage receptors to the north and east of the Site:

- The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m;
- At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD;
- Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site;
- Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development;
- Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing;
- Treatment of façades shall be sensitive in scale and the use of materials;
- Woodland infill planting at the site edges shall be native trees and shrubs and shall be in accordance with the Woodland Management Plan, Appendix 8.4, Volume 3;
- The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3);
- Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge.
- Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened.
- External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings.
- The Listed Schlumberger Research building shall remain the primary landmark for the site. New development and spaces shall work together to define a new and appropriate setting for this building;
- A view corridor with a minimum 20m width will be preserved between JJ Thomson Avenue and High Cross to protect views through the Site of the Schlumberger Research Building;
- On the west side of High Cross, the Listed Schlumberger Research building shall remain visible as a key site landmark;

- In the central part of High Cross Avenue, a zone of lower development height shall be established to maintain the views of the Schlumberger Research building roof structure. The exact positioning of this lower zone shall be such to allow views of the roof-line (tent structure) from The Green.
- Rooftop plant shall not be located within the 32m AOD zone along Madingley Road;
- Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road;

7.6 Summary

- 7.6.1 During construction, the Proposed Development will have a significant adverse effect on the setting of the Schlumberger Gould Research Centre.
- 7.6.2 During operation, the Proposed Development will have a significant adverse effect on the White House, and the Schlumberger Gould Research Centre and Conduit Head Road Conservation Area. This does not constitute substantial harm as defined in the National Planning Policy Framework.
- 7.6.3 No significant effects would occur to Shawms, The Observatory, Northumberland Dome at the Observatory, 9 Wilberforce Road, Emmanuel College Sports Pavilion including groundsman's house and stables, or the West Cambridge Conservation Area.

8. Landscape and visual

8.1 Introduction

8.1.1 This chapter updates the landscape and visual assessment in the submitted ES to show the changes resulting from the amended Proposed Development. The landscape and visual assessment requires updating due to the reduced building heights specified in the parameter plans and new mitigation measures specified in the Design Guidelines. The following sections remain unchanged from the submitted ES and have not been replicated within this document.

- Scope of assessment;
- Relevant legislation and policy;
- Method of assessment;
- Baseline conditions.

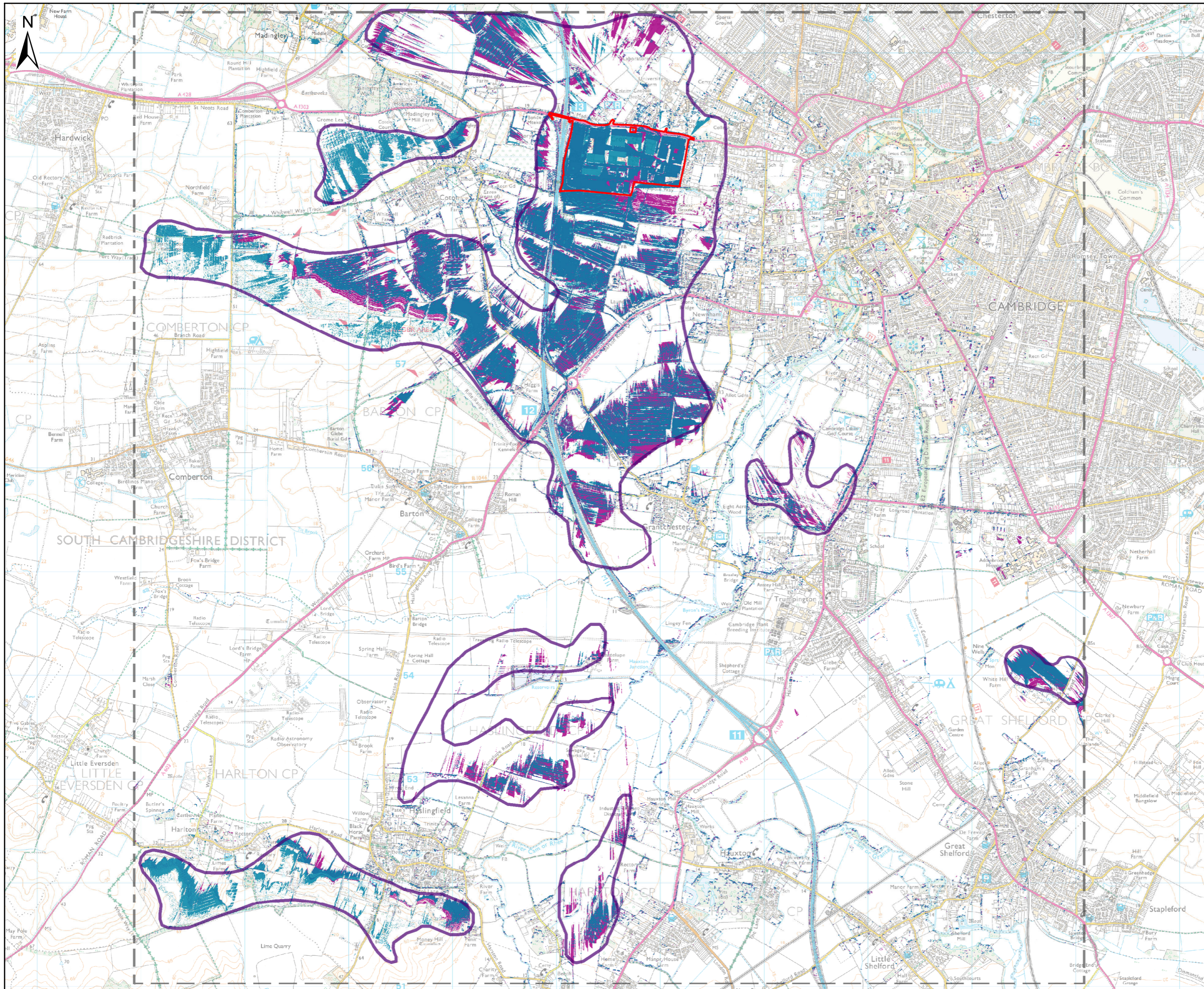
8.1.2 The following sections require updating to reflect the amended Proposed Development and are presented in this chapter:

- Impact assessment – Operational phase only. Construction phase effects remain unchanged;
- Mitigation measures;
- Summary.

8.2 Impact assessment

Operational phase

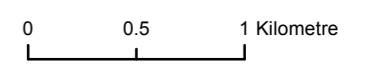
8.2.1 The operational phase assessment, considers the environment at year 1 and 15 following opening to assess the changes in effects associated with growth of the existing vegetation. Operational phase impacts are assessed in Tables 8.1 and 8.2. Visualisations of the parameter plans, which represent the maximum extent that buildings could be constructed to, from eight viewpoints are shown in Appendix 8.3, Volume 3. The revised Zone of Theoretical Visibility (ZTV) and visual envelope are shown on Figure 5.1.



- Site boundary
- Extent of digital surface model (DSM) elevation data analysed
- Visual envelope
- Visible areas from proposed buildings
- Visible areas from proposed buildings and 8m western flue

Notes:
 The ZTV is an indication only of the area within which the the highest points of the proposed scheme buildings may be visible from ground level.

The study uses a 2 metre resolution Digital Surface Model (DSM), which takes into consideration the surface detail of vegetation and buildings.



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Client
University of Cambridge

Project
West Cambridge Masterplan EIA

Title
**Landscape
 Zone of Theoretical Visibility
 Figure 8.1**

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:35,000	SJD	HM	DP
Drawing Number	Date	Date	Date	Rev
5137998_CAM_LV_VIS	24/04/17	24/04/17	24/04/17	10

Table 8.1 Operational phase effects on landscape character areas

Baseline		Impact assessment				
Landscape character area	Landscape sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
A – Cambridge Central Core	High	Some distant glimpsed views of the tops of new buildings, rooftop plant and the energy centre flue will be possible from elevated areas within the landscape character area.	None proposed	Opening year – Negligible Year 15 – Negligible	The distant glimpsed views from elevated areas such as the Great St Mary's Church tower of the tops of the new buildings, roof top plant, and the energy centre flue, will not affect the landscape character area which will retain its vibrant historic character. The landscape character area is outside the ZTV and the Proposed Development will not be perceptible from the open spaces. There will be no effect.	Opening year – Neutral Not significant Year 15 – Neutral Not significant
B – Chesterton / North Cambridge	Low	Some distant glimpsed views of the tops of new buildings, rooftop plant and the energy centre flue will be possible from elevated areas and western edge within the landscape character area.	None proposed	Opening year – Negligible Year 15 – Negligible	Distant glimpsed views of the new buildings, roof top plant, and the energy centre flue from elevated areas such as the Castle Mount will not affect the character of the landscape character area. The landscape character area is outside the ZTV and the Proposed Development will not be perceptible from the open spaces. There will be no effect.	Opening year – Neutral Not significant Year 15 – Neutral Not significant

Baseline		Impact assessment				
Landscape character area	Landscape sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
C – West Cambridge Central Core	High	New buildings will be constructed close to the eastern boundary of the Site adjacent to the landscape character area, the building heights of these will be staggered with building heights reducing towards this character area.	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Lengths of unbroken frontages on multi storey car parks shall be limited to 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents; Development along the Southern Edge shall respond to long distance views. Long frontages here shall be broken/varied and additional tree planting and landscape shall be introduced to provide a softer, woodland edge; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location; Large feature tree planting shall be provided at a minimum of 5 key locations along the Southern edge; Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Long distance views shall be considered in the location of plant; Plant should be considered as a way to add variation and interest in the roofscape; Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials; Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines; Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment; If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that don't overwhelm key open spaces; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; 	Opening year – Low adverse Year 15 – Low adverse	The western part of the landscape character area is within the ZTV and new buildings constructed up to the eastern boundary of the Site will be visible from some open areas such as the St John's College sports pitches. Elevated views from some tall buildings such as the University Library tower will experience new buildings which will give the sense of a denser form of urban development to the west of the landscape character area. As screening vegetation along the eastern boundary grows and matures together with existing screening vegetation, views of the new buildings will diminish. The staggered nature of these building heights will reduce the massing of the built forms adjacent to this character area. The proposed built form will still form prominent components. It is only the western portion of the landscape character area that will be affected. This will be a permanent adverse effect.	Opening year – Moderate adverse Significant Year 15 – Moderate adverse Significant

Baseline		Impact assessment				
Landscape character area	Landscape sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
D – north west Cambridge	Low	<p>Densification of the Site.</p> <p>The energy centre flue could be visible from the landscape character area. From some limited areas, glimpsed views of some of the taller buildings may be possible.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Lengths of unbroken frontages on multi storey car parks shall be limited to 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Plant should be considered as a way to add variation and interest in the roofscape; Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials; Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines; Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment; If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that don't overwhelm key open spaces; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; 	<p>Opening year – Low adverse</p> <p>Year 15 – Negligible adverse</p>	<p>The denser urban development of the Site will result in an increase in urbanisation to the immediate south of the landscape character area which will reduce its 'city-edge character by removing the buffer to the open countryside to the south. Due to the contained nature of the landscape character area this is unlikely to be perceptible from within north west Cambridge.</p> <p>Views of the energy centre flue will not adversely change the character of the landscape character area.</p> <p>This will be a permanent adverse effect.</p>	<p>Opening year – Slight adverse</p> <p>Not significant</p> <p>Year 15 – Neutral</p> <p>Not significant</p>

Baseline		Impact assessment				
Landscape character area	Landscape sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
E – Madingley	High	<p>Densification of the Site.</p> <p>The tops of new buildings, roof top plant and the energy centre flue could all be visible from the landscape character area, the building heights along the western boundary will be staggered, reducing the proposed impact along the western boundary of the Proposed Development.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Lengths of unbroken frontages on multi storey car parks shall be limited to 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Treatment of façades shall be sensitive in scale and the use of materials; Materials for less visible façades shall be robust and designed to age well; Large feature tree planting shall be provided at a minimum of 5 key locations within The Green public open space area, such as at the gateways to The Green or key nodes within the space; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Long distance views shall be considered in the location of plant; Plant should be considered as a way to add variation and interest in the roofscape; Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials; Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines; Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment; If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that don't overwhelm key open spaces; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; 	<p>Opening year – Low adverse</p> <p>Year 15 – Low adverse</p>	<p>The Proposed Development will result in an increase in urbanisation at the Site affecting the landscape character area to the west. The higher quality areas of the landscape character area are located between the Site, Coton, and Madingley and include a part of the Coton Countryside Reserve. These higher quality areas are visually contained and located outside of the ZTV. They are not tranquil due to traffic noise from the adjacent M11 and will not be affected by the Proposed Development.</p> <p>An area of open agricultural fields south of Madingley Road are less visually contained and are located within the ZTV. In this part of the landscape character area the Proposed Development will have an encroaching urbanising effect although this is partially offset by the M11 which acts as a barrier between the city and the landscape character area. The staggered nature of the building heights along the western boundary will slightly reduce the massing of the built forms. Screening vegetation along the M11 corridor is already established and unlikely to grow much taller.</p> <p>This will be a permanent adverse effect.</p>	<p>Opening year – Moderate adverse</p> <p>Significant</p> <p>Year 15 – Moderate adverse</p> <p>Significant</p>

Baseline		Impact assessment				
Landscape character area	Landscape sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
F – Coton	High	<p>Densification of the Site.</p> <p>The new buildings, roof top plant and the energy centre flue will influence this landscape character area</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Lengths of unbroken frontages on multi storey car parks shall be limited to 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents; Development along the Southern Edge shall respond to long distance views. Long frontages here shall be broken/varied and additional tree planting and landscape shall be introduced to provide a softer, woodland edge; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Treatment of façades shall be sensitive in scale and the use of materials; Frontages facing the southern landscape shall have a high quality architectural treatment and materials; Large feature tree planting shall be provided at a minimum of 5 key locations along the Southern edge. Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside. Long distance views shall be considered in the location of plant; Plant should be considered as a way to add variation and interest in the roofscape; Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials; Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines; Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment; If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that don't overwhelm key open spaces; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; 	<p>Opening year – Medium adverse</p> <p>Year 15 – Medium adverse</p>	<p>The landscape character area has poor visual containment and much of it is within the ZTV. Red Meadow Hill, including parts of the Coton Countryside Reserve in particular, command clear and elevated views across and into the Site where the Proposed Development will be clearly visible.</p> <p>The staggered nature of the building heights along the southern boundary will slightly reduce the massing of the built forms however the Proposed Development will result in the encroachment of the city edge and increases the urbanising effect on this rural landscape character area although this is partially offset by the M11 which acts as a barrier between the city edge and the landscape character area. Screening vegetation along the M11 corridor is already established and unlikely to grow much taller.</p> <p>This will be a permanent adverse effect.</p>	<p>Opening year – Large adverse</p> <p>Significant</p> <p>Year 15 – Large adverse</p> <p>Significant</p>

Baseline		Impact assessment				
Landscape character area	Landscape sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
G – Grantchester	High	<p>Densification of the Site.</p> <p>The new buildings, roof top plant and the energy centre flue could all be visible from the landscape character area, the building heights along the southern boundary will be staggered reducing the proposed impact along this boundary.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Lengths of unbroken frontages on multi storey car parks shall be limited to 50m; Maximum build-to lines along High Cross Avenue shall be setback from the road corridor by at least 8m on the eastern side and by at least 5m on the western side of the street; At the southern end of High Cross Avenue, an additional frontage height restriction of 33m AOD (to the west) and 35m AOD (to the east) shall be applied. Any development above these heights shall be set back by a minimum of 5m from the primary frontage line; Building Zones along JJ Thompson Avenue are set to allow for a 10m buffer between the stems of the existing trees and the proposed building faces (maximum Build to Line); Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents; Development along the Southern Edge shall respond to long distance views. Long frontages here shall be broken/varied and additional tree planting and landscape shall be introduced to provide a softer, woodland edge; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; 	<p>Opening year – Medium adverse</p> <p>Year 15 – Medium adverse</p>	<p>This landscape character area has a strong relationship with the Site and much of it is within the ZTV particularly the area north of Barton Road. South of Barton Road, blocks of woodland and hedgerows in addition to the increased distance result in a weaker relationship with the Site.</p> <p>The staggered nature with the decreasing of the building heights towards the southern boundary will slightly reduce the massing of the built forms, however the Proposed Development will result in large institutional buildings continuing along the southern boundary. This will create an abrupt edge between the urban townscape and the open countryside resulting in an increased urbanising effect on this landscape character area. The line of buildings will be broken up by the tree planting along the green avenues running north-south through the Proposed Development and terminating at the west forum. With the staggered building heights and reinforcement of the screening planting associated with the Woodland Management Plan, including the legacy trees, along the southern boundary this will soften the effect once established</p> <p>This will be a permanent adverse effect</p>	<p>Opening year – Large adverse</p> <p>Significant</p> <p>Year 15 – Large adverse</p> <p>Significant</p>
H – Haslingfield	High	<p>Densification of the Site.</p> <p>The new buildings, roof top plant and the energy centre flue could all be visible from the landscape character area, the building heights along the southern boundary will be staggered reducing the proposed impact along this boundary.</p>	<ul style="list-style-type: none"> Treatment of façades shall be sensitive in scale and the use of materials; Frontages facing the southern landscape shall have a high quality architectural treatment and materials; Large feature tree planting shall be provided at a minimum of 5 key locations along the Southern edge. Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside. Long distance views shall be considered in the location of plant; Plant should be considered as a way to add variation and interest in the roofscape; Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials; Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines; Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment; If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that don't overwhelm key open spaces; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – Negligible</p> <p>Year 15 – Negligible</p>	<p>The landscape character area has a weak relationship with the Site due to the large intervening distance between them. Other distinct landscape features including the travelling radio telescope blocks of woodland and communities such as Haslingfield exert a much greater influence on the character of the landscape character area than the Site. The southern edge of the Proposed Development will be visible in the distance from elevated areas in the landscape character area, such as Chapel Hill, on clear days but will not break the skyline and will be barely perceptible.</p> <p>There will be no effect on the character of the landscape character area.</p>	<p>Opening year – Neutral</p> <p>Not significant</p> <p>Year 15 – Neutral</p> <p>Not significant</p>

Baseline		Impact assessment				
Landscape character area	Landscape sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
I – High Cross (Site of Proposed Development)	Low	<p>The Proposed Development will increase the amount of built development on Site, particularly at the western end of the Site where undeveloped plots will become developed. There will be a large increase in occupants on the Site which will include commercial, academic service, maintenance staff, and students which will increase the vitality of the Site.</p> <p>Built development will be coherent with active frontages of high quality, integrated and publicly accessible open spaces, the proposals will also allow for staggered building heights across the Site particularly along boundaries and thoroughfares which will help to integrate the development into the wider landscape character. .</p>	<ul style="list-style-type: none"> Existing north-south streets shall be further greened through the use of development setbacks and landscaped areas formed alongside High Cross and Western Access/Ada Lovelace Road; The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Lengths of unbroken frontages on multi storey car parks shall be limited to 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents; The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m; Maximum build-to lines along High Cross Avenue shall be setback from the road corridor by at least 8m on the eastern side and by at least 5m on the western side of the street; At the southern end of High Cross Avenue, an additional frontage height restriction of 33m AOD (to the west) and 35m AOD (to the east) shall be applied. Any development above these heights shall be set back by a minimum of 5m from the primary frontage line; Building Zones along JJ Thompson Avenue are set to allow for a 10m buffer between the stems of the existing trees and the proposed building faces (maximum Build to Line); Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Treatment of façades shall be sensitive in scale and the use of materials; Materials for less visible façades shall be robust and designed to age well; Planting at the West Forum shall reinforce the visual connection from the upper areas to the wider landscape and the Southern Ecological Corridor; Existing mature planting and hedgerows within the East Pond area and along the Southern edge shall be maintained with the appropriate tree buffer zone. New tree planting shall be accommodated within the East Pond space (to the north of the pond) to ensure that new development is set within landscape; Large feature tree planting shall be provided at a minimum of 5 key locations within The Green public open space area, such as at the gateways to The Green or key nodes within the space. Where large trees are planted, they shall be given the proper environmental conditions and space to grow to maturity; The impact of plant (and rooftop plant in particular) on building design and on open spaces shall be carefully considered from the concept stage of design; Wherever possible, plant shall be placed on roofs in locations where it will not be visible from the public realm; Any plant required to be provided as a separate structure shall not be located next to or within the key open spaces; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter. Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – low adverse</p> <p>Year 15 – low beneficial</p>	<p>There is a general lack of vitality of the Site particularly at the western half which has not yet been developed in accordance with the existing planning permission and is dominated by large empty plots and surface car parking.</p> <p>The Proposed Development, will transform the Site into a bustling and vibrant campus. The building design will be of high quality with staggered building heights along boundaries and tree planting along the green avenues running north-south. Active frontages will face onto integrated publicly accessible open spaces. New planting associated with the landscape design will be immature at the opening year which will result in hardscaped areas and new built form giving rise to a starker character than at present. This will be a temporary adverse effect.</p> <p>As the planting associated with the landscape design and Woodland Management Plan matures, the hardscaped areas and built form will soften and better reflect the surrounding leafy peri-urban environment. This will be a permanent beneficial effect.</p>	<p>Opening year – Slight adverse</p> <p>Not significant</p> <p>Year 15 – Slight beneficial</p> <p>Not significant</p>

Table 8.2 Operational phase effects on visual receptors

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 1 Public viewpoint within the Coton Countryside Reserve	High	<p>The Proposed Development would form a prominent consolidated alignment to the settlement edge with infill development within the existing view of the Site. This view is a key viewpoint that is highlighted in the Cambridge Skyline document and, as a result of its geography, will result in a change to visual perception of the users.</p> <p>External lighting and lighting from windows would contribute to sky glow.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Large feature tree planting shall be provided at a minimum of 5 key locations along the Southern edge. Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Long distance views shall be considered in the location of plant; Plant should be considered as a way to add variation and interest in the roofscape; Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application. 	<p>Opening year – High adverse</p> <p>Year 15 – High adverse</p>	<p>Views from the elevated vantage point will look into the Proposed Development this will be seen with the historic city core in the background.</p> <p>The Proposed Development would include the introduction of new built forms within an existing view that contains a mixture of built forms seen from a medium distance. The buildings with the greatest proposed visual impact would be located on the south western and southern portion of the Site, these would help to mitigate the views of proposed buildings further to the north and east.</p> <p>The proposed building heights and massing will create a change of view from this receptor increasing the visible built forms and extend the urbanisation of the settlement edge towards the viewpoint.</p> <p>Light spill/sky glow will impact upon visual amenity of the receptor particularly seen within the foreground of the wider city skyline. Mitigating the control of lighting, in particular the spread to surrounding areas, will help to reduce the impact at night.</p> <p>Through the use of vegetation and building treatments the longer term effects will be reduced.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Large adverse Significant</p> <p>Year 15 – Large adverse Significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 2 Public Right of Way alongside the western boundary (39/30) and adjacent to the M11.	Medium	<p>The Proposed Development would result in new buildings close to the western boundary adjacent to the public right of way.</p> <p>External lighting and lighting from windows on the western facades of the buildings would result in light spill and contribute to sky glow.</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Any new landscaped gaps between buildings along the western edge shall be a minimum of 20m from building face to building face. Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application. 	<p>Opening year – Low adverse</p> <p>Year 15 – Low adverse</p>	<p>Due to the presence of a thick dense belt of vegetation along the western boundary, there is only a single view into the Site from the public right of way through a gap which coincides with an overhead power line.</p> <p>The Proposed Development would include the introduction of new built forms into part of the existing view. The proposed buildings will intensify the present development along the western edge of the Site, the building heights will be staggered with lower built form/heights along the western boundary. The result will be a change to the existing view.</p> <p>Light spill/sky glow will impact upon the visual amenity of the receptor. Mitigating the control of lighting particularly any light spill from the Site onto the public right of way will reduce the effects at night.</p> <p>Through the use of additional vegetation and building treatments/heights the longer term effects will be reduced.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Slight adverse</p> <p>Not significant</p> <p>Year 15 – Slight adverse</p> <p>Not significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 3 Harcamlow Way (39/31a)	Medium	<p>The Proposed Development would result in new buildings close to the southern boundary of the Site adjacent to the public right of way.</p> <p>External lighting and lighting from windows on the southern facades of the buildings would result in light spill and contribute to sky glow</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. Planting at the West Forum shall reinforce the visual connection from the upper areas to the wider landscape and the Southern Ecological Corridor; Existing mature planting and hedgerows within the East Pond area and along the Southern edge shall be maintained with the appropriate tree buffer zone. New tree planting shall be accommodated within the East Pond space (to the north of the pond) to ensure that new development is set within landscape; Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – High adverse</p> <p>Year 15 – Medium adverse</p>	<p>The Proposed Development would introduce new buildings along the southern boundary adjacent to the public right of way resulting in short distance views of the new built forms. This will create a change of view from this receptor increasing the feeling of urbanisation.</p> <p>Light spill/sky glow will impact upon the visual amenity of the receptor. Mitigating the control of lighting particularly any light spill from the Site onto the public right of way will reduce the effects at night.</p> <p>Reinforcing the existing screening vegetation and setting back buildings together with creating staggered building heights with reducing heights towards the southern boundary would help to reduce the impact on views. The effects would reduce over time as new planting associated with the Woodland Management Plan matures and establishes.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Moderate adverse</p> <p>Significant</p> <p>Year 15 – Slight adverse</p> <p>Not significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 4 Wimpole Way (39/31a)	Medium	<p>The Proposed Development would result in new buildings close to the southern boundary of the Site adjacent to the public right of way.</p> <p>External lighting and lighting from windows on the southern facades of the buildings would result in light spill and contribute to sky glow</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. Planting at the West Forum shall reinforce the visual connection from the upper areas to the wider landscape and the Southern Ecological Corridor; Existing mature planting and hedgerows within the East Pond area and along the Southern edge shall be maintained with the appropriate tree buffer zone. New tree planting shall be accommodated within the East Pond space (to the north of the pond) to ensure that new development is set within landscape; Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – Medium adverse</p> <p>Year 15 – Low adverse</p>	<p>The Proposed Development would introduce new buildings along the southern boundary adjacent to the public right of way resulting in short distance views of the new built form. Views into the Site will open up via the new East Forum but the quality of the current views, which include the dated existing Cavendish Laboratories, will be improved through better quality landscape design and new buildings with high architectural finishes. This will create a change of view from this receptor increasing the feeling of urbanisation.</p> <p>Light spill/sky glow will impact upon the visual amenity of the receptor. Mitigating the control of lighting particularly any light spill from the Site onto the public right of way will reduce the effects at night.</p> <p>Reinforcing the existing screening vegetation and setting back buildings together with creating staggered building heights with lower heights towards the southern boundary would help to soften views. The effects would lessen over time as new planting associated with the Woodland Management Plan matures and establishes.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Moderate adverse</p> <p>Significant</p> <p>Year 15 – Slight adverse</p> <p>Not significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 5 Clerk Maxwell Road	High	<p>The Proposed Development would result in new buildings close to the eastern boundary of the Site adjacent to the public right of way.</p> <p>External lighting and lighting from windows on the eastern facades of the buildings would result in light spill and contribute to sky glow</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened. Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – Low adverse</p> <p>Year 15 – Negligible adverse</p>	<p>Views of the Site from residential receptors off Clerk Maxwell Road at the Lawns and Perry Court are extremely limited due to the presence of thick belts of screening vegetation on either side of the road. Views of the new built forms would only be from upper storey windows.</p> <p>The Proposed Development would result in new buildings being constructed closer to the eastern boundary of the Site, these will have a staggered roof height with the lower ones towards the eastern boundary. The existing screening vegetation and the proposed mitigation would ensure that changes to views from the residential properties are limited to glimpses of roof tops, at the year of opening. As the existing screening vegetation and new vegetation associated with the Woodland Management Plan matures, views of the new built form will reduce further.</p> <p>Light spill could result from the new buildings onto Clerk Maxwell Road. Mitigation to control light spill from external lighting will reduce effects on the views of residential receptors at night time.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Moderate adverse</p> <p>Significant</p> <p>Year 15 – Neutral</p> <p>Not Significant</p>
Viewpoint 6 Wilberforce Road	High	<p>The Proposed Development would result in new buildings close to the eastern boundary of the Site.</p> <p>External lighting and lighting from windows would contribute to sky glow</p>	<ul style="list-style-type: none"> Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened. Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – Medium adverse</p> <p>Year 15 – Medium adverse</p>	<p>The Proposed Development would introduce new built forms up to the eastern boundary of the Site. Residents of properties along Wilberforce Road, opposite the Emmanuel College Recreation Ground, would experience this new built form in views that contain a contrasting scale of built forms with open space and residential buildings in the foreground and the new taller buildings beyond. These will have a staggered roof height with the lower buildings located towards the eastern boundary, which would have the effect of reducing the massing of the built form adjacent to the residential edge.</p> <p>The existing screening vegetation and new planting associated with the Woodland Management Plan would ensure that changes to views from the residential properties are limited to glimpses of the upper storeys and rooftops, at the year of opening, between gaps in the existing mature screening vegetation. As the screening vegetation further matures views of the new built form will reduce further.</p> <p>Mitigation to control light spill from external lighting will reduce the effects of sky glow on the views of residential receptors at night time.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Moderate adverse</p> <p>Significant</p> <p>Year 15 – Moderate adverse</p> <p>Significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 7 Dane Drive	High	<p>The Proposed Development would result in new buildings close to the southern boundary of the Site.</p> <p>External lighting and lighting from windows would contribute to sky glow</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development ‘backs’ are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – Medium adverse</p> <p>Year 15 – Medium adverse</p>	<p>The Proposed Development would introduce new built forms into a view that contains open space in the foreground and a mixture of existing built forms concentrated at the southern and south eastern portion of the Site.</p> <p>Residents would have glimpsed views of the Proposed Development from rearward facing windows in the upper storeys of their houses. The new buildings along the southern boundary will intensify the level of development with increased massing. This would be offset by lower building heights along the southern boundary which will change the view from these residential receptors.</p> <p>Mitigation to control light spill from external lighting will reduce the effects of sky glow on the views from the viewpoint at night time.</p> <p>Through the use of planting associated with the Woodland Management Plan and building treatments, the longer term effects will be reduced.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Large adverse</p> <p>Significant</p> <p>Year 15 – Large adverse</p> <p>Significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 8 and 9 Conduit Head Road and Madingley Road	High	<p>The Proposed Development would result in new buildings close to the northern and eastern boundaries of the Site.</p> <p>External lighting and lighting from windows would contribute to sky glow</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Large feature tree planting shall be incorporated at key locations along High Cross, such as: the gateway to Madingley Road and the interface with The Green; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge; Large feature tree planting shall be incorporated at key spaces along JJ Thompson Avenue such as the gateway to Madingley Road and the interface with The Green; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall not be located within the 32m AOD zone along Madingley Road; Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application. 	<p>Opening year – Medium adverse</p> <p>Year 15 – Medium adverse</p>	<p>The Proposed Development would result in new buildings along the northern and eastern boundaries of the Site adjacent to Madingley Road. The new buildings will result in a substantial change in views from this receptor increasing the feeling of urbanisation. The building lines would be brought closer to the road corridor, although the building heights are proposed to be staggered the effect will be to increase the urbanisation effect.</p> <p>Mitigation to control light spill from external lighting will reduce the effects of sky glow on the views from the residential receptors at night time.</p> <p>With the maturing of the existing tree planting and new planting associated with the Woodland Management Plan and along the green avenues this would reduce the longer term effects.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Large adverse</p> <p>Significant</p> <p>Year 15 – Large adverse</p> <p>Significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 10 Public Right of Way to the south of Harcamlow Way (55/9)	Medium	<p>The Proposed Development would result in new buildings close to the southern boundary of the Site.</p> <p>External lighting and lighting from windows would contribute to sky glow</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development ‘backs’ are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	<p>Opening year – High adverse</p> <p>Year 15 – Medium adverse</p>	<p>The Proposed Development would introduce new built forms into a view that contains open agricultural fields in the foreground and a mixture of existing built forms concentrated at the south eastern portion of the Site.</p> <p>The new buildings along the southern boundary will intensify development with increased massing resulting in an abrupt urban edge that will change the view from this receptor particularly as it is viewed from a mid-distance. The built forms will have a staggered roof line with the lower buildings along the southern boundary, this would add a variety to the built forms reducing the intensification.</p> <p>Mitigation to control light spill from external lighting will reduce the effects of sky glow on the views from the viewpoint at night time.</p> <p>Through the use of vegetation, associated with the Woodland Management Plan, and building treatments, the longer term effects will be reduced.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Moderate adverse</p> <p>Significant</p> <p>Year 15 – Moderate adverse</p> <p>Significant</p>
Viewpoint 11 Madingley Road (West)	Low	<p>The Proposed Development would result in new buildings close to the northern and eastern boundaries of the Site.</p> <p>External lighting and lighting from windows would contribute to sky glow</p>	None proposed	<p>Opening year – Negligible</p> <p>Year 15 – Negligible</p>	<p>Views of the Site from Madingley Road, west of the M11, are completely screened by the intervening vegetation along the southern boundary of Madingley Road and the blocks of woodland on east and western boundaries of the M11.</p> <p>There would be no effect.</p>	<p>Opening year – Neutral</p> <p>Not Significant</p> <p>Year 15 – Neutral</p> <p>Not significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 12 Madingley Road (East)	Medium	<p>The Proposed Development would result in new buildings close to the northern boundary of the Site along Madingley Road.</p> <p>External lighting and lighting from windows would contribute to sky glow</p>	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Large feature tree planting shall be incorporated at key locations along High Cross, such as: the gateway to Madingley Road and the interface with The Green; The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3); Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge; Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall not be located within the 32m AOD zone along Madingley Road; Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application. 	<p>Opening year – High adverse</p> <p>Year 15 – High adverse</p>	<p>The Proposed Development will increase the proximity of built form to the northern boundary of the Site adjacent to Madingley Road which would increase the scale and presence of the built forms along the western Cambridge approach.</p> <p>The new buildings will result in a substantial change in views from this receptor. This will increase the feeling of urbanisation to the settlement edge and gateway to Cambridge.</p> <p>Light spill could result from the new buildings onto Madingley Road. Mitigation to control light spill from external lighting will reduce effects on the views of travellers at night time.</p> <p>The effects of the building scale impacts will be reduced as the tree planting along the north-south green avenues mature.</p> <p>This would be a permanent adverse effect.</p>	<p>Opening year – Moderate adverse</p> <p>Significant</p> <p>Year 15 – Moderate adverse</p> <p>Significant</p>

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 13 Public Right of Way crossing M11 Motorway (55/6)	Medium	The Proposed Development would result in the introduction of new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. 	Opening year – Medium adverse Year 15 – Medium adverse	<p>The Proposed Development will result in new buildings along the southern boundary which will change the views from the elevated pedestrian footbridge crossing the M11. This will result in an urbanising effect on the views and the existing Schlumberger Gould Research Centre would be screened by the intervening buildings and will no longer feature in the views. This will have an increased urbanising effect on the views of West Cambridge.</p> <p>Views of the Proposed Development along the M11 will be limited to glimpses from specific locations where there are gaps in the vegetation and the M11 is not in cutting. Views will be limited to northbound traffic.</p> <p>Mitigation to control light spill from external lighting will reduce the effects of sky glow on the views at night time. The built forms will have a staggered roof line with the lower buildings along the southern boundary, this would add a variety to the built forms reducing the intensification.</p> <p>Through the use of vegetation, associated with the Woodland Management Plan, and building treatments the longer term effects of urbanisation will be reduced.</p> <p>This would be a permanent adverse effect.</p>	Opening year – Slight adverse Not significant Year 15 – Slight adverse Not significant
Viewpoint 14 Public Right of Way to the west of Laundry Farm (55/6)	Medium	The Proposed Development would result in the introduction of new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	<ul style="list-style-type: none"> Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development ‘backs’ are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	Opening year – Medium adverse Year 15 – Medium adverse	<p>Medium distance views of the Proposed Development will be possible from the public right of way where new buildings extend above the intervening hedgerows and screening vegetation. The Proposed Development would introduce new built forms into a view that contains open agricultural fields in the foreground and a mixture of existing built forms concentrated at the south eastern portion of the Site.</p> <p>The new buildings along the southern boundary will create a change of view from this receptor that will result in an abrupt edge to the Site and an urbanising effect to the view.</p> <p>Building treatments, limits on plot size together with the built forms and staggered roof heights, with the lower buildings along the southern boundary would add a variety to the built forms while minimising the urbanising effects.</p> <p>Mitigating to control light spill, in particular the spread to surrounding open landscape to the south of the Site, would reduce the impact upon the visual amenity of the receptor particularly when seen against the skyline at night.</p> <p>Reinforcement of the existing screening vegetation, controlled through the Woodland Management Plan, along the southern boundary will provide some transition to an abrupt change in character along this south settlement edge. The effects will reduce overtime as the new planting matures.</p> <p>This would be a permanent adverse effect.</p>	Opening year – Moderate adverse Significant Year 15 – Slight adverse Not significant

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 15 Grantchester Road	Low	The Proposed Development would result in the introduction of new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development ‘backs’ are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	Opening year – Low adverse Year 15 – Low adverse	Medium distance glimpsed views of the Proposed Development will be possible from the elevated approach to the M11 overbridge. The Proposed Development would introduce new built forms into a view that contains the M11 and open agricultural fields in the foreground and a mixture of existing built forms concentrated at the south eastern portion of the Site. Views of the new buildings will be limited to the upper storeys of the southern and western facades and rooftops, which extend above the screening vegetation and the intervening M11, resulting in an urbanising effect. Mitigating to control light spill, in particular the spread to surrounding open landscape to the south of the Site, would reduce the impact upon the visual amenity of the receptor particularly when seen against the skyline at night. Building treatments and limits on plot size together with the staggered roof line, with the lower buildings along the southern boundary, would add a variety to the built forms which will minimise the urbanising effects. Reinforcement of the existing screening vegetation, controlled through the Woodland Management Plan, along the southern boundary will provide some transition to an abrupt change in character along this south settlement edge. The effects will reduce overtime as the new planting matures. This would be a permanent adverse effect.	Opening year – Slight adverse Not Significant Year 15 – Slight adverse Not significant
Viewpoint 16 Barton Road	Medium	The Proposed Development would result in the introduction of new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow.	<ul style="list-style-type: none"> Where service areas, multi storey car parks and development ‘backs’ are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application; Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan. 	Opening year – Medium adverse Year 15 – Medium adverse	A dense block of woodland along the northern boundary of Barton Road limits views of the Proposed Development to a short section of the road just north of the roundabout junction with Grantchester Road and Coton Road. Here longer distance glimpsed views of the Proposed Development will be possible. The introduction of the proposed buildings would increase the existing massing of built forms within this view. The built forms will have a staggered roof line with the lower buildings along the southern boundary, this would add a variety to the built forms reducing the intensification. After 15 years the strengthened boundary planting, associated with the Woodland Management Plan, will begin to mature and intervening vegetation, between the viewpoint and the Proposed Development, will develop to soften views. External lighting could result in an increase in sky glow but mitigation will minimise the effect and is unlikely to be perceptible from this distance. This would be a permanent adverse effect.	Opening year – Moderate adverse Significant Year 15 – Slight adverse Not significant
Viewpoint 17 Cambridge Rugby Football Club	Low	The Proposed Development would result in new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	None proposed	Opening year – Negligible Year 15 – Negligible	There is substantial mature vegetation and some existing built form between the viewpoint and the Proposed Development which effectively screens views northwards. The viewpoint is outside of the ZTV and views from the rugby club would not feature the Proposed Development. External lighting could result in an increase in sky glow but mitigation will minimise the effect and is unlikely to be perceptible due to the existing intervening development. There would be no effect.	Opening year – Neutral Not significant Year 15 – Neutral Not significant

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 18 Coton Road	Medium	The Proposed Development would result in new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development ‘backs’ are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application. 	Opening year – Medium adverse Year 15 – Medium adverse	The Proposed Development would introduce new built forms into an existing long distance view. The blocks of woodland, north and south, of Grantchester Road would limit views of the Proposed Development to the upper storeys and rooftops of the new buildings and the new energy centre flue which would form new features on the skyline. This would have an urbanising effect and give the impression of a westward extension of the city. Mitigating to control light spill, in particular the spread to surrounding open landscape to the south of the Site, would reduce the impact upon the visual amenity of the receptor particularly when seen against the skyline at night. Building treatments and limits on plot size, along with the introduction of a few legacy trees along the southern boundary, will minimise the urbanising effects. This would be a permanent adverse effect.	Opening year – Slight adverse Not significant Year 15 – Slight adverse Not significant
Viewpoint 19 Public Right of Way south west of Grantchester (106/6)	Medium	The Proposed Development would result in new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	None proposed	Opening year – Negligible Year 15 – Negligible	Most of this public right of way will not afford views of the Proposed Development due to the intervening vegetation comprising blocks of woodland, groups and individual trees and hedgerows along field boundaries. A short section of the public right of way near Grantchester will experience glimpsed long distance views of the energy centre flue. These will not be prominent features within the view. Mitigation to prevent light spill, in particular the spread to surrounding open landscape to the south of the Site, would minimise sky glow. This is unlikely to be perceptible over the long distance. There would be no effect.	Opening year – Neutral Not Significant Year 15 – Neutral Not Significant

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 20 Public Right of Way west of Grantchester (106/5)	Medium	The Proposed Development would result in new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	<ul style="list-style-type: none"> The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m; Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD; The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m; Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials; Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development; Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing; Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site; Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location. Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside; Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting; Where service areas, multi storey car parks and development ‘backs’ are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed; Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application. 	Opening year – Low adverse Year 15 – Low adverse	The Proposed Development will result in new buildings along the southern boundary. The upper storeys and rooftops of these new buildings and the energy centre flue will be visible from this footpath. Due to the long intervening distance this will result in a minor change in views from this receptor which will result in a slight urbanising effect. Limits on building massing along the southern boundary and building treatments, along with the introduction of a few legacy trees along the southern boundary, will minimise the urbanising effect. Mitigation to prevent light spill, in particular the spread to surrounding open landscape to the south of the Site, would minimise sky glow. This is unlikely to be perceptible over the long distance. This would be a permanent adverse effect.	Opening year – Slight adverse Not Significant Year 15 – Slight adverse Not Significant
Viewpoint 21 Public Right of Way along the top of Chapel Hill (117/15)	Medium	The Proposed Development would result in new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	None proposed	Opening year – Negligible Year 15 – Negligible	The viewpoint has long distance views from the elevated vantage point looking across the landscape with the Proposed Development in the distance. New buildings along the southern boundary will be seen as part of a wider view with Cambridge City in the background. The Proposed Development would form a visible element within the existing view of the wider Cambridge conurbation resulting in an urbanisation effect. Due to the long intervening distance the Proposed Development will result in a minor change in a small proportion of the overall view from this receptor. Mitigation to prevent light spill, in particular the spread to surrounding open landscape to the south of the Site, would minimise sky glow. This is unlikely to be perceptible over the long distance. There would be no effect	Opening year – Neutral Not Significant Year 15 – Neutral Not Significant

Baseline		Impact assessment				
Visual receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Viewpoint 22 Chapel Hill	Low	The Proposed Development would result in new buildings close to the southern boundary of the Site. External lighting and lighting from windows would contribute to sky glow	None proposed	Opening year – Negligible Year 15 – Negligible	The viewpoint has long distance views from the elevated vantage point looking across the landscape with the Proposed Development in the distance. New buildings along the southern boundary will be seen as part of a wider view with Cambridge City in the background. The Proposed Development would form a visible element within the existing view of the wider Cambridge conurbation resulting in an urbanisation effect. Due to the long intervening distance the Proposed Development will result in a minor change in a small proportion of the overall view from this receptor. Mitigation to prevent light spill, in particular the spread to surrounding open landscape to the south of the Site, would minimise sky glow. This is unlikely to be perceptible over the long distance. There would be no effect	Opening year – Neutral Not Significant Year 15 – Neutral Not Significant
Viewpoint 23 Castle Mound	Medium	The Proposed Development would result in new buildings infilling the Site. External lighting and lighting from windows would contribute to sky glow	<ul style="list-style-type: none"> Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter; Long distance views shall be considered in the location of plant; Plant should be considered as a way to add variation and interest in the roofscape; Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials; Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines; Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment; If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that don't overwhelm key open spaces; Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone; An artificial lighting scheme shall be submitted with each reserved matters application. 	Opening year – Low adverse Year 15 – Low adverse	The Castel Mound will have medium distance views of the Proposed Development, from an elevated location, between gaps in the intervening vegetation and built form. Only the very tops of some of the buildings and the energy centre flue will be glimpsed resulting in a minor change in views from this receptor. The viewpoint is located close to the city centre and is surrounded by external artificial lighting. Sky glow from the Proposed Development would not be perceptible. This would be a permanent adverse effect.	Opening year – Slight adverse Not significant Year 15 – Slight adverse Not significant

8.3 Mitigation measures

- 8.3.1 Relevant planning policy and supplementary guidance for Cambridge have informed the environmental design as an integral part of the Proposed Development. Key considerations include important views, landscape character and the quality of the setting of Cambridge as well as the landscape constraints identified as part of the baseline desk study, survey and consultation. The objective is to protect and enhance the intrinsic character of the local landscape with reference to key characteristics and features *which* help inform the siting, massing, design and materials of the Proposed Development.
- 8.3.2 Design principles based on relevant planning policy and supplementary guidance to minimise the impact on landscape character views and visual amenity include:
- Maximising the positive aspects of the Proposed Development and its surroundings through creative design and use of local materials, including native planting in order to enhance the local sense of place and adjacent rural landscape character, with emphasis on environmental quality and sustainability;
 - Identifying the existing features, habitats and planting for retention and protection;
 - Designing the scale, massing and layout, and arrangement of features and finishes, to integrate the Proposed Development into the grain of the urban edge including adjacent landscape character areas of the north west Cambridge site and adjacent Green Belt and reduce visibility of the Proposed Development in views across the area;
 - Creating opportunities to improve landscape character of the Proposed Development on the urban edge through an integrated approach to mitigation improving biodiversity, connectivity and amenity of the urban edge is improved;
 - Providing adequate land for tree planting where possible within and along the boundaries so the Proposed Development can be successfully integrated into the wider rural landscape and provides a 'soft green edge to the City';
 - Carefully consider the location and design of lighting, in relation to the Institution of Lighting Engineers guidance, to minimise light spill into the surrounding Green Belt;
 - Selecting a palette of building finishes, including the choice of colour and materials, and planting types and species which is sympathetic to the setting of the Site; and
 - Implementing a landscape management plan to ensure the maintenance of existing features and the establishment of the new planting and the management of replacement habitats, including those features which are specifically aimed at providing ecological mitigation.
- 8.3.3 Based on these principles specific mitigation measures have been identified for the construction and operational phases which will avoid or reduce the identified significant effects.

Construction phase

- 8.3.4 During construction the following mitigation measures will be implemented. This will be achieved by specifying these measures in the Construction Environmental Management Plan.

- Vegetation on Site to be retained will be protected from accidental damage during construction by erecting temporary fencing;
- Temporary hoarding will be used around all construction compounds and work sites to screen views of construction activities;
- The use of security lighting during construction will be minimised. Where it is needed Institute of Lighting Engineers guidance³ will be followed to minimise light spill;
- Construction traffic to and from the Site will travel along haul routes agreed with Cambridgeshire County Council. The haul routes will avoid Cambridge city centre and Madingley Road west of the M11, where possible;
- Mitigation measures to minimise construction noise will help to preserve the tranquil character of the adjacent landscape character areas; and
- Operation of a clean and tidy construction site, including the covering of stockpiles.

Operational phase

- 8.3.5 As discussed in Chapter 4 (Alternatives) the parameter plans have been amended to minimise the impact of building mass on the views and the surrounding landscape character areas. This has been achieved by reducing the overall heights of the buildings across the Site and by stepping building heights so that buildings adjacent to the Site boundaries are lower than buildings in the centre of the Site.
- 8.3.6 In addition the following design measures are included in the Design Guidelines to minimise the effects of the Proposed Development on specific viewpoints and landscape character areas:
- Existing north-south streets will be further greened through the use of development setbacks and landscaped areas formed alongside High Cross and Western Access/Ada Lovelace Road;
 - The maximum length of an uninterrupted building frontage and/or roof line will not exceed 50m – The frontages longer than 50m shall employ at least one of the strategies described in Figure 24 of the Design Guidelines for breaking the long frontages. The choice of one or more of the strategies will depend on the location on the site: some strategies will be better suited for the site edges (for example using planting adjacent to woodland buffers) others will be required along streets or key spaces (for example varying roof lines and building lines);
 - Lengths of unbroken frontages on multi storey car parks will be limited to 50m – Frontage lengths of multi storey car parks longer than 50m shall be broken by introducing one or more of the strategies and/or other measures described in Figure 25 of the Design Guidelines, which achieve the effect of introducing variety and breaking down the frontage length;
 - Maximum build-to lines along High Cross Avenue will be setback from the road corridor by at least 8m on the eastern side and by at least 5m on the western side of the street – Thus, together with the road corridor of 25.3m, the width between buildings along High Cross shall be a minimum 38.3m in the south and 44.8m minimum in the north;
 - At the southern end of High Cross Avenue, an additional frontage height restriction of 33m AOD (to the west) and 35m AOD (to the east) will be applied. Any development above these heights will be set back by a minimum of 5m from the primary frontage line;

³ Institute of Lighting Engineers, 2011, Guidance notes for the reduction of obtrusive light GN01:2011

- Building Zones along JJ Thompson Avenue are set to allow for a 10m buffer between the stems of the existing trees and the proposed building faces (maximum Build to Line) – This provides an additional zone of minimum 4m between the edge of the road corridor and the building faces on each side. Thus, together with the road corridor width of 25.3m, the width between buildings along JJ Thomson Avenue shall be minimum 33.3m;
- Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site;
- Frontages facing the southern landscape will have a high quality architectural treatment and materials. Materials and facade design will respond to this south facing location.
- Primary frontages will be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials;
- The development of continuous roof lines of consistent height along the key spaces, streets and Green Links will be avoided and preference will be given to compositions with varying roof lines and accents;
- Development along the Southern Edge will respond to long distance views. Long frontages here will be broken/varied and additional tree planting and landscape will be introduced to provide a softer, woodland edge;
- Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary will not exceed 31m AOD;
- At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form will comply with an additional height restriction of 25m AOD. From this line, the development heights will remain within envelope rising by 45° angle to the parameter height of 31m AOD;
- Colour choice of façade materials will be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development;
- Highly visible façades, located at sensitive edges and/or facing key spaces will be treated using high quality materials and detailing;
- Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades will provide variation and interest through use of setbacks, varied roofline and use of materials and planting;
- Treatment of façades will be sensitive in scale and the use of materials;
- Materials for less visible façades will be robust and designed to age well;
- Planting at the West Forum will reinforce the visual connection from the upper areas to the wider landscape and the Southern Ecological Corridor;
- Existing mature planting and hedgerows within the East Pond area and along the Southern edge will be maintained with the appropriate tree buffer zone. New tree planting will be accommodated within the East Pond space (to the north of the pond) to ensure that new development is set within landscape;
- Large feature tree planting will be provided at a minimum of 5 key locations within The Green public open space area, such as at the gateways to The Green or key nodes within the space – Where large trees are planted they will be given the appropriate environmental conditions and space to grow to maturity;
- Large feature tree planting will be provided at a minimum of 5 key locations along the Southern edge – Where these trees are planted they will be given the proper environmental conditions and space to grow to maturity and will be provided with a 15m buffer, in accordance with the Woodland Management Plan (Appendix 8.4, Volume 3);
- Supplemental new planting to the Southern edge will be provided to ensure a soft edge to the Site and a transition from the Site to open countryside;
- Large feature tree planting will be incorporated at key locations along High Cross, such as: the gateway to Madingley Road and the interface with The Green – Large tree species will be given the appropriate environmental conditions and space to grow to maturity;
- Large feature tree planting will be incorporated at key spaces along JJ Thompson Avenue such as the gateway to Madingley Road and the interface with The Green – Large tree species will be given the appropriate environmental conditions and space to grow to maturity;
- The buffer along the Madingley Road edge will serve as a screening element for the Proposed Development – The buffer will be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3);
- Any gaps or setbacks in development frontages along Madingley Road will contain landscape planting and greenery to soften the development edge;
- Any new landscaped gaps between buildings along the western edge will be a minimum of 20m from building face to building face;
- The impact of plant (and rooftop plant in particular) on building design and on open spaces will be carefully considered from the concept stage of design;
- Wherever possible, plant will be placed on roofs in locations where it will not be visible from the public realm;
- Any plant required to be provided as a separate structure will not be located next to or within the key open spaces;
- Screening or parapets around plant locations will be employed to reduce visibility of plant locations and reduce clutter;
- Long distance views will be considered in the location of plant;
- Plant will be considered as a way to add variation and interest in the roofscape;
- Medium and large plant will be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so will be treated with appropriate materials;
- Visual impact of large plant areas will be reduced by breaking their volume and providing variation in rooflines;
- Any parts of building facade related to plant will not be inferior to the rest of the facade in materials and treatment;
- If larger flues are required, they will be treated as part of the architectural concept design and placed in locations that do not overwhelm key open spaces;
- Where service areas, multi storey car parks and development 'backs' are located along the edges, they will be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed;

- Rooftop plant will be set back from the Southern Building Zone edge and there will be effective screening of all rooftop plant, when viewed from the south;
- Any new artificial lighting to buildings or spaces will ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone;
- An artificial lighting scheme will be submitted with each reserved matters application;
- Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan;
- Rooftop plant shall not be located within the 32m AOD zone along Madingley Road;
- Any rooftop plant within the 37m or 41m AOD zone along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road;
- The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m.

8.4 Summary

8.4.1 The operational phase will result in a densification of the Site with new contemporary institutional and commercial buildings which will be visible from long distances and result in an urbanising effect at the edge of the city. At the opening year, this will result in temporary significant adverse effects to the following landscape and visual receptors:

- Landscape character area C – West Cambridge Central Core;
- Landscape character area E – Madingley;
- Landscape character area F – Coton;
- Landscape character area G – Grantchester;
- Viewpoint 1 – Public viewpoint within the Coton Countryside Reserve;
- Viewpoint 3 – Harcamlow Way (39/31a);
- Viewpoint 4 – Wimpole Way (39/31a);
- Viewpoint 5 – Clerk Maxwell Road;
- Viewpoint 6 – Wilberforce Road;
- Viewpoint 7 – Dane Drive;
- Viewpoint 8 and 9 – Conduit Head Road and Madingley Road;
- Viewpoint 10 – Public Right of Way to the south of Harcamlow Way (55/9);
- Viewpoint 12 – Madingley Road (East)
- Viewpoint 14 – Public Right of Way to the west of Laundry Farm (55/6); and
- Viewpoint 16 – Barton Road.

8.4.2 Fifteen years after opening the screening vegetation and landscape planting will have matured which will soften the built form of the Proposed Development and maximise the screening effect of boundary planting. This will reduce the magnitude of the impact of the Proposed Development. At year fifteen after opening there will be significant effects to the following landscape and visual receptors:

- Landscape character area C – West Cambridge Central Core;
- Landscape character area E – Madingley;
- Landscape character area F – Coton;
- Landscape character area G – Grantchester;
- Viewpoint 1 – Public viewpoint within the Coton Countryside Reserve;
- Viewpoint 6 – Wilberforce Road;
- Viewpoint 7 – Dane Drive;
- Viewpoint 8 and 9 – Conduit Head Road and Madingley Road;
- Viewpoint 10 – Public Right of Way to the south of Harcamlow Way (55/9); and
- Viewpoint 12 – Madingley Road (East).

8.4.3 These significant effects on landscape and visual receptors should be considered in the context of the existing planning permission which allows for dense built development along the southern boundary of the Site. Many of the significant effects to visual receptors to the south of the Site from the Proposed Development would occur if the existing planning permission were to be fully built out.

10. Traffic and transport

10.1 Introduction

10.1.1 This chapter updates the traffic and transport assessment in the submitted ES to show the changes resulting from further detailed discussions with Highways England, Cambridge City Council and Cambridgeshire County Council in 2016 and 2017. This has resulted in further work being undertaken to the modelling that informed the Transport Assessment specifically relating to:

- The cumulative development quantum assumed across the region, to reflect the full Local Plan allocations;
- Updated person trip data for the land uses within West Cambridge;
- Updated local traffic count data following completion of local roadworks;
- Alternative trip length data sources to synthesise the origins of West Cambridge Development trips; and
- Locally, the assignment of West Cambridge trips to reflect amendments to the on-site car parking provision.

10.1.2 The following sections require updating to reflect the amended Proposed Development and are presented in this chapter:

- Scope of assessment;
- Relevant legislation and policy;
- Method of assessment;
- Baseline conditions;
- Impact assessment;
- Mitigation measures;
- Summary.

10.2 Scope of the assessment

10.2.1 The Transport chapter provides the details of development impacts on the existing transport network for walk, cycle and public transport usage, as well as from vehicular traffic.

10.2.2 Reflecting the subject matter and order of topics as stated in the Guidelines for the Environmental Assessment of Road Traffic, this Chapter considers significant effects deriving from any:

- Severance;
- Driver delay;
- Pedestrian delay (also considering cyclist delay);
- Pedestrian amenity (also considering cyclist amenity);
- Fear and intimidation;

- Road safety; and
- Hazardous loads.

10.2.3 No hazardous loads are associated with the construction, operation or decommissioning of the Proposed development and therefore have been scoped out of the assessment.

10.2.4 The potential effects of the Proposed Development have been considered for the following three scenarios:

- The effects of the Construction Phase of Development – this is assessed in the context of the 2016 Base flows;
- The operational effects of completion of the Initial Phase of Development in 2021 – cumulative impact assessment; and
- The operational effects of the Full Development in 2031 – cumulative impact assessment.

10.2.5 This assessment refers to the detailed Transport Assessment prepared in support of the Proposed Development. The Transport Assessment document is separate to the Environmental Statement.

10.2.6 A list of consultation responses received from statutory consultees during the EIA process relating to traffic and transport is presented in Table 10.1. All comments have been considered within this assessment.

Table 10.1 Traffic and transport scoping response

Issue raised	Respondent
The Guidance for Transport (2007) is now archived. Whilst still of value, and its use is welcomed in this process, this is not technically DfT guidance. The list of criteria should include the DfT Circular 02/2013 “The strategic road network and the delivery of sustainable development”, this being current DfT policy in terms of planning in regard to the SRN	David Abbott, Asset Manager - Area 8, Highways England
Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. The EIA should consider potential impacts on rights of way in the vicinity of the development. Appropriate mitigation should be incorporated for any adverse impacts. We also recommend reference to the relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.	Janet Nuttall, Sustainable Land Use Advisor, Natural England
How has linking this development (and that proposed in NW Cambridge) to the city centre, railway station, Addenbrookes and other major sites within the Cambridge (<i>sic</i>) been included? This includes bus lanes, cycle routes, etc, as the A1303 has already become a challenge at peak times. Both Cambridgeshire County Council and the University should look at transport alternatives for all development. One alternative for consideration could be a new Guided Busway starting at St Neots through Cambourne and Bourne Airfield, Hardwick, Coton, then NW Cambridge, through West Cambridge and into the city along Barton Road.	Stacey Weiser, Head of Planning and Conservation, Cambridge Past, Present and Future

Issue raised	Respondent
<p>Construction Environment Management Plan – Prior to the commencement of development or any reserved matters approval, a site-wide CEMP shall be submitted to and approved in writing by the local planning authority. The CEMP shall include the consideration of the following aspects of construction: (<i>inter alia</i>).</p> <p>b) Contractors' access arrangements for vehicles, plant and personnel including the location of construction traffic routes to, from and within the site, details of their signing, monitoring, and enforcement measures, along with location of parking for contractors and construction workers.</p> <p>Para 3.8.3 first sentence suggest amend to say 'The public transport provision will be developed to be complementary with the aspirations set out in the Transport Strategy for Cambridge and South Cambridgeshire, some of which will be delivered via the ongoing City Deal process'.</p> <p>Para 3.8.4: in Cambs cycle trips are made over longer distances than the typically assumed 5km national average. Para should be amended to reflect this.</p> <p>Para 3.8.7: last bullet 'smaller concentrations of cycle parking at a range of locations....'</p> <p>Para 9.3.9: At the end of para please add 'The study area for the Transport Assessment (TA) may well be more extensive as the use of a 30% threshold is not considered refined enough for the assessment of operational traffic and transport implications.</p> <p>Para 9.3.12: at the end of para please note 'there may be a need for immediate years to be considered in the TA so that the impacts of phasing understood'.</p> <p>Para 9.3.18: suggest adding the following to the end of this para 'It should be noted that these criteria relate to ES thresholds but it is recognised that in operational highway terms much lower thresholds can be important and will be considered via the TA process'.</p> <p>Para 9.3.20: are these thresholds relevant / applicable to local highways?</p> <p>Para 9.3.2: these thresholds sound too coarse for detailed assessment of pedestrian delays in a TA context.</p>	<p>Judith Carballo, Economy, Transport and Environment, Cambridgeshire County Council</p>

10.3 Relevant legislation

National Planning Policy Framework (NPPF)⁴

10.3.1 A Transport Statement or Transport Assessment and Travel Plan should be provided for all developments that generate significant amounts of movement (Paragraphs 32 and 36 of the NPPF) and decisions should ensure that they "are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised" (Paragraph 34), and take account of whether:

- The opportunities for sustainable transport modes have been taken up...;
- Safe and suitable access to the site can be achieved for all people; and
- Improvements can be undertaken within the transport network that cost effectively limits the significant impacts of the development....

10.3.2 To facilitate the use of sustainable modes of transport, paragraph 35 states that, where feasible, developments should be located and designed to:

- Accommodate the efficient delivery of goods and supplies;

- Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;
- Create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians...;
- Incorporate facilities for charging plug-in and other ultra-low emission vehicles; and
- Consider the needs of people with disabilities by all modes of transport.

Circular 02/2013 'Strategic Road Network and the Delivery of Sustainable Transport'⁵

10.3.3 Relevant policy is also set out in Circular 02/2013 'The Strategic Road Network and the Delivery of Sustainable Development' published by Highways England (then operating as the Highways Agency) in September 2013. This sets out the role of Highways England in engaging with communities and developers to deliver sustainable development and economic growth.

10.3.4 Paragraph 9 sets out the broad policy aims of the circular as it relates to development proposals, stating that:

"Development proposals are likely to be acceptable if they can be accommodated within the existing capacity of a section (link or junction) ... or they do not increase demand for use of a section that is already operating at over-capacity levels, taking account of any travel plan, traffic management and/or capacity enhancement measures that may be agreed...."

10.3.5 With reference to decision making regarding developments, paragraph 9 continues:

"However, development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe".

10.3.6 The emphasis of this document reflects national guidance, stressing the obligation placed on every developer to 'manage down' traffic generation from new development and to provide evidence that proposals for measures to reduce traffic generation from the site have been considered.

Cambridge Local Plan 2014⁶

10.3.7 15 strategic objectives are identified for the implementation of the Local Plan under the spatial vision for Cambridge, including:

- *"Promote and support economic growth in environmentally sustainable and accessible locations, facilitating innovation... while maintaining the quality of life and place that contribute to economic success;*
- *Be located to help minimise the distance people need to travel, and be designed to make it easy for everyone to move around the city and access jobs and services by sustainable modes of transport"*.

⁴ Department for Communities and Local Government, March 2012, National Planning Policy Framework

⁵ Highways Agency (now Highways England) and the Department for Transport, September 2013, Strategic Road Network and the Delivery of Sustainable Development

⁶ Cambridge City Council, July 2013, Cambridge Local Plan 2014 Proposed Submission

10.3.8 Policy 5 of the spatial strategy regards strategic transport infrastructure, placing emphasis on modal shift and greater use of sustainable transport. In particular, the following points will be supported, with the ones relevant to West Cambridge identified:

- *“Promoting greater pedestrian and cycle priority through and to the city centre, district centres and potentially incorporating public real and cycle parking improvements;*
- *Promoting sustainable transport and access for all to and from major employers, education and research clusters...;*
- *Working with partners in supporting...city-wide cycle and pedestrian network by addressing ‘pinch-points’, barriers and missing links;*
- *Linking growth to the proposed city-wide 20mph zone;*
- *Easing pressure on the air quality management area in the city centre”.*

10.3.9 Policy 18 identifies that densification of West Cambridge will be permitted, stating:

“Development of this area will be permitted in line with the existing planning permissions. The principal land uses will be:

- *D1 educational uses, associated sui generis research establishments and academic research institutes...*
- *A mix of commercial research uses within use class B1(b)...*

Small-scale community facilities, amenities, and A1 (local shop), A3 (café), A4 (public house), D1 (crèche) type uses and student accommodation will be acceptable, if they support existing occupants on the site and add to the social spaces and vibrancy of the area, essential to its continued success.

Any densification of development on the site that results in a significant increase in floorspace, over that already approved, will be supported providing that:

- *A revised masterplan has been proposed that takes an integrated and comprehensive approach to the provision and distribution of the uses, and supporting facilities and amenities;*
- *Phasing of the development will be determined through the masterplan and as the need is proven;*
- *Development should not exceed four commercial storeys (16 metres in total) and given the sensitivity of the Green Belt to the south and west a lower overall height may be appropriate along these edges;*
- *Proposals respect the important adjacent Green Belt setting to the south and west, and other neighbouring residential uses and views of the city from the west;*
- *It includes a comprehensive transport strategy for the site, incorporating a sustainable transport plan to minimise reliance on private cars. This should include assessing the level, form and type of car parking on the site;*
- *That walking, cycling and public transport links (including access for all) to the city centre, railway station(s), other principal educational and employment sites, and other key locations within the city are enhanced to support sustainable development; and*

- *That proposals provide appropriate green infrastructure which is well integrated with the existing and new development and with the surrounding area.*

Greater Cambridge City Deal⁷

10.3.10 The Greater Cambridge City Deal was agreed between the Government and the Greater Cambridge City Deal (comprising Cambridge City Council, Cambridgeshire County Council, South Cambridgeshire District Council, University of Cambridge, Greater Cambridge Greater Peterborough Local Enterprise Partnership) in June 2014, allowing Greater Cambridge to maintain and grow its status as a prosperous economic area, whilst maintaining ease of movement between economic hubs.

“Greater Cambridge needs to connect new developments to each other, and to existing research institutes, science and business parks; to Cambridge city centre and transport hubs... There will be new orbital bus routes around Cambridge and new high quality public transport links into Cambridge on key corridors connecting with major employment centres.”

10.3.11 West Cambridge Development transport proposals align well with this aspect of the Greater Cambridge City Deal, making more efficient use of an existing hub, whilst maximising sustainable travel opportunities available from the 2014 City Deal.

Cambridgeshire Local Transport Plan 2011 – 2031⁸

10.3.12 The third Cambridgeshire Local Transport Plan (LTP3) sets out the transport objectives, policies and strategy for the county. The document was updated in 2014 “to reflect new data and changing context with regard to funding and development plans” and identifies large scale growth and the associated pressure on the transport network and the environment as a key issue affecting Cambridgeshire.

10.3.13 Having outlined the objectives of the LTP3, the document sets out 8 challenges for transport, along with strategies to address each challenge. The ones relevant to West Cambridge are discussed below.

- Challenge 2: Reducing the length of the commute and the need to travel by private car - *“our transport strategy supports the development strategy for Cambridgeshire by aiming to reduce the need to travel and by providing sustainable travel options for new developments”;*
- Challenge 3: Making sustainable modes of transport a viable and attractive alternative to the private car - *“by continuing to develop sustainable networks for walking and cycling, making it easier for people to change between modes of transport and working with bus operators to provide high quality bus services... We aim to improve the environment and safety for pedestrians, cyclists and public transport users... Focus on raising awareness of transport choices available... this will include work with local planning authorities to ensure provision for sustainable modes that form an integral part of new developments”.*

⁷ Deputy Prime Minister’s office, June 2014, Greater Cambridge City Deal

⁸ Cambridgeshire County Council, July 2015, Cambridgeshire Local Transport Plan 2011-2031

Transport Strategy for Cambridge / South Cambridgeshire⁹

- 10.3.14 The Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) ensures local councils plan together for sustainable growth and continued economic prosperity in the area. It was adopted by Cambridgeshire County Council in 2014 and is to be regularly reviewed given the extent of growth and development in the area. The strategy has two main roles for improving access across the area:
- To provide a detailed policy framework and programme of transport schemes for the area, addressing current problems, and being consistent with the Cambridgeshire LTP3;
 - Supporting the Cambridge and South Cambridgeshire Local Plans, taking into account future levels of growth in the area and detailing the transport infrastructure and service necessary to deliver this growth.
- 10.3.15 The document sets out a number of transport policies and supporting strategies for the development of movement in the region:
- TSCSC 1 The strategy approach - “The transport network will support economic growth, mitigate the transport impacts of the growth and help protect the areas distinctive character and environment”.
 - TSCSC 2 Catering for travel demand in Cambridge - “*More people will walk, cycle and use public transport services for journeys into, out of and within the city. More people will car share;*”
 - TSCSC 7 Supporting sustainable growth - “*New development will be required to make provision for integrated and improvement transport infrastructure to ensure that most people have the ability to travel by foot, bicycle or by passenger transport and in line with specified modal split targets where relevant*”.
 - TSCSC 9 Access to jobs and services – “*Access to areas of employment and key services will be maximised, particularly by sustainable modes of travel, to:*
 - *Provide a transport network that is efficient and effective;*
 - *Provide good accessibility to services and for businesses;*
 - *Provide a HQPT and cycle network to routes near major employment, education and service centres*”.
 - TSCSC 12 Encouraging Walking and Cycling” - “*All new development must provide safe and convenient pedestrian and cycle environments including adequate and convenient cycle parking and ensure effective and direct integration with the wider network.*”

10.4 Method of assessment

Assessment approach

- 10.4.1 The method used to assess the effects of traffic associated with the Proposed Development is set out within the Transport Assessment. A transport model has been constructed of the local highway to evaluate the movement of trips generated by the Proposed Development on the external highway network in the area.

- 10.4.2 The assessment has been undertaken in accordance with the following guidelines:

- Guidelines for the Environmental Assessment of Road Traffic (IEMA)¹⁰;
- Design Manual for Roads and Bridges (DMRB)¹¹;
- Local Cambridgeshire County Council guidance.

Scenarios

Year of assessment

- 10.4.3 It is anticipated that construction of the Proposed Development will commence in 2017 and will take around 14 years to build out, i.e. through to 2031. In order to examine this “worst case”, the overall EIA has tested the operational phase in 2031 – this is coincidentally, consistent with the Joint Authorities’ latest available transport modelling assessment years for testing the emerging Local Plan.
- 10.4.4 Because of the timescales involved to 2031, this includes a substantial element of uncertainty in terms of
- Development delivery across the Cambridge Sub Region;
 - The associated infrastructure provision necessary to accommodate this level, of growth particularly relating to:
 - The A14 Huntingdon – Cambridge Enhancement;
 - The Greater Cambridge City Deal transport proposals;
 - The A428 Black Cat to Caxton Gibbet Enhancement Scheme;
 - Highways England’s currently unpublished proposals for the M11;
 - Other emerging transport proposals including - inter alia - the Oxford – Cambridge Expressway, and East-West Rail;
 - The emerging development policy, including that enshrined within the Cambridge Local Plan.
- 10.4.5 As such, the transport modelling cannot robustly define a baseline scenario for 2031.
- 10.4.6 For the purposes of assessing the transport effects of the Proposed Development, the principles of the proposed strategy have been discussed and agreed with Joint Authorities. This “Adaptive Phased Approach” is summarised as incorporating both:
- A graduated approach – the assessment process reflecting current transport planning policy where travel demand management measures are introduced first, followed by any necessary highway infrastructure measures to mitigate the residual traffic impact; as well as
 - An adaptive approach – where, to maintain future flexibility, the proposed mitigation for later phases responds to the quanta of development within the individual phase proposals, the timescales for the delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty relating to the development and transport infrastructure enhancement proposals.
- 10.4.7 The effect of the Proposed Development has been assessed with reference to the:

⁹ Cambridgeshire County Council, April 2014, Transport Strategy for Cambridge and South Cambridgeshire

¹⁰ Institute of Environmental Assessment, 1993, Guidelines for the environmental assessment of road traffic

¹¹ Highways Agency, 1993, Design Manual for Roads and Bridges, Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 8 Pedestrians, Cyclists, Equestrians and Community Effects

- Do Minimum (i.e., with the Constructed West Cambridge Development, and all other committed and consented highway enhancements and developments than the Proposed Development); and
- Do Something scenarios (i.e., with the committed and consented highway enhancements and developments as well as the relevant phase of the Proposed Development).

10.4.8 The following scenarios have therefore been considered:

- Baseline
 - 2016 Baseline;
 - 2021 Do Minimum;
 - 2031 Do Minimum;
- Future
 - 2016 With Construction (assumed to have the greatest traffic impact);
 - 2021 Do Something - (reflecting committed and proposed developments including the Initial Phase of the Proposed Development as per Table 6.2); and
 - 2031 Do Something - (reflecting committed and proposed developments including the Proposed Development in its completed form).

Development quanta

10.4.9 The development quanta assumed for West Cambridge in the 2021 and 2031 Do Minimum assessments reflects the existing development in the study area.

10.4.10 For the 2021 Do Something scenario, it has been agreed that an indicative Initial Phase of Development be assumed and assessed, the composition of this Initial Phase of West Cambridge Development is shown in Table 10.2, with the assumed completion in 2021.

Table 10.2 Proposed Initial Phase of West Cambridge Development – Land Use Mix

Lane Use (GFA)	Area (m ²)
Academic Research (m ²)	168,259
Commercial Research and Research Institute (m ²)	92,386
Nursery (m ²)	1,900
Shop, Café Restaurant, Pub - A1-A5 (m ²)	350
Assembly and Leisure	6,060
Residential (m ²)	10,680
Ancillary Infrastructure (data centre, energy centre)	7,675
Total (m ²)	287,310

10.4.11 The Full Development quanta assumed for 2031 reflects the composition as stated in Chapter 3.

Access Strategy

10.4.12 Measures envisaged to mitigate the likely significant effects of this indicative Initial Phase are included later in this chapter.

10.4.13 Acknowledging that there is uncertainty regarding future development and transport infrastructure proposals, and that these would have a significant and substantial impact upon future traffic flows in the local area, as discussed with the Joint Authorities it is not appropriate to define further mitigation measures at this stage beyond an indicative Initial Phase of development (assumed to be 2021).

10.4.14 The supporting development access strategy is considered by mode within the respective Sections of the Transport Assessment as summarised below:

- Pedestrian and Cycle strategy - Section 6
- Public Transport Strategy – Section 7
- Travel Demand Management Strategy – Section 9
- Site Layout, Vehicular Access and Parking - Section 8.

10.4.15 As defined in the latter, the Vehicle access will be provided to the Development by a series of existing, enhanced and new vehicular access points off Madingley Road. These will be delivered through the duration of the Development, to a programme to be determined. These access points assumed for the 2021 assessment for the Initial Phase of Development are:

- The existing traffic signal controlled High Cross junction;
- The existing JJ Thomson Avenue priority junction; and
- The existing Clerk Maxwell Road priority junction providing access to a single Proposed Development car parking facility only.

10.4.16 In addition, a further priority junction formerly serving the Veterinary School (currently closed), between JJ Thomson Avenue and High Cross would be opened and enhanced to provide limited service access only to the occupiers immediately adjacent Madingley Road.

10.4.17 For the 2031 assessment, the above three accesses are assumed, along with a new traffic signal controlled, restricted movement (right in / left out), access junction onto Madingley Road at the western end of the site, which would connect to the Western Access Road.

Establishing the baseline

Survey data

10.4.18 For the purposes of the traffic assessment, traffic count survey data has been collated from both existing sources as well as the commissioning new traffic count surveys in order to set out baseline traffic flows.

10.4.19 Traffic Turning Count Surveys were commissioned by the University of Cambridge at the flowing junctions and were undertaken on 25th November 2014 by Advanced Transport Research (ATR):

- Madingley Road / JJ Thomson Avenue;
- Adams Road / Wilberforce Road;
- Grange Road / Adams Road / Burrell's Walk;

- Madingley Road / Clerk Maxwell Road; and
 - Madingley Road / Madingley Rise.
- 10.4.20 Additional traffic turning count surveys were undertaken by Sky High Technology on Tuesday 30th June 2015 at the following junctions:
- A1303 / A428 / St Neots Road roundabout;
 - M11 Junction 13 Off-Slip / Madingley Road West junction;
 - M11 Junction 13 On-Slip / Madingley Road East junction;
 - Madingley / Grange Road priority junction;
 - Huntingdon Road / Girton Road priority junction;
 - Huntingdon Road / Storey's Way priority junction;
 - Barton Road / Grange Road priority junction;
 - Madingley Road / Cambridge Road crossroad priority junction;
 - Madingley Road / Lady Margaret Road priority junction; and
 - Madingley Rd / Northampton St / Queen's Road mini roundabout junction.
- 10.4.21 Further manual classified turning counts were commissioned by the University in October 2016 at the following junctions:
- A428 / A1303 Madingley Mulch Roundabout;
 - Madingley Road / Cambridge Road crossroad priority junction;
 - M11 Junction 13 East traffic signal controlled junction;
 - M11 Junction 13 West priority junction;
 - Madingley Road / Park and Ride traffic signal controlled junction;
 - Madingley Road / High Cross / Eddington Avenue traffic signal controlled junction;
 - Madingley Road / Madingley Rise / JJ Thomson Avenue Crossroads; and
 - Madingley Road / Clerk Maxwell Road priority junction.
- 10.4.22 Automatic Traffic Counts (ATC) were commissioned by the University of Cambridge to undertake a two week-long ATC at the following location sites from 17th June to 30th June 2015 by Sky High Technology:
- Barton Road – east of Grantchester Road;
 - JJ Thomson Avenue;
 - Grange Road – north of Clarkson Road; and
 - Madingley Road – west of M11 Junction 13.
- 10.4.23 These ATC surveys were primarily commissioned to inform the daily composition of the vehicle movements, especially to inform the noise and air quality assessments of the Proposed Development.
- 10.4.24 The Highways England Traffic Information Database (WebTRIS) website has been referred to, to provide volumetric and classified traffic flow information for the strategic highway for 2016 at:

- M11 Junction 13; and
- A14 – Junction 32

10.4.25 The Highways England Traffic Information Database (TRADS) website was referred to earlier, to provide volumetric and classified traffic flow information for the strategic highway for 2014 at:

- A14 – Junction 30 and section near to Girton.

Growth factors

10.4.26 Highways England Trip End Model Presentation Program (TEMPRO) database was used to provide the local growth factors for the Cambridge area as required, these are summarised in Table 10.3, the details shown in Appendix 10.4.

Table 10.3 TEMPRO growth factors

TEMPRO V.7.0.0 Growth Factors										
Road Classification	2015-2016 Cambridge 005 (E02003723)		2015-2016 Cambridge 007 (E02003725)		2015-2016 Cambridge 009 (E02003727)		2014-2016 Cambridge 009 (E02003727)		2013-2016 Cambridge 007 (E02003725)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Urban Trunk	1.0129	1.015	1.0151	1.0176			1.0425	1.0436		
Urban Principal Road	1.0118	1.014	1.014	1.0166					1.041	1.0487
Urban Minor Road	1.012	1.0141	1.0141	1.0167						
Rural Motorway	1.0142	1.0164	1.0164	1.019			1.0454	1.0464		
Rural Trunk	1.0151	1.0173	1.0173	1.0199	1.0239	1.0244	1.0465	1.0475		
Rural Principal	1.0126	1.0147	1.0148	1.0173						

Highway flow data

10.4.27 The trip generation from West Cambridge has been assessed for all scenarios; (Current – 2016), Do Minimum (Constructed) and Do Something for the two 2021 Initial Phase and 2031 Full Development tests, using:

- Peter Brett Associates' Transport Model; in combination with
- Observations – including person trip surveys, and site access vehicle trip movement counts.

10.4.28 Peter Brett Associates developed a first-principles Transport Model independently to assess development trip generation, distribution and mode share in this area. The West Cambridge Person Trip Model element was based on the previously-approved north west Cambridge Model - albeit expanded considerably to incorporate:

- The West Cambridge Development;
- Demographic information contained within the updated 2011 Census data and the National Travel Survey;
- The trip generation from the allocated strategic developments included within the Cambridge Local Plan; and
- The results of the 2016 University staff data postcode data analysis.

10.4.29 Further details are provided below.

Base year traffic flows (2016)

10.4.30 The 2016 vehicle flows will be derived across the network from the most appropriate source, including inter alia:

- The traffic count survey - including automatic traffic counts and manual part-classified junction turning counts - undertaken across a wider area in June 2015 as part of this West Cambridge Development (commissioned by the University following the initial Transport Assessment Scoping in May 2015);
- Further traffic count surveys undertaken along Madingley Road in October 2016 as part of the West Cambridge Development Annual Monitoring (commissioned by the University in September 2016);
- Traffic count survey data provided by Cambridgeshire County Council;
- Traffic count survey data from Highways England's TRADS and Web TRIS databases; and
- Growth factors from the Department for Transport's TEMPRO model will be used to convert all the survey results to the common year of 2016.

Calculation of 2021 traffic

10.4.31 The 2016 network traffic flows will be increased by the vehicle trips identified by Peter Brett Associates' Transport Model arising from the consented strategic development delivered by 2021 assigning along each link.

10.4.32 These 2021 flows, being based in part on observation from the surveys in 2016, would already include movements associated with West Cambridge. For the purposes of assessing the 2021 Do Something scenario for the Transport Assessment, to avoid double counting the existing West Cambridge development-generated vehicle trips:

- The Modelled 2016 West Cambridge vehicle movements would be deducted by link;
- These Modelled 2016 West Cambridge vehicle movements would be replaced with the predicted Proposed Development (Initial Phase of the Do Something scenario) also identified by the Transport Model.

10.4.33 To provide reassurance to the accuracy of these flow increases, the resulting increases in link flow will be considered with reference to the appropriate growth factor obtained from the Department for Transport's TEMPRO model. The flows are summarised in Appendix 10.3.

Calculation of 2031 traffic

10.4.34 The 2016 network traffic flows will be increased by the vehicle trips identified by Peter Brett Associates' Transport Model arising from the consented strategic development delivered by 2031 assigning along each link.

10.4.35 These 2031 flows, being based in part on observation from the surveys in 2016, would already include movements associated with West Cambridge. For the purposes of assessing the 2031 Do Something scenario for the Transport Assessment, to avoid double counting the existing West Cambridge development-generated vehicle trips:

- The Modelled 2016 West Cambridge vehicle movements would be deducted by link;
- These Modelled 2016 West Cambridge vehicle movements would be replaced with the predicted Proposed Development (Full Do Something scenario) identified by the Transport Model.

Calculation of construction traffic generation

- 10.4.36 For the Proposed Development, a first-principles approach has been undertaken to derive the peak construction trip generation assumptions used in this assessment. These flows are summarised in Table Appendix 10.1.
- 10.4.37 Reference has been made to the Construction Environmental Management Plan (CEMP) prepared by Peter Brett Associates in 2016 for West Cambridge to ascertain these movements.

Study area

- 10.4.38 The initial area of study agreed with the Joint Highway Authorities during the Transport Scoping exercise is shown on Figure 10.1.
- 10.4.39 The Institute of Environmental Assessment (now Institute of Environmental Management and Assessment (IEMA)) guidelines¹² suggest that for environmental impact, traffic flow increases (or HGV increases) of 30% represent a reasonable threshold for inclusion of highway links within the assessment process, although a lower threshold may be appropriate, for example, where there are higher HGV flows. It also suggests that links with traffic flow increases of 10% or more should be assessed in other sensitive areas. This has been used to inform the links assessed.
- 10.4.40 The transport modelling has calculated that the below listed links will experience a 30% or greater change in traffic flows in 2031 as a result of natural growth, plus growth from the specific cumulative developments and the Proposed Development.
- Link 1.3 – M11 J13 off-slip and on-slip;
 - Link 3.2 – Madingley Road on Over Bridge M11;
 - Link 3.3 – Madingley Road - Between M11 south bound on-slip to proposed Madingley Rd West Access;
 - Link 3.6 – Madingley Road – East of Proposed High Cross Access;
 - Link 3.7 – Madingley Road – East of JJ Thomson Avenue;
 - Link 3.8 – Madingley Road – East of Clerk Maxwell Road;
 - Link 3.9 – Madingley Road – East of Storey's Way;
 - Link 3.10 – Madingley Road – East of Grange Road;
 - Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street roundabout;
 - Link 3.12 – Northampton Street – West of Pound Hill;
 - Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access;
 - Link 4.2 – Huntingdon Road – East of NWC HRW Access;
 - Link 4.3 – Huntingdon Road – East of NIAB Access;
 - Link 4.4 – Huntingdon Road – East of Storey's Way
 - Link 12.1 – High Cross Access to Madingley Road;

- Link 12.2 – JJ Thomson Ave Access to Madingley Road;
- Link 12.3 – Clerk Maxwell Road – South of Car Park Access; and
- Link 12.4 – Clerk Maxwell Road – North of Car Park Access.

- 10.4.41 Similarly, the transport modelling has calculated that the below listed links will experience a 10% or greater change in traffic flows in 2031 as a result of natural growth, plus growth from cumulative developments and the Proposed Development.

- Link 4.1 – Huntingdon Road – South East of Grange Drive;
- Link 6.0 – Queen's Road – North of West Road;
- Link 9.0 – Storey's Way – between Madingley Road and Huntingdon Road; and
- Link 10.0 – Girton Road – North of Huntingdon Road.

¹² Institute of Environmental Assessment, 1993, Guidelines for the Environmental Assessment of Road Traffic



Figure 10.1 Study Area

Impact assessment

- 10.4.42 The method and significance criteria used in this assessment reflect that within the guidance documents referenced earlier within this Chapter, together with professional judgement.
- 10.4.43 The significance of effect is derived from a combination of the Sensitivity (or importance) of the receptors affected, and the magnitude (or scale) of impact from the change on the receptors. These three factors are considered individually.

Sensitivity

- 10.4.44 For the transport-related effects considered in this chapter, categories of receptor sensitivity have been defined from the principles set out in the IEMA Guidelines as set out in Table 10.4

Table 10.4 Sensitivity of receptors

Sensitivity	Receptor
High	<ul style="list-style-type: none"> Schools, colleges and other educational institutions; Retirement / care homes for the elderly or infirm; Roads used by pedestrians with no footways; and Road safety black spots.
Medium	<ul style="list-style-type: none"> Hospitals, surgeries and clinics; Parks and recreation areas; Shopping areas; and Roads used by pedestrians with narrow footways.
Low	<ul style="list-style-type: none"> Open space; Tourist / visitor attractions; Historical buildings; and Churches.

- 10.4.45 In addition, although not specifically identified within the IEMA Guidelines as being sensitive, it has been assumed that residential areas and employment areas have low sensitivity to these effects, as they typically experience regular traffic movements on a day-to-day basis.

Magnitude of impact

- 10.4.46 The magnitude of impact depends upon the category of traffic effects being assessed, and this has been based on the guidance relating to Severance (as set out below) which suggests that 0%, 30%, 60% and 90% changes in traffic levels should be considered as "negligible", "minor", "moderate" and "major" impacts respectively.
- 10.4.47 IEMA's guidelines set out the broad principles of how to assess the magnitude of effect for each category of potential environmental impact. This is summarised below by category.

Magnitude of impact – Severance

- 10.4.48 The IEMA guidance states that “severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery.” Further, “Changes in traffic flow of 30%, 60% and 90% are regarded as producing ‘slight’, ‘moderate’ and ‘substantial’ changes in severance respectively”. However, the guidance acknowledges that the measurement and prediction of Severance is extremely difficult. The assessment of Severance pays full regard to specific local conditions, in particular the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided. For the purposes of this assessment, motorway and dual carriageway links where walking and cycling are excluded or the numbers extremely limited have not been included in the assessment tables.
- 10.4.49 Volume 11, Section 3, Part 8, Chapter 6 of the Design Manual for Roads and Bridges dated 2006 (the “DMRB”) provides further guidance on this aspect of Severance in terms of the 2-way Annual Average Daily Traffic Flow (AADT) on a link. It states that new Severance should be described in terms of “Slight”, “Moderate” or “Severe” and that these categories “... should be coupled with an estimate of the numbers of people affected, their location and the community facilities from which they are severed”.
- 10.4.50 These descriptions of Severance have been adapted to maintain consistency with this assessment - these are now referred to as “Low”, “Medium” and “High”. For anything less than low significance, no such estimate of the numbers of people affected need be made. A further severance level of negligible has been incorporated for this reason. Table 10.5 summarises these thresholds.

Table 10.5 Pedestrian Severance threshold (DMRB)

Magnitude	AADT
High	> 16,000
Medium	8,000 - 16,000
Low	4,000 - 8,000
Negligible	< 4,000

- 10.4.51 In addition, (with specific reference to relief from existing Severance), the DMRB Guidelines acknowledge that there is a traffic flow threshold below which Severance is not considered significant where the AADT (daily) flow is below 8,000 vehicles.

Magnitude of impact – Driver Delay

- 10.4.52 Driver delays “... are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.”¹⁰

Magnitude of impact – Pedestrian Delay

- 10.4.53 “Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads.” The guidance suggests that assessors “... use their judgement to determine whether pedestrian delay is a significant effect.”¹⁰
- 10.4.54 For the purposes of this assessment, the pedestrian Severance threshold levels identified in Table 6.5 above have been applied to pedestrian delay.
- 10.4.55 Although the IEMA’s Guidelines for the Environmental Assessment of Road Traffic only considers pedestrian delay consideration is also given to cyclist delay.

Magnitude of impact – Pedestrian Amenity

- 10.4.56 This is broadly defined as the relative pleasantness of a journey; it is affected by traffic flow, traffic composition and pavement width / separation from traffic. The guidance suggests a tentative threshold for judging the significance of changes in pedestrian amenity of where traffic flow (or its heavy vehicle component) is halved or doubled.
- 10.4.57 Although IEMA’s Guidelines for the Environmental Assessment of Road Traffic only considers Pedestrian Amenity, within the assessment of the West Cambridge Development consideration is also given to Cyclist Amenity.

Magnitude of impact – Fear and Intimidation

- 10.4.58 The effect of this is dependent upon the volume of traffic, its heavy vehicle composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths.
- 10.4.59 Receptors are assessed as being pedestrians and cyclists. For the purposes of this assessment, the highest road category links (such as the M11 motorway and the A14 / A428 dual carriageways) do not have pedestrian / cyclist facilities, the use by these users of these links is minimal, if any. As no receptors would be present on these links, these links have not been included within the assessment tables below.
- 10.4.60 The IEMA guidelines state that there are no commonly agreed thresholds for estimating “fear and intimidation” from known traffic and physical conditions, but it does nevertheless suggest some thresholds which could be used, based on previous research, and these are shown in Table 10.6.

Table 10.6 Fear and Intimidation thresholds

Degree of hazard	Average traffic flow over 18 hr day – vehicles / hour 2-way	Total 18 hour heavy vehicle flow	Average vehicle speed over 18 hour day - mph
High	+1,800	+ 3,000	+20
Medium	1,200 – 1,800	2,000 – 3,000	15 – 20
Low	600 - 1,200	1,000 – 2,000	10-15
Negligible	<600	<1,000	<10

Note 1: Although no category is given in the guidance for flows less than the “Low” (was Moderate”) threshold, this has been added to the table.

Note 2: These categories of degree / magnitude of hazard have also been expressed consistently with the terms used in this assessment as High, Medium, Low, and Negligible.

Magnitude of impact – Accidents and safety

- 10.4.61 The guidance¹⁰ suggests that “Professional judgement will be needed to assess the implications of local circumstances, or factors, which may elevate or lessen risks of accidents, e.g. junction conflicts”.

Significance of effect

- 10.4.62 The sensitivity of the receptor and the magnitude of impact are combined to give the overall significance of effect for both beneficial and adverse conditions as shown in Table 10.7 Definitions for the effect significance are given in Table 10.8

Table 10.7 Significance of Effect Categories

		Sensitivity		
		High	Medium	Low
Magnitude of impact)	High	Major	Major	Moderate
	Medium	Major	Moderate	Minor to Moderate
	Low	Moderate	Minor to Moderate	Minor
	Negligible	Negligible	Negligible	Negligible

Table 10.8 Generic Significance Criteria

Significance Level	Criteria
Major	These effects are likely to be important considerations at a local or district scale
Moderate	These effects are likely to be important considerations at a local scale
Minor	These effects may be raised as local issues but are unlikely to be of importance.
Negligible	No effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error.

- 10.4.63 In addition to the above, as the percentage of increased traffic is a function of the level of baseline traffic flows. Trigger levels in terms of absolute levels of increase have been introduced to prevent very minor changes on links with low baseline flows from being considered as more significant.
- 10.4.64 For example, a change in traffic flow of greater than 90% on a road with a high sensitive receptor would result in a 'major significant effect'. However, the existing baseline traffic flows could be very minor and an increase of only a few vehicles would produce a large change in magnitude whereas in real terms the increase in traffic is still considered to be insignificant. Therefore, reference has been made to the Fear and Intimidation threshold trigger levels in Table 6.6 where a significant effect is only considered to occur if the baseline traffic flow is increased to any of the trigger levels identified.

Assumptions and limitations

- 10.4.65 As agreed with CCC and Highways England, the transport-related technical assessment work used to support the development is based on Peter Brett Associates' Transport Model.
- 10.4.66 To create the Baseline, this Transport Model includes the Constructed West Cambridge Development, and all other committed and consented highway enhancements and developments than the Proposed Development. The assumptions included within the model for these developments were agreed with the Joint Authorities and represent the best available information at the present time.
- 10.4.67 Whilst this Transport Model is a suitable tool for assessing the strategic impact of West Cambridge and steps have been undertaken to ensure the assignment of the model trips on local routes around the development reflects the current reality, minor limitations inherent in all such transport models may remain. As this concern relates to the assignment choice of trips from the south and east of the City using the local roads to assign to the Proposed Development rather than the strategic network, this will not have a significant adverse impact on the conclusions of this EIA process.

- 10.4.68 Typical construction traffic movements have been based on experience of other similar projects.
- 10.4.69 This assessment of the indicative peak daily construction two-way flows arising from the Proposed Development has been completed in advance of appointing a contractor, or defining the development programme completion targets. As a result of the range of construction projects and processes occurring on any one day, there is wide variation in the flows accruing to the construction of a multi-occupancy development such as the Proposed Development. Typically, the final rate of project completion reflects many competing factors – such as construction access to the Development, agreeing the final occupiers of the buildings, availability of labour or materials (such as concrete or bituminous material) as well as maintaining a quality environment during the early phases of a project during these construction phases. Nevertheless, a reasonable worst case assessment of the likely extent of construction-related activities occurring at any one time has been made for the purposes of assessing environmental effects. This has been forecast to occur during the construction of the infrastructure enabling works.

10.5 Baseline conditions

- 10.5.1 The following existing conditions are contained within the respective Sections of the Transport Assessment as summarised below:
- Existing Pedestrian and Cycle Facilities - Section 3.3
 - Existing Bus Services – Section 3.4
 - Existing Rail Services – Section 3.5
 - Existing Vehicular Access - Section 2.7
 - Existing Road Network – Section 3.6
 - Public Rights of Way – Section 3.3
 - Road Safety Assessment – Section 3.9

Receptors

- 10.5.2 A review of the Study Area has been undertaken to understand the receptors potentially affected by the traffic generated by the Proposed Development in the general area of the Development. These Sensitive Receptors are shown in Table 10.9 and Figure 10.3. In addition, the receptors on the links identified in Section 10.3 as experiencing increases in flow of greater than 30% / 10% are listed in Table 10.9.

Table 10.9 Sensitive receptors

Reference on Figure 10.3	Receptor	Sensitivity
Barton Road 1	Wolfson College	High
Grange Road 2 3 4	Robinson College Margaret Beaufort Institute Selwyn College	High High High
Huntingdon Road 5 6 7 8 9	Murray Edwards (ex-New Hall) College and Art Collection Westfield House (tertiary education) Girton College Church Blackfriars Priory	High High High Low Low
JJ Thomson Avenue 10 & 11 12	University of Cambridge Dept of Veterinary Medicine University of Cambridge Cavendish Laboratory	High High
Madingley Road 13 14	Madingley Windmill American Cemetery	Low Low
Storey's Way 15 16	Churchill College Fitzwilliam College / Murray Edwards College	High High
Road link	Receptor	Sensitivity
Link 1.3 – M11 J13 off-slip and on-slip;	Drivers on the slip roads	Low
Link 3.2 – Madingley Road on Over Bridge M11;	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.6 – Madingley Road – East of Proposed High Cross Access	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low

Reference on Figure 10.3	Receptor	Sensitivity
Link 3.9 – Madingley Road – East of Storey's Way	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.10 - Madingley Road – East of Grange Road	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.12 – Northampton Street – West of Pound Hill	Drivers along Northampton Street	Low
	Pedestrians and cyclists travelling along Northampton Street	Low
	Residents living at Northampton Street	Low
Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access	Drivers along Huntingdon Road	Low
Link 4.1 – Huntingdon Road – South East of Grange Drive	Drivers along Huntingdon Road	Low
	Pedestrians and cyclists travelling along Huntingdon Road	Low
	Residents living along Huntingdon Road	Low
	Girton College	High
	Westfield House	High
Link 4.2 – Huntingdon Road – East of NWC HRW Access	Drivers along Huntingdon Road	Low
	Pedestrians and cyclists travelling along Huntingdon Road	Low
	Residents living along Huntingdon Road	Low
Link 4.3 – Huntingdon Road – East of NIAB Access	Drivers along Huntingdon Road	Low
	Pedestrians and cyclists travelling along Huntingdon Road	Low
	Residents living along Huntingdon Road	Low
Link 4.4 – Huntingdon Road – East of Storey's Way	Westfield House	High
	Pedestrians and cyclists travelling along Huntingdon Road	Low
	Drivers along Huntingdon Road	Low
	Church	Low
Link 6.0 – Queen's Road – North of West Road	Drivers along Queen's Road	Low
	Pedestrians and cyclists travelling along Queen's Road	Low
Link 9.0 – Storey's Way – between Madingley Road and Huntingdon Road	Churchill / Fitzwilliam College / Murray Edwards Colleges	High
	Drivers along Storey's Way	Low
	Pedestrians and cyclists travelling along Storey's Way	Low

Reference on Figure 10.3	Receptor	Sensitivity
	Residents living on Storey's Way	Low
Link 10.0 – Girton Road – North of Huntingdon Road	Drivers along Girton Road	Low
	Pedestrians and cyclists travelling along Girton Road	Low
	Residents living on Girton Road	Low
Link 12.1 – High Cross Access to Madingley Road	Drivers along High Cross Road	Low
	Pedestrians and cyclists travelling along High Cross Road	Low
	Employees working at West Cambridge	Low
Link 12.2 – JJ Thomson Ave Access to Madingley Road	Drivers along JJ Thomson Avenue	Low
	Pedestrians and cyclists travelling along JJ Thomson Avenue	Low
	Employees working at West Cambridge	Low
Link 12.3 – Clerk Maxwell Road – South of Car Park Access	Drivers along Clerk Maxwell Road	Low
	Pedestrians and cyclists travelling along Clerk Maxwell Road	Low
	Residents living at The Lawns and Perry Close	Low
Link 12.4 – Clerk Maxwell Road – North of Car Park Access	Drivers along Clerk Maxwell Road	Low
	Pedestrians and cyclists travelling along Clerk Maxwell Road	Low

Baseline traffic flow information

- 10.5.3 Table 10.10 shows the predicted baseline traffic flows for the three assessment scenarios; 2016, 2021, and 2031. Increases in traffic flows between the three scenarios are attributed to natural growth, plus growth from the specific cumulative developments as referred to in paragraph 6.3.7.

Table 10.10 Baseline traffic flows for assessment years 2016, 2021, and 2031

Link	Estimated 24hr base 7-day flows all vehicles		
	2016	2021	2031
Link 1.3 – M11 J13 off-slip and on-slip;	17,265	20,208	21,742
Link 3.2 – Madingley Road on Over Bridge M11;	17,000	17,976	19,724
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access	19,311	21,109	22,859
Link 3.6 – Madingley Road – East of Proposed High Cross Access	15,573	17,207	18,634
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	17,085	18,642	19,886
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	16,805	18,416	19,660
Link 3.9 – Madingley Road – East of Storey's Way	15,112	17,000	18,213
Link 3.10 - Madingley Road – East of Grange Road	15,112	16,928	18,123
Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street	16,317	18,806	19,660

Link	Estimated 24hr base 7-day flows all vehicles		
	2016	2021	2031
Link 3.12 – Northampton Street – West of Pound Hill	13,706	15,725	16,664
Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access	10,644	13,874	15,410
Link 4.1 – Huntingdon Road – South East of Grange Drive	10,644	11,746	13,057
Link 4.2 – Huntingdon Road – East of NWC HRW Access	14,955	20,294	22,367
Link 4.3 – Huntingdon Road – East of NIAB Access	17,671	23,062	25,215
Link 4.4 – Huntingdon Road – East of Storey's Way	16,411	21,790	23,882
Link 6.0 – Queen's Road – North of West Road	14,928	15,788	16,508
Link 9.0 – Storey's Way – between Madingley Road and Huntingdon Road	3,215	2,800	2,825
Link 10.0 – Girton Road – North of Huntingdon Road	5,019	5,446	5,535
Link 12.1 – High Cross Access to Madingley Road	2,223	1,750	1,750
Link 12.2 – JJ Thomson Avenue Access to Madingley Road	2,289	2,365	2,365
Link 12.3 – Clerk Maxwell Road – South of Car Park Access	322	312	312
Link 12.4 – Clerk Maxwell Road – North of Car Park Access	851	802	802

Baseline severance

- 10.5.4 The existing levels of severance on the road network surrounding the Site are detailed in Appendix 10.2. All the link flows considered are as two-way flows on a particular link.
- 10.5.5 It is noted that although identified as experiencing high levels of Severance, no pedestrian and cyclists may use the M11, and would be discouraged from using the A14 or A428. As such, link 1.3 is not considered further in this assessment.
- 10.5.6 The existing and future level of Severance experienced within the vicinity of the Development on the local roads within the City area (i.e., excluding the M11, A14, A428 and rural lengths of the A1303) with sensitive receptors is shown in Table 10.11.

Table 10.11 Baseline Severance (24 hour all vehicle two way traffic flows)

Receptor	2016		2021		2031	
	Base traffic flow	Severance	Base traffic flow	Severance	Base traffic flow	Severance
Link 3.2 – Madingley Road on Over Bridge M11	17,000	High	17,976	High	19,724	High
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access	19,311	High	21,109	High	22,859	High
Link 3.6 – Madingley Road – East of Proposed High Cross Access	15,573	Medium	17,207	High	18,634	High
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	17,085	High	18,642	High	19,886	High
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	16,805	High	18,416	High	19,660	High
Link 3.9 – Madingley Road – East of Storey's Way	15,112	Medium	17,000	High	18,213	High
Link 3.10 - Madingley Road – East of Grange Road	15,112	Medium	16,928	High	18,123	High
Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street	16,317	High	18,806	High	19,660	High
Link 3.12 – Northampton Street – West of Pound Hill	13,706	Medium	15,725	Medium	16,664	High
Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access	10,644	Medium	13,874	Medium	15,410	Medium
Link 4.1 – Huntingdon Road – South East of Grange Drive	10,644	Medium	11,746	Medium	13,057	Medium
Link 4.2 – Huntingdon Road – East of NWC HRW Access	14,955	Medium	20,294	High	22,367	High
Link 4.3 – Huntingdon Road – East of NIAB Access	17,671	High	23,062	High	25,215	High
Link 4.4 – Huntingdon Road – East of Storey's Way	16,411	High	21,790	High	23,882	High
Link 6.0 – Queen's Road – North of West Road	14,928	Medium	15,788	Medium	16,508	High
Link 9.0 – Storey's Way – between Madingley Road and Huntingdon Road	3,215	Negligible	2,800	Negligible	2,825	Negligible
Link 10.0 – Girton Road – North of Huntingdon Road	5,019	Low	5,446	Low	5,535	Low
Link 12.1 – High Cross Access to Madingley Road	2,223	Negligible	1,750	Negligible	1,750	Negligible
Link 12.2 – JJ Thomson Avenue Access to Madingley Road	2,289	Negligible	2,365	Negligible	2,365	Negligible
Link 12.3 – Clerk Maxwell Road – South of Car Park Access	322	Negligible	312	Negligible	312	Negligible

Receptor	2016		2021		2031	
	Base traffic flow	Severance	Base traffic flow	Severance	Base traffic flow	Severance
Link 12.4 – Clerk Maxwell Road – North of Car Park Access	851	Negligible	802	Negligible	802	Negligible

Baseline Driver Delay

- 10.5.7 The Transport Assessment considers that the local network operates towards capacity in 2016 during the network peak hours.
- 10.5.8 As the junctions along Madingley Road, and others across the network, are operating close to capacity during the peak hours, some Driver Delay would be expected at these limited peak hour times – albeit that these junctions would operate within capacity throughout the significant majority of the day.
- 10.5.9 Whilst the above assessment suggests there is some driver delay during the peak periods across the study area, taking into account conditions across a full day, only limited Driver Delay is experienced in normal operating conditions.

Baseline pedestrian and cyclist delay

- 10.5.10 The level of existing pedestrian delay is assumed to broadly reflect the severance as described above – i.e., that there would be limited pedestrian delay experienced within the built-up areas where there is pedestrian activity.
- 10.5.11 There are reasonable crossing facilities for pedestrians and cyclists to use across the area – this would assist in minimising delay on these routes. Pedestrian delay is therefore slight / negligible.

Baseline pedestrian and cyclist amenity

- 10.5.12 Pedestrian and cyclist amenity, broadly defined as ‘the relative pleasantness of a journey’, is affected by traffic flows and composition, footway width and the degree of segregation.
- 10.5.13 Although the strategic highway links (such as the M11, A14, and A428) have high levels of traffic flow and high speeds, there is no pedestrian or cyclist access and there are few / no attractors along these for existing pedestrian and cyclist amenity to be a material consideration.

- 10.5.14 Although the levels of traffic flows on the local principal highway network are high, existing pedestrian and cyclist amenity within Cambridge is good due to the quality of the footway and cycleway provision, the alternative off-road routes, the frequency of crossing facilities, the limited heavy vehicle proportions, and the relatively controlled vehicle speeds.

Baseline fear and intimidation

- 10.5.15 The existing levels of fear and intimidation on the road network surrounding the Site are also detailed in Table A6.2.1 contained in Appendix 10.2. Table 10.12 summarises the baseline fear and intimidation for the three assessment years. There is currently no Fear and Intimidation related to the use of public rights of way adjacent to the Site.

Table 10.12 Baseline fear and intimidation (average hourly traffic flows over 18hours)

Receptor	a) Average Hourly Flows Over 18hr Day			b) Total 18hr HV Flows			c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)		
	2016	2021	2031	2016	2021	2031		2016	2021	2031
Link 3.2 – Madingley Road on Over Bridge M11	979	1,035	1,136	1,010	1,068	1,171	40	Low	Low	Low
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access	1,117	1,221	1,322	737	806	873	40	Low	Low	Low
Link 3.6 – Madingley Road – East of Proposed High Cross Access	901	995	1,078	595	657	712	40	Low	Low	Low
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	988	1,078	1,150	652	712	759	30	Low	Low	Low
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	972	1,065	1,137	642	703	751	30	Low	Low	Low
Link 3.9 – Madingley Road – East of Storey’s Way	874	983	1,053	577	649	696	30	Low	Low	Low
Link 3.10 - Madingley Road – East of Grange Road	874	979	1,048	577	646	692	30	Low	Low	Low
Link 3.11 – Madingley Road – West of Queen’s Road / Northampton Street	944	1,088	1,137	623	718	751	30	Low	Low	Low
Link 3.12 – Northampton Street – West of Pound Hill	793	909	964	523	601	636	30	Low	Low	Low
Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access	615	802	891	406	530	588	60	Low	Low	Low
Link 4.1 – Huntingdon Road – South East of Grange Drive	615	679	435	406	449	499	30	Low	Low	Low
Link 4.2 – Huntingdon Road – East of NWC HRW Access	865	1,174	1,293	571	775	854	30	Low	Low	Low
Link 4.3 – Huntingdon Road – East of NIAB Access	1,022	1,334	1,458	675	881	963	30	Low	Low	Low
Link 4.4 – Huntingdon Road – East of Storey’s Way	949	1,260	1,381	627	832	912	30	Low	Low	Low
Link 6.0 – Queen’s Road – North of West Road	863	913	955	570	603	630	30	Low	Low	Low
Link 9.0 – Storey’s Way – between Madingley Rd and Huntingdon Road	188	164	165	165	143	145	20	Negligible	Negligible	Negligible
Link 10.0 – Girton Road – North of Huntingdon Road	294	319	324	257	279	283	20	Negligible	Negligible	Negligible
Link 12.1 – High Cross Access to Madingley Road	160	126	126	191	151	151	25	Negligible	Negligible	Negligible
Link 12.2 – JJ Thomson Avenue Access to Madingley Road	165	170	170	197	204	204	25	Negligible	Negligible	Negligible
Link 12.3 – Clerk Maxwell Road – South of Car Park Access	23	22	22	28	26	26	30	Negligible	Negligible	Negligible
Link 12.4 – Clerk Maxwell Road – North of Car Park Access	61	56	56	73	67	67	30	Negligible	Negligible	Negligible

Existing accidents and safety

- 10.5.16 A Road Safety Review is reported in Section 3.9 of the Transport Assessment, including Personal Injury Collision (PIC - formerly known as Personal Injury Accident – PIA) summary data was obtained from Cambridgeshire County Council for the latest available 5 year period between of 2011 to 2016 for Madingley Road.
- 10.5.17 The Transport Assessment provides a summary of the PICs (location and nature) and provides an estimate of the likely anticipated number of PICs for similar types of links and junctions to provide a comparison.
- 10.5.18 Of the collisions on the links within the study area, only the 250m section of Madingley Road link to the west of the Cambridge Road crossroads has a higher than anticipated personal injury collision record. The observed records on all other links were equalled or were lower than that anticipated. A review of these collisions has indicated that these could be speed related, a review of the existing road markings and signings is proposed to alert motorists of this.
- 10.5.19 The Road Safety assessment has identified three existing road safety issues, the first two for vulnerable road users:
- Madingley Road / Storey's Way priority junction;
 - Madingley Road / Grange Road signalised junction; and
 - Madingley Road / Cambridge Road crossroads.
- 10.5.20 Remedial measures are proposed at these locations - further details of these proposed measures are discussed in Section 16 of the Transport Assessment.
- 10.5.21 The Proposed Development will not result in any detriment to the existing highway safety conditions within the site vicinity.

10.6 Impact Assessment

Construction phase

- 10.6.1 Further details of the following construction traffic impacts are contained within Section 12 of the Transport Assessment (contained within Appendix 10.1):
- Earthworks;
 - On-site Drainage;
 - Carriageway Construction; and
 - Initial Construction works to a major building.
- 10.6.2 For the purposes of this assessment it is assumed that the initial construction works for a major building (in this case, the concrete work casting the foundations) would not occur at the same time as the on-site carriageway construction due to the excessive heavy vehicle trip generation characteristics of both operations.

10.6.3 For the purposes of this assessment it is assumed that all heavy vehicle access will be from M11 Junction 13 / Madingley Road – it being assumed that the heavy vehicle movements through the City will be discouraged.

10.6.4 The assumed initial phase peak daily construction traffic flows are summarised in Table 10.13

Table 10.13 Peak daily construction movements

Activity	Max Light Vehicles Movements / day			Max Heavy Vehicles Movements / day			Max Total Vehicles Movements / day		
	In	Out	Tot	In	Out	Tot	In	Out	Tot
Earthworks	10	10	20	82	82	164	92	92	184
On-Site Drainage	4	4	8	4	4	8	8	8	16
Carriageway construction	6	6	12	60	60	120	66	66	132
Building construction	10	10	20	0	0	0	10	10	20
Total	30	30	60	146	146	292	176	176	352

10.6.5 No links within the study area exceed the 10% or 30% thresholds for total traffic increases but a number of links exceed these thresholds for heavy vehicles. These are detailed in Table 10.14.

Table 10.14 Traffic flow increases due to construction traffic

Link	Base 2016 Daily Flow (24 hour, 7 day two-way flows)		Estimated Daily Construction Traffic (two-way)			Increase	
	All Vehs	Heavy Vehs	Light Vehs	Heavy Vehs	All Vehs	All Vehs	Heavy Vehs
Link 1.3 – M11 J13 off-slip and on-slip	17,265	2,681	6	248	254	1.5%	9.2%
Link 3.2 - Madingley Road on Over Bridge M11	17,000	931	9	168	177	1.0%	18.0%
Link 3.3 - Madingley Road between M11 South bound On Slip - Proposed Madingley Road West Access	19,311	656	12	292	304	1.6%	44.5%
Link 3.4 - Madingley Road - West of P&R Access	19,311	656	12	292	304	1.6%	44.5%
Link 3.5 - Madingley Road - East of P&R Access	17,835	606	12	292	304	1.7%	48%
Link 3.6 - Madingley Road - East of Proposed High Cross Access	15,573	529	12	292	304	2.0%	55.2%
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	17,085	581	48	0	48	0.3%	0.0%
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	16,805	571	48	0	48	0.3%	0.0%

10.6.6 Table 10.15 provides the assessment for construction phase transport impacts.

Table 10.15 Construction phase transport effects

Baseline		Impact assessment						
Receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect		
Link 3.2 - Madingley Road on Over Bridge M11 (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low	Total 352 daily one-way (176 two-way) vehicle movements due to construction traffic for plant, materials, and staff deliveries and the removal of construction waste and excess cut material. Additional traffic flows caused by construction traffic could result in increased severance; driver delay; pedestrian and cyclist delay, fear and intimidation, and reduced pedestrian and cycling amenity	Hours of operation and delivery routes to and from Site will be agreed with the local highways authority and specified in the Construction Environment Management Plan (CEMP)	Negligible	The All Vehicle Construction impact assessment results show that the highest impact would be no more than 0.4%. As such, there are no links experiencing increases exceeding the assessment magnitude threshold of either 30%, or 10% in any sensitive areas.	Negligible Not significant		
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible		The daily percentage impact for Heavy Vehicles on Link 3.6 Madingley Road to the East of the High Cross Access peaks at 55% - significantly higher than the increase in All Vehicle traffic flows (peaking at 2%). However, there are no receptors with sensitivity greater than Low at this location, nor is the increase in heavy vehicle flow more than a doubling (refer to the thresholds identified in Section 6.3), such that there would be no discernible effect on Severance, Driver Delay, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation, Road Safety and Hazardous Loads associated with construction activities.	Negligible Not significant	
Link 3.4 – Madingley Road – West of P&R Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible		In all cases, the magnitude of Construction daily flow increases – be it All Vehicle or Heavy Vehicle - is Negligible, and therefore the significance of effect for the impacts assessed within the chapter for Construction movements is also Negligible.	Negligible Not significant	
Link 3.5 – Madingley Road – East of P&R Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible		Full details of the assignment of the construction traffic are detailed in Section 12 of the Transport Assessment	Negligible	Negligible Not significant
Link 3.6 – Madingley Road – East of Proposed High Cross Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible				

Operational phase

Potential Effects in 2021

10.6.7 Table 10.16 shows the predicted severance levels in 2021. Links 6.0 and 12.1 are predicted to increase in Severance magnitude, the former due to a minor increase in flow resulting in an increase of one Severance threshold from Medium to High, the latter increasing by one from Negligible to Low.

Table 10.16 Predicted severance in 2021

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 3.2 – Madingley Road on Over Bridge M11	17,976	High	19,150	High
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access	21,109	High	22,611	High
Link 3.6 – Madingley Road – East of Proposed High Cross Access	17,207	High	21,293	High
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	18,642	High	20,604	High
Link 3.8 – Madingley Road – East of Clerk Maxwell Rd	18,416	High	21,438	High

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 3.9 – Madingley Road – East of Storey's Way	17,000	High	20,230	High
Link 3.10 - Madingley Road – East of Grange Road	16,928	High	20,040	High
Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street	18,806	High	19,223	High
Link 3.12 – Northampton Street – West of Pound Hill	15,725	Medium	15,793	Medium
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	13,874	Medium	15,840	Medium
Link 4.1 – Huntingdon Road – South East of Grange Drive	11,746	Medium	11,613	Medium
Link 4.2 – Huntingdon Road – East of NWC HRW Access	20,294	High	19,716	High
Link 4.3 – Huntingdon Road – East of NIAB Access	23,062	High	22,315	High
Link 4.4 – Huntingdon Road – East of Storey's Way	21,790	High	20,891	High
Link 6.0 – Queen's Road – North of West Rd	15,788	Medium	16,982	High

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 9.0 – Storey's Way – between Madingley Road and Huntingdon Road	2,800	Negligible	2,799	Negligible
Link 10.0 – Girton Road – North of Huntingdon Road	5,446	Low	5,476	Low
Link 12.1 – High Cross Access to Madingley Road	1,750	Negligible	5,425	Low
Link 12.2 – JJ Thomson Ave Access to Madingley Road	2,365	Negligible	2,347	Negligible
Link 12.3 – Clerk Maxwell Road – South of Car Park Access	312	Negligible	102	Negligible
Link 12.4 – Clerk Maxwell Road – North of Car Park Access	802	Negligible	1,613	Negligible

10.6.8 Table 10.17 shows the predicted fear and intimidation levels with and without the Proposed Development in 2021. The magnitude of fear and intimidation would not increase for any links.

Table 10.17 Fear and intimidation in 2021

Receptor	Baseline				Proposed Development			
	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)
Link 3.2 – Madingley Road on Over Bridge M11	1,035	1,068	40	Low	1,136	1,171	40	Low
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access	1,221	1,068	40	Low	1,308	863	40	Low
Link 3.6 – Madingley Road – East of Proposed High Cross Access	995	657	40	Low	1,231	813	40	Low
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	1,078	712	30	Low	1,191	787	30	Low
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	1,065	703	30	Low	1,240	819	30	Low
Link 3.9 – Madingley Road – East of Storey's Way	983	649	30	Low	1,170	773	30	Low
Link 3.10 - Madingley Road – East of Grange Road	979	646	30	Low	1,159	765	30	Low
Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street	1,088	718	30	Low	1,112	734	30	Low
Link 3.12 – Northampton Street – West of Pound Hill	909	601	30	Low	913	603	30	Low
Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access	802	530	60	Low	916	605	60	Low
Link 4.1 – Huntingdon Road – South East of Grange Drive	679	449	30	Low	672	443	30	Low
Link 4.2 – Huntingdon Road – East of NWC HRW Access	1,174	775	30	Low	1,140	753	30	Low
Link 4.3 – Huntingdon Road – East of NIAB Access	1,334	881	30	Low	1,290	852	30	Low
Link 4.4 – Huntingdon Road – East of Storey's Way	1,260	832	30	Low	1,208	798	30	Low

Receptor	Baseline				Proposed Development			
	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)
Link 6.0 – Queen’s Road – North of West Road	913	603	30	Low	982	649	30	Low
Link 9.0 – Storey’s Way – between Madingley Road and Huntingdon Road	164	143	20	Negligible	164	143	20	Negligible
Link 10.0 – Girton Road – North of Huntingdon Road	319	279	20	Negligible	320	280	20	Negligible
Link 12.1 – High Cross Access to Madingley Road	126	151	25	Negligible	391	467	25	Negligible
Link 12.2 – JJ Thomson Avenue Access to Madingley Road	170	204	25	Negligible	169	202	25	Negligible
Link 12.3 – Clerk Maxwell Road – South of Car Park Access	22	26	30	Negligible	7	8	30	Negligible
Link 12.4 – Clerk Maxwell Road – North of Car Park Access	56	27	30	Negligible	112	134	30	Negligible

10.6.9 Table 10.18 shows the environmental impact assessment for operational phase effects for the first phase of the development in 2021.

Table 10.18 Operational phase transport effects in 2021

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> Colleges on Storey’s Way (link 9.0) Colleges on Huntingdon Road (links 4.1, 4.4) Church on Huntingdon Road (link 4.4) 	High High Low	Increased traffic flows along the following affected links could result in an increase in: Severance; Fear and Intimidation; and Pedestrian delay.	Provisions within the transport strategy to i) reduce new vehicle trips; ii) review existing pedestrian and cyclist infrastructure	Negligible	Baseline severance and fear and intimidation in 2021 is predicted to range from high for receptors along Huntingdon Road to negligible for receptors along Storey’s Way. Once the Initial Phase of the Proposed Development is operational in 2021 whilst traffic flows are predicted to increase along all of these links, for all these receptors the fear / intimidation and severance magnitude will remain unchanged. Based on the change in traffic flow due to the addition of cumulative development and Proposed Development traffic flow changes, there is unlikely to be a perceptible change in the level of pedestrian delay. As such, the likely significance of effect for pedestrian delay is Negligible.	Negligible Not significant
<ul style="list-style-type: none"> Residents living on Madingley Road (links 3.6, 3.7, 3.8, 3.9, 3.10) Residents living at Northampton Street (link 3.12) Employees working at West Cambridge (links 12.1, 12.2) 	Low	Increased traffic flows could result in an increase in Severance for residents and workers along the affected links.	Provisions within the transport strategy to: i) reduce new vehicle trips; ii) enhance pedestrian and cyclist infrastructure.	Low adverse	Baseline severance in 2021 is predicted to range from high for receptors along Madingley Road to negligible for receptors along the three roads on-Site and the new access road to north west Cambridge off Huntingdon Road. Once the first phase of the Proposed Development is operational in 2021 traffic flows are predicted to increase along all of these links. For most receptors the severance magnitude will remain unchanged. For receptors along High Cross on link 12.1 traffic flows will increase by 3,675 vehicles across 24 hours. Whilst this will increase the severance magnitude from negligible to low, the 5,425 AADT is still less than the threshold of 8,000 AADT. Whilst the effect is likely to be noticeable given the proportionate increase against the baseline traffic flows, severance will still be low. Overall the magnitude of impact from increased severance would be low adverse.	Minor adverse Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> Drivers along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Drivers along Northampton Street (link 3.12) Drivers along Huntingdon Road (links 4.0, 4.1, 4.2, 4.3, 4.4) Drivers along High Cross Road (link 12.1) Drivers along JJ Thomson Avenue (link 12.2) Drivers along Clerk Maxwell Road (link 12.3, 12.4) 	Low	Increase in Driver Delay at junctions and road links caused by increased use of the local road network by drivers travelling to and from the Proposed Development.	Provisions within the transport strategy to reduce new vehicle trips, and - only where shown to be necessary – minor enhancements to the local junction infrastructure.	Negligible	<p>Whilst the results of the 2021 junction capacity assessments for the Proposed Development shows the network generally with conditions at capacity in peak periods, there would be limited levels of delay for drivers when considered across the full 24 hour day.</p> <p>Overall the magnitude of change in daily flows as a consequence of the addition of Cumulative Development and Development traffic – considered to be the difference between 2016 Base and 2021 scenarios - is Negligible and the sensitivity of the links and junctions to increases in daily flow is Low - therefore the overall significance of effect for driver delay is Negligible.</p>	Negligible Not significant
<ul style="list-style-type: none"> Pedestrians and cyclists travelling along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Pedestrians and cyclists travelling along Northampton Street (link 3.12) Pedestrians and cyclists travelling along Huntingdon Road (links 4.1, 4.2, 4.3, 4.4) Pedestrians and cyclists travelling along High Cross Road (link 12.1) Pedestrians and cyclists travelling along JJ Thomson Avenue (link 12.2) Pedestrians and cyclists travelling along Clerk Maxwell Road (link 12.3, 12.4) 	Low	Increase in Pedestrian Delay as a result of an increase in traffic travelling to and from the Proposed Development.	Provisions within the transport strategy to <ul style="list-style-type: none"> i) reduce new vehicle trips; ii) enhance pedestrian and cyclist infrastructure. 	Negligible	Based on the change in pedestrian severance category due to the addition of cumulative development and Proposed Development traffic flow changes, there is unlikely to be a perceptible change in the level of pedestrian delay. As such, the likely significance of effect for pedestrian delay is Negligible.	Negligible Not significant
		Changes to Pedestrian Amenity - the relative pleasantness of pedestrian and cyclist journeys - as a result of changes in traffic.	Provisions within the transport strategy to <ul style="list-style-type: none"> i) reduce new vehicle trips; ii) enhance pedestrian and cyclist infrastructure. 	Negligible	<p>The relevant guidance suggests a tentative threshold for assessing the significance of changes in pedestrian amenity of where traffic flow is halved or doubled. There are three links to consider:</p> <p>Link 12.4 - Clerk Maxwell Road North of Car Park Access - experiences an increase of 100% - based on a further 811 vehicles per day – whilst Link 12.3 – Clerk Maxwell South of Car Park Access – decreases to 32% - based on a reduction of 210 vehicles per day. Whilst the former impact, being for a distance of 60m, would be significant, this would be offset by the benefit to pedestrians and cyclists provided along the remaining 420m length of Clerk Maxwell Road – will not result in any discernible adverse change in pedestrian amenity;</p> <p>Link 12.1 – High Cross Access. Whilst this experiences an increase of 200%, this relates to the low initial flow reflecting that development of this area has not progress far currently. As High Cross is formed with wide grass verges and quality footway / cycleways, will not result in any discernible change in pedestrian amenity.</p> <p>There are no other existing off-site links forecast to experience a doubling of traffic flow with the addition of Cumulative Development and Development traffic – indeed whilst most links experience minimal change, all other increases are well below 30%. Within the Site, the traffic flow changes arising from the Proposed Development will not result in any discernible change in pedestrian amenity, and that the significance of effect on Pedestrian Amenity is therefore Negligible.</p>	Negligible Not significant
Pedestrians and cyclists	Low	Changes in traffic volume, composition and speed resulting in an increase in fear and intimidation to pedestrians and cyclists.	Provisions within the transport strategy to <ul style="list-style-type: none"> i) reduce new vehicle trips; ii) enhance pedestrian and cyclist infrastructure, and iii) improve the amenity of pedestrian and cyclist routes along popular corridors. 	Negligible	The Cumulative Development will result in an increase in overall and heavy vehicle traffic flows on most of the assessed links with sensitive receptors, with a maximum increase of 265 overall vehicles per average hour and 316 heavy vehicles over 18 hours for link 12.1. Speeds are not predicted to change for any of the links. The Proposed Development will not change the magnitude of fear and intimidation for any of the receptors and the overall effect will be negligible.	Negligible Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> • Drivers along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) • Pedestrians and cyclists travelling along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) • Drivers along Northampton Street (link 3.12) • Pedestrians and cyclists travelling along Northampton Street (link 3.12) • Drivers along Huntingdon Road (links 4.0, 11.2) • Pedestrians and cyclists travelling along Huntingdon Road (links 4.0, 11.2) • Drivers along the north west Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1 and 11.2) • Pedestrians and cyclists along the north west Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1 and 11.2) • Drivers along High Cross Road (link 12.1) • Pedestrians and cyclists travelling along High Cross Road (link 12.1) • Drivers along JJ Thomson Avenue (link 12.1) • Pedestrians and cyclists travelling along JJ Thomson Avenue (link 12.1) • Drivers along Clerk Maxwell Road (link 12.3) • Pedestrians and cyclists travelling along Clerk Maxwell Road (link 12.3) 	Low	Changes in traffic flows could result in a change on personal injury collision rates.	Provisions within the transport strategy to provide road safety measures at identified blackspots.	Negligible	The additional traffic flows on the network resulting from the West Cambridge Development would be unlikely to have any significant effect on existing personal injury collision rates. The overall significance of effect for Highway Safety is therefore Negligible.	Negligible Not significant

Potential Effects in 2031

10.6.10 Table 10.19 shows the predicted severance levels in 2031. Links 4.0 and 12.2 are predicted to increase in severance magnitude. There are no receptors along link 4.0 so this link has not been considered further in the impact assessment for severance.

Table 10.19 Predicted severance in 2031

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 1.3 – M11 J13 off-slip and on-slip	21,742	High	24,865	High
Link 3.2 – Madingley Road on Over Bridge M11	19,724	High	23,053	High
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Road West Access	22,859	High	27,397	High
Link 3.6 – Madingley Road – East of Proposed High Cross Access	18,634	High	22,976	High
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	19,886	High	25,098	High
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	19,660	High	26,554	High
Link 3.9 – Madingley Road – East of Storey's Way	18,213	High	25,316	High
Link 3.10 - Madingley Road – East of Grange Road	18,123	High	25,036	High
Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street	19,660	High	22,149	High
Link 3.12 – Northampton Street – West of Pound Hill	16,664	High	18,052	High
Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access	15,410	Medium	20,434	High
Link 4.1 – Huntingdon Road – South East of Grange Drive	13,057	Medium	12,870	Medium
Link 4.2 – Huntingdon Road – East of NWC HRW Access	22,367	High	22,197	High
Link 4.3 – Huntingdon Road – East of NIAB Access	25,215	High	24,339	High
Link 4.4 – Huntingdon Road – East of Storey's Way	23,882	High	22,650	High
Link 6.0 – Queen's Road – North of West Road	16,508	High	19,031	High
Link 9.0 – Storey's Way – between Madingley Road and Huntingdon Road	2,825	Negligible	2,817	Negligible
Link 10.0 – Girton Road – North of Huntingdon Road	5,535	Low	5,717	Low
Link 12.1 – High Cross Access to Madingley Road	1,750	Negligible	5,798	Negligible
Link 12.2 – JJ Thomson Ave Access to Madingley Road	2,365	Negligible	4,599	Low

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 12.3 – Clerk Maxwell Road – South of Car Park Access	312	Negligible	102	Negligible
Link 12.4 – Clerk Maxwell Rd – North of Car Park Access	802	Negligible	1,667	Negligible

10.6.11 Table 10.20 shows the predicted fear and intimidation levels with and without the Proposed Development in 2031. The magnitude of fear and intimidation would not increase for any links.

Table 10.20 Fear and intimidation at 2031

Receptor	Baseline				Proposed Development			
	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)
Link 1.3 – M11 J13 off-slip and on-slip	1,210	3,419	70	High	1,384	3,911	70	High
Link 3.2 – Madingley Road on Over Bridge M11	1,136	1,171	40	Low	1,327	1,369	40	Low
Link 3.3 – Madingley Road between M11 On Slip – Proposed Madingley Road West Access	1,332	873	40	Low	1,584	1,046	40	Low
Link 3.6 – Madingley Road – East of Proposed High Cross Access	1,078	712	40	Low	1,329	877	40	Low
Link 3.7 – Madingley Road – East of JJ Thomson Avenue	1,150	759	30	Low	1,451	958	30	Low
Link 3.8 – Madingley Road – East of Clerk Maxwell Road	1,137	751	30	Low	1,536	1,014	30	Low
Link 3.9 – Madingley Road – East of Storey's Way	1,053	696	30	Low	1,464	967	30	Low
Link 3.10 - Madingley Road – East of Grange Road	1,048	692	30	Low	1,448	956	30	Low
Link 3.11 – Madingley Road – West of Queen's Road / Northampton Street	1,137	751	30	Low	1,281	846	30	Low
Link 3.12 – Northampton Street– West of Pound Hill	964	636	30	Low	1,044	689	30	Low
Link 4.0 – Huntingdon Road – West of Proposed NWC HRW Access	891	588	60	Low	1,182	780	60	Low
Link 4.1 – Huntingdon Road – South East of Grange Drive	755	499	30	Low	744	492	30	Low
Link 4.2 – Huntingdon Road – East of NWC HRW Access	1,293	854	30	Low	1,284	848	30	Low
Link 4.3 – Huntingdon Road – East of NIAB Access	1,458	963	30	Low	1,407	929	30	Low
Link 4.4 – Huntingdon Road – East of Storey's Way	1,381	912	30	Low	1,310	865	30	Low
Link 6.0 – Queen's Road – North of West Road	955	630	30	Low	1,101	727	30	Low
Link 9.0 – Storey's Way – between Madingley Road and Huntingdon Road	165	145	20	Negligible	165	144	20	Negligible
Link 10.0 – Girton Road – North of Huntingdon Road	324	283	30	Negligible	335	293	30	Negligible
Link 12.1 – High Cross Access to Madingley Road	126	151	20	Negligible	418	499	20	Negligible
Link 12.2 – JJ Thomson Avenue Access to Madingley Road	170	204	25	Negligible	332	396	25	Negligible
Link 12.3 – Clerk Maxwell Road.	22	26	25	Negligible	7	8	30	Negligible
Link 12.4 – Clerk Maxwell Road – North of Car Park Access	56	67	30	Negligible	116	139	30	Negligible

10.6.12 Table 10.21 shows the environmental impact assessment for operational phase effects for the first phase of the development in 2031.

Table 10.21 Operational phase transport effects in 2031

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> Colleges on Storey's Way (link 9.0) Colleges on Huntingdon Road (links 4.1, 4.4) Church on Huntingdon Road (link 4.4) 	High High Low	Increased traffic flows along the following affected links could result in an increase in: Severance; Fear and Intimidation; and Pedestrian delay.	Provisions within the transport strategy to i) reduce new vehicle trips; ii) review existing pedestrian and cyclist infrastructure	Negligible	Baseline severance and fear / intimidation in 2031 is predicted to range from high for receptors along Huntingdon Road to negligible for receptors along Storey's Way. Once the Proposed Development is fully built out and operational in 2031, traffic flows are predicted to increase along all of these links. For all these receptors, the fear / intimidation and severance magnitude will remain unchanged. Based on the change in flow due to the addition of cumulative development and Proposed Development traffic flow changes, there is unlikely to be a perceptible change in the level of pedestrian delay. As such, the likely significance of effect for pedestrian delay is Negligible.	Negligible Not significant
<ul style="list-style-type: none"> Residents living on Madingley Road (links 3.6, 3.7, 3.8, 3.9, 3.10) Residents living at Northampton Street (link 3.12) <p>Employees working at West Cambridge (links 12.1, 12.2)</p>	Low	Increased traffic flows could result in an increase in Severance for residents and workers along the affected links.	Adaptive Phased Approach to long-term transport mitigation.	Low adverse	Baseline severance in 2031 is predicted to range from high for receptors along Madingley Road, Northampton Street and Huntingdon Road (between the East of NIAB access and the East of Storey's way) to negligible for receptors along the three roads on-Site. Once the Proposed Development is fully built out and operational in 2031, traffic flows are predicted to increase along all of these links. For link 4.0 – Huntingdon Road, west of the NWC HRW access, whilst the severance has increased from medium to high, the numbers of pedestrians and cyclists is low, but connectivity across Huntingdon Road will be improved by the delivery of the pedestrian / cyclist crossing at this junction as part of the NWC Proposals. In addition, and although not identified as a change in severance, there will be an increase in traffic volumes along Madingley Road affecting links 3.2 to 3.11. The 2031 Baseline Severance along Madingley Road is predicted to be high and there are a number of mitigation measures already in place including centre refuges and crossings. The effect of severance on residents and employees along Madingley Road is unlikely to be significant. Overall the magnitude of impact from increased severance would be permanent low adverse.	Minor adverse Not significant
<ul style="list-style-type: none"> Drivers along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Drivers along Northampton Street (link 3.12) Drivers along Huntingdon Road (links 4.0) Drivers along High Cross Road (link 12.1) Drivers along JJ Thomson Avenue (link 12.2) Drivers along Clerk Maxwell Road (link 12.3) 	Low	Increase in Driver Delay at junctions and road links caused by increased use of the local road network by drivers travelling to and from the Proposed Development.	Adaptive Phased Approach to long term transport mitigation.	Negligible	The future junction capacity assessments for 2031 for the Proposed Development will be required to show the proposed local network would operate within absolute capacity in peak periods. As such, there would be limited levels of delay for drivers across the day. Further mitigation measures would be considered where the impact of West Cambridge is considered significant. The magnitude of change in daily flows as a consequence of the Proposed Development would be Negligible. The overall significance of effect for Driver Delay is also Negligible.	Negligible Not significant
<ul style="list-style-type: none"> Pedestrians and cyclists travelling along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Pedestrians and cyclists travelling along Northampton Street (link 3.12) 	Low	Increase in Pedestrian Delay as a result of an increase in traffic travelling to and from the Proposed Development.	Adaptive Phased Approach to long term transport mitigation.	Negligible	Based on the change in pedestrian severance category due to the addition of cumulative development and Proposed Development traffic flow changes, there is unlikely to be a perceptible change in the level of pedestrian delay. As such, the likely significance of effect for pedestrian delay is Negligible.	Negligible Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> • Pedestrians and cyclists travelling along Huntingdon Road (links 4.1, 4.2, 4.3 and 4.4) • Pedestrians and cyclists travelling along High Cross Road (link 12.1) • Pedestrians and cyclists travelling along JJ Thomson Avenue (link 12.2) • Pedestrians and cyclists travelling along Clerk Maxwell Road (link 12.3, 12.4) 	Low	Changes to Pedestrian Amenity - the relative pleasantness of pedestrian and cyclist journeys as a result of changes in traffic.	Provisions within the transport strategy to improve the amenity of pedestrian and cyclist routes.	Negligible	<p>The relevant guidance suggests a tentative threshold for assessing the significance of changes in pedestrian amenity of where traffic flow is halved or doubled. There are four links to consider:</p> <p>Link 12.4 - Clerk Maxwell Road North of Car Park Access - experiences an increase of 108% - based on a further 865 vehicles per day, whilst Link 12.3 – Clerk Maxwell South of Car Park Access – decreases by 67% - based on a reduction of 210 vehicles per day. Whilst the former impact, being for a distance of 60m, would be significant, this would be offset by the benefit to pedestrians and cyclists provided along the remaining 420m length of Clerk Maxwell Road – will not result in any discernible adverse change in pedestrian amenity.</p> <p>Link 12.2 – JJ Thomson Ave Access to Madingley Rd experience an increase of 94% - based on a further 2234 vehicles per day. This relates to the low initial flow reflecting that development of this area has not progress far currently. As JJ Thomson Avenue is formed with wide grass verges and quality footway / cycleways, will not result in any discernible change in pedestrian amenity</p> <p>Link 12.1 – High Cross Access. Whilst this experiences an increase of 231%, based on a further 4,048 vehicles per day, this relates to the low initial flow reflecting that development of this area has not progress far currently. As High Cross is formed with wide grass verges and quality footway / cycleways, will not result in any discernible change in pedestrian amenity.</p> <p>There are no other existing off-site links forecast to experience a doubling of traffic flow with the addition of Cumulative Development and Development traffic – most increases are well below 30%. Within the Site, as such, the traffic flow changes arising from the Proposed Development will not result in any discernible change in pedestrian amenity, and that the impact of magnitude on Pedestrian Amenity is therefore Negligible.</p>	Negligible Not significant
Pedestrians and cyclists	Low	Changes in traffic volume, composition and speed resulting in an increase in fear and intimidation to pedestrians and cyclists.	<p>Adaptive Phased Approach to long term transport mitigation.</p> <p>Provisions within the transport strategy to improve the amenity of pedestrian and cyclist routes</p>	Negligible	The Cumulative Development will result in an increase in overall and heavy vehicle traffic flows on all of the assessed links with sensitive receptors, with a maximum increase of 411 overall vehicles per average hour and 271 heavy vehicles over 18 hours for link 3.9. Speeds are not predicted to change for any of the links. The Proposed Development will not change the magnitude of impact to fear and intimidation for any of the receptors and the overall effect will be negligible.	Negligible Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> • Drivers along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) • Pedestrians and cyclists travelling along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) • Drivers along Northampton Street (link 3.12) • Pedestrians and cyclists travelling along Northampton Street (link 3.12) • Drivers along Huntingdon Road (links 4.0, 4.1, 4.2, 4.3 and 4.4) • Pedestrians and cyclists travelling along Huntingdon Road (links 4.1, 4.2, 4.3 and 4.4) • Drivers along High Cross Road (link 12.1) • Pedestrians and cyclists travelling along High Cross Road (link 12.) • Drivers along JJ Thomson Avenue (link 12.2) • Pedestrians and cyclists travelling along JJ Thomson Avenue (link 12.2) • Drivers along Clerk Maxwell Road (link 12.3, 12.4) • Pedestrians and cyclists travelling along Clerk Maxwell Road (link 12.3, 12.4) 	Low	Changes in traffic flows could result in a change on personal injury collision rates.	Adaptive Phased Approach to long term transport mitigation.	Negligible	The additional traffic flows on the network resulting from the West Cambridge Development would be unlikely to have any significant effect on existing personal injury collision rates, although the number of personal injury collisions would be likely to increase as a function of additional traffic flows on these links in 2031. The overall significance of effect for Highway Safety is therefore Negligible.	Negligible Not significant

10.7 Mitigation measures

Construction phase

10.7.1 A Construction Environment Management Plan (CEMP) will be implemented by the developer, approved by Cambridge City Council prior to construction commencing, and implemented by all contractors associated with the Proposed Development. This document will identify the appropriate hours of operation and routes to be used by construction vehicles travelling to and from the Site. Specific mitigation which will be included within the CEMP includes:

- Delivery routes will be agreed with the local highways authority and will preferentially access the Site from the M11 Junction 13/ Madingley Road particularly for heavy vehicles; and
- Heavy vehicle movements will not be permitted through Cambridge unless no alternative is available and only once agreement has been sought with the local highway authority.

Operational mitigation for the initial phase of development (2021)

Transport strategy

10.7.2 The mitigation measures to be implemented; to reduce the vehicular trip generation of the Initial Phase of the Proposed Development, to reduce vehicle use on the network, and to manage the effects of the Proposed Development, are:

- The travel demand management strategy, set out in the Framework Travel Plan based on:
 - The benefit of a fully-funded quality FTP;
 - The consequences of the application of "Smarter Choices" guidance to reduce vehicular trip generation from the Proposed Development; and

- The provision of car parking at a controlled, appropriate level of provision, and the implementation of a car parking management scheme combined with permit provision on a demonstrated needs basis;

- An enhanced public transport strategy. The scale of the Proposed Development means that there will be both a high quantum of demand for public transport, and a number of locations that will need to be connected to West Cambridge. The strategy, detailed within Section 7 of the Transport Assessment, includes:
 - Increased regularity of bus provision;
 - Direct on-site routes;
 - Provision of high quality bus stops (including real time passenger information, and the provision of comprehensive timetable information including network maps and fare details);
 - Bus priority measures to be provided with Selective Vehicle Detection technology at any new traffic signals controlling the entrances to the Site from Madingley Road;
 - Provision of service information and incentive measures to increase patronage; and
 - Promote network ticketing with operators serving West Cambridge, allowing for passengers from destinations other than Cambridge city centre to make journeys on other services and transfer using the same ticket stored on a smartcard, mobile phone or EMV wave and pay card.
- Quality pedestrian and cyclist facilities. The strategy, detailed within Section 6 of the Transport Assessment, includes:
 - Direct, quality North-South footway and cycleway provision across West Cambridge linking between Madingley Road and Coton Path using the Western Access, High Cross, JJ Thomson Avenue and Clerk Maxwell Road.;

- The East - West Shared Space Link to provide the main east - west spine for Pedestrians and Cyclists connecting Clerk Maxwell Road and High Cross with access to a number of plots and lower-hierarchy Cycle routes;
- As with north west Cambridge, all vehicle routes being designed for a 20mph speed limit using passive speed management measures such as constrained widths and the use of shared surface areas. This low-speed environment is primarily to control vehicle speeds, but in so doing will create a safer and more attractive environment for pedestrians and cyclists;
- Footways being provided on both sides of the on-site streets and at the Site Access locations. Controlled crossing points would be provided, and traffic calming measures would be present to reduce traffic speed and to ease pedestrian movement;
- Improved links between West Cambridge and all popular destinations; including to the East, towards the City, and to the north through north west Cambridge. These links will be supported with controlled crossings;
- Provision of high levels of quality cycle parking, at least to the adopted Cambridge Local Plan 2014 minimum cycle parking standards, within private covered, secure, lit and well-located areas at the destinations, as well as further provision through the Development; and
- All major employers being encouraged to provide associated shower and changing room facilities for walkers and cyclists after their journeys.
- Schemes to improve environmental conditions. The strategy, identified in Section 16 of the Transport Assessment, includes:
 - Contributions to affect a lower speed limit than the existing 40mph speed limit locally on Madingley Road – thus providing environmental benefit from existing vehicular movements;
 - Contributions to the necessary Traffic Regulation Orders to implement car parking zones or prohibitions on surrounding streets to minimise inappropriate overspill parking – potentially in the context of providing improved cycle facilities;
 - Measures at three locations to address existing highway safety concerns – especially effecting vulnerable road users;
 - The extension of the SCOOT and MOVA traffic signal optimisation to the proposed traffic signals along Madingley Road – JJ Thomson Avenue and Clerk Maxwell – to control any additional queuing and delays as a consequence of the Proposed Development.
- Guaranteeing funding for potential highway mitigation schemes that could be implemented should the cyclic monitoring strategy identify that conditions deteriorate significantly at:
 - Madingley Road / High Cross junction; and
 - Madingley Road / Clerk Maxwell Road junction.

Operational Mitigation for the Full Development (2031)

10.7.3 At the date of the submission of the Planning Application, there was significant uncertainty regarding:

- Development delivery across the Cambridge Sub Region;
- The associated infrastructure provision necessary to accommodate this level, of growth - particularly relating to:

- The A14 Huntingdon – Cambridge Enhancement;
- The Greater Cambridge City Deal transport proposals;
- Highways England’s currently unpublished proposals for the M11;
- Other emerging transport proposals – such as improvements to east - west movement;
- The emerging development policy, including that enshrined within the Cambridge Local Plan.

10.7.4 As there may be a degree of variability in future traffic flow projections (which can be attributed to a number of factors including fuel prices, Government policy etc.), this pragmatic mitigation strategy has been formulated which is designed to be resilient to change in conditions by being focused to all sustainable modes, with appropriate levels of mitigation for vehicular traffic. This strategy therefore reflects current planning policy by:

- Reducing and controlling existing and future vehicular trips across the network;
- Improving pedestrian and cyclist infrastructure through the area for the benefit of both the existing and future users;
- Providing financial contributions towards the delivery of public transport services on and off-Site infrastructure; and
- Where necessary, providing measures to preserve and / or enhance capacity on particular links or junctions.

10.7.5 The overall transport strategy for the Proposed Development responds to a number of important national and local objectives. The mitigation provision for the Initial Phase of the Proposed Development is set within the agreed context for the overall transport mitigation strategy for West Cambridge, consisting of:

- A graduated approach – the assessment process reflecting current transport planning policy where travel demand management measures are introduced first, followed by any necessary highway infrastructure measures to mitigate the residual traffic impact; as well as
- An adaptive approach – where, to maintain future flexibility, the proposed mitigation for later phases responds to the quanta of development within the individual phase proposals, the timescales for the delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty relating to the development and transport infrastructure enhancement proposals.

10.7.6 Acknowledging this situation, as discussed with the Joint Authorities, it is not appropriate to define further mitigation measures at this stage beyond an indicative Initial Phase of development (i.e. over and above the measures described in the Framework Travel Plan and those additional measures envisaged in the 2021 scenario) prior to confirmation of the details of the above. Instead, the Adaptive Phase Approach is proposed, through which a mitigation scheme will be developed at the appropriate time, and ensured through a planning condition, which sets out:

- The mitigation scheme's objectives including the targets it must meet over time;
- The mitigation scheme's parameters;
- The methods of achieving the mitigation scheme's objectives and reviewing and adapting those methods over time to ensure that the objectives are met; and
- A review mechanism to ensure that the achievement of the objectives is kept under review and the methods adapted if further steps prove necessary.

10.7.7 The likely mitigation strategy is anticipated to consist of the following elements:

- To control and reduce vehicle trip generation:
 - provision of appropriate levels of car parking on-site, with delivery phased to reflect development implementation;
 - managing the on-site car parking provision; and
 - review of car parking off-site, offer of further parking control measures if required.
- To preserve conditions:
 - offer contributions to the delivery of a further reduction in the Madingley Road speed limit; and
 - review road safety and promote further local schemes if required.
- To improve conditions for pedestrians and cyclists on-site:
 - quality footway / cycleway infrastructure;
 - high levels of conveniently located quality cycle parking;
 - all major occupiers providing shower and changing room facilities; and
 - managing cycle parking provision.
- To improve conditions for pedestrians and cyclists off-site:
 - providing remedial measures to assist in resolving any identified emerging road safety issues;
 - improved crossing at Eddington Avenue;
 - improved facilities along the Corridor to the City Centre – along Grange Road, West Road, Queen’s Green and Silver Street; and
 - contributions to the delivery of a further reduction in the Madingley Road speed limit.
- To enhance Public Transport on-site:
 - provide selected vehicle detection for buses through traffic signal controlled junctions to provide bus priority; and
 - provide information and incentives to the site occupiers.
- Enhanced bus services:
 - Citi 4 - increased frequency to every 10 minutes;
 - Universal – possibly introduce an extended orbital service to Addenbrooke’s Hospital; or
 - Arc Service – increased frequency, and possibly extend service further to South Cambridge;
 - review a new variation of the Service B on the Guided Busway.
- Enhancing travel demand management:
 - locate further Car Club vehicles on-site;
 - review cycling initiatives – including cycle pools, cycle buddy, training, discounted equipment; and
 - marketing and promotion.
- To preserve local highway capacity, consider physical interventions:

- provide localised highway enhancement to accommodate the new Western Access Road junction; and
- consider further highway mitigations, if required.
- To preserve strategic highway capacity, consider Corridor interventions:
 - work together with the Highway and Planning Authorities to deliver interventions strategically

10.8 Summary

- 10.8.1 During the construction phase traffic, construction traffic will be controlled through measures specified in the CEMP. This will include reaching an agreement with the local highways authority about delivery routes which will avoid Cambridge city centre. There would be no significant adverse or beneficial transport effects from the Proposed Development during the construction phase.
- 10.8.2 The first phase of the Proposed Development is anticipated to be operational in 2021. A transport strategy has been produced and this sets out mitigation measures identified as being required through transport modelling and other measures to improve the amenity of pedestrian and cyclist routes. There will be no significant adverse or beneficial transport effects in 2021.
- 10.8.3 The full Proposed Development will be operational in 2031. Due to uncertainty about other developments in the city and region and the required provision of new or upgraded transport infrastructure it is not possible to specify what mitigation measures might be required. Instead mitigation will be identified and implemented through an Adaptive Phased Approach which will ensure the right measures are implemented at the right time and in the right location. There would be no significant adverse or beneficial transport effects in 2031.

11. Air quality

11.1 Introduction

11.1.1 This chapter updates the air quality assessment in the submitted ES to show the changes resulting from the amended Proposed Development. The air quality assessment requires amending due to the update in the predicted traffic flows. The following sections remain unchanged from the submitted ES and have not been replicated within this document.

- Scope of assessment;
- Relevant legislation and policy;

11.1.2 The following sections require updating to reflect the amended Proposed Development and are presented in this chapter:

- Method of assessment- Operational phase only. Construction phase effects remain unchanged.
- Baseline conditions.
- Impact assessment – Operational phase only. Construction phase effects remain unchanged;
- Mitigation measures;
- Summary.

11.2 Method of assessment

Impact assessment – operational effects

11.2.1 Updated information is provided on the operational effects of the development only where there is a change from the original assessment.

11.2.2 Re-modelling to take revised traffic data into consideration has also included updating the assessment methodology to take account of updated traffic data and vehicle emission factors. The most recent version of ADMS-Roads (4.1) has been used as has the most recent version of the Emissions Factor Toolkit (EFT (7.0)). In addition, the baseline assessment year and the year for which the model has been verified has been updated to 2016 due to more recent data becoming available.

11.2.3 The modelling has been undertaken using the same approach to vehicle emission factors and background concentrations as in the original assessment; i.e. future traffic data for the year 2021 has been combined with 2018 emission factors and background concentrations, and future traffic data for the year 2031 has been combined with 2025 emission factors and background concentrations, in order to provide a conservative assessment of the effects of the proposed development. As road traffic emissions are predicted to decline with time, selecting earlier emission years for the assessment increases the emissions from the vehicle fleet that are assessed, over and above the emissions in the EFT (whatever the version used). This is considered appropriate for the determination of likely significant effects, which is the requirement for the ES (not worst case effects). Further justification for this is provided in Appendix 11.9, in particular:

- The model verification process takes account of (in addition to other factors) the current under-estimation of emissions from the vehicle fleet that is in the EFT;
- Vehicles corresponding to Euro 6 / VI emission standards are being introduced into the vehicle fleet;
- Emissions testing on these vehicles has shown that NO_x emissions from diesel vehicles corresponding to Euro 6 / VI standards are much lower than previous Euro standards, notwithstanding the fact that they are higher in real-life than the laboratory based emission standards require. Emissions from the vehicle fleet will reduce significantly in the future;
- The introduction of real world emission testing requirements into Euro 6 (from September 2017, tightened in January 2020) will mean that emissions from future Euro 6 diesel cars will be much closer to the laboratory test limits than current Euro 6 vehicle emissions. This will further reduce NO_x emissions from diesel cars compared to current vehicles on the road;
- By 2031, approximately 95% of the diesel cars on the road will be Euro 6 vehicles.

11.2.4 Overall therefore, there is no credible justification for assuming that vehicle emissions in the future will remain at current levels, even if one ignores the introduction of electric/hybrid vehicles.

11.2.5 The effect of emissions from delivery vehicles accessing the site from Clerk Maxwell Road (CMR) can be screened out of detailed modelling. Although there are no residential properties fronting onto CMR, the road provides access to two Cul-de-sacs (Perry Court and The Lawns). CMR has well established vegetation along both sides of the road and is characterised by (uncontrolled) on-road parking on both sides of the road. The residential receptors at the southern end of CMR are therefore well separated from the road. Clerk Maxwell Road itself currently accommodates around 190 car movements daily on the assumption that 95 on street parking spaces are used. Although not all cars park towards the southern end of CMR, often cars in the southern half will drive down to Perry Court to turn before driving north. It is estimated that the Proposed Development will lead to an additional 328 deliveries per week on CMR, of which only 7 would be vehicles greater than 7 tonnes in weight. The additional Annual Average Daily Traffic is only approximately 94 vehicle movements per day, well below the thresholds stipulated in IAQM/EPUK on the assessment of road traffic impacts from development. The total vehicle flows on CMR are also very low, being less than 300 movements per day.

11.2.6 Emissions from the proposed centralised energy centre have been modelled at existing on-site and off-site residential receptors and proposed receptor locations on site, as listed in Appendix 11.1 and shown in Figure 11.1.

11.2.7 The centralized energy centre is the same as for the submitted ES, i.e. 3 CHP units to be installed with up to 3 x 10MW boilers and 1 x 5MW boilers. The total boiler capacity is required to provide heat in the event that the CHP is unavailable and therefore all of the boilers would not normally run, or only for very short periods of time. For the modelling of annual average impacts, we have used the anticipated energy demand as set out in para 11.3.34 of the submitted ES to determine the operating hours of the equipment. The data provided in the submitted ES Appendix 11.4 is for each individual piece of equipment. The annual average modelling has been undertaken for 3 CHP engines and 1 x 10MW boiler to meet the required demand. For the hourly average impacts, it is assumed that the 3 CHP engines, 2 x 10MW boilers and 1 x 5MW boiler would be operating all year round, this is a significant over-estimate of the likely short term energy centre operation.

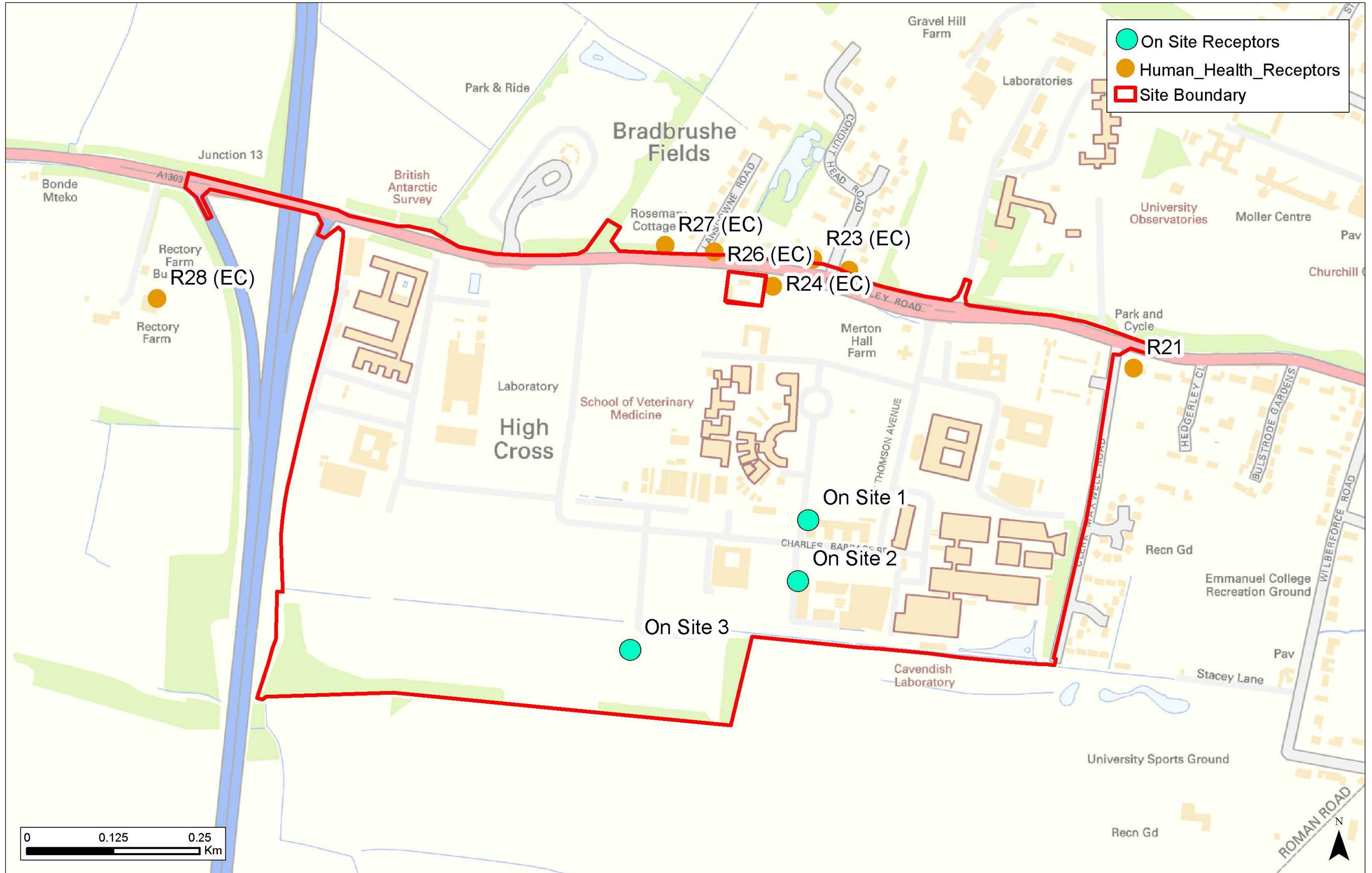


Figure 11.1 Location of air quality receptors

11.2.8 It should be noted in interpreting the contour plots that the annual average NO₂ concentration only applies at the specific receptor locations assessed, i.e. the residential receptor locations on-site and off-site. The predicted hourly average NO₂ concentrations assume that all of the combustion equipment is operating all year round and are therefore significant over-estimates of the actual concentrations that will occur. In addition, the 100th percentile concentration has been predicted which does not take into account the allowable exceedances of the objective.

11.2.9 There is the potential that instead of a centralised energy centre, heat will be provided for each building or clusters of buildings across the site, with part of the energy provision being provided by ground or air source heat pumps. In the case of an individual building approach, CHP would unlikely to be viable. In a distributed energy scenario, each combustion source will be much smaller than a centralised energy centre and the overall quantity of emissions will be lower. Emissions will be dispersed from more points geographically and the maximum ground level concentrations will be lower. The assessment that has been undertaken for the centralised energy centre is therefore considered to be the reasonable worst case scenario.

11.3 Baseline conditions

Monitoring

11.3.1 Since the ES chapter was completed 2015 and 2016 monitoring results have been provided by both Cambridge City Council and South Cambridgeshire District Council. This is shown in the updated Table 11.1, below. No data is available in relation to the hourly mean NO₂ objective in 2015 and 2016 so this has not been updated.

Table 11.1 Measured NO₂ concentrations, (2010 – 2016)

ID	Site Type	Within AQMA	Annual Mean (µg/m ³)						
			2010	2011	2012	2013	2014	2015	2016
Cambridge City Council Diffusion Tubes									
Maddingley Road*	K	N	53	43	41	36	40.2	37.9	37.2
Northampton Street	R	Y	54	45	41	38	39.5	38.4	37.4
Magdalene Street	R	Y	48	35	31	29	30	28.1	26.5
Victoria Road	R	Y	49	37	34	33	33	29.9	28.4
Histon Road 1 NEW ^a	K	N	-	-	-	30	32	34.7	29.3
Histon Road 1 ^b	K	N	43	35	35	29	-	-	-
Histon Road 2	R	N	40	31	28	28	31.6	30.7	26.9
Huntingdon Road 1*	R	N	36	29	25	25	25	23.9	22.9
Huntingdon Road 2*	R	N	38	29	30	27	23	27.0	22.8
Objective	40								
South Cambridgeshire District Council Automatic Monitors									
Impington (A14)*	R	Y	30	31	31	27	23	22	23

¹³ Cambridge City Council (2015). '2015 Updating and Screening Assessment for Cambridge City Council'. Cambridge, UK

ID	Site Type	Within AQMA	Annual Mean (µg/m ³)						
			2010	2011	2012	2013	2014	2015	2016
Girton*	R	N	-	-	27	26	25	24	23
Objective	40								
South Cambridgeshire District Council Diffusion Tubes									
1A Weavers Field*	UB	Y	32.4	32.6	29.5	26.8	30.5	27.0	26.2
1 Catchall Farm*	R	Y	36.2	25.6	24.4	26.4	25.4	22.5	24.1
Hackers Fruit Farm*	R	Y	-	28.5	41.5	42.9	38.0	34.0	37.1
Rhadegund Farm*	R	Y	-	15.7	22.0	26.0	21.7	19.7	20.6
Crafts Way Bar Hill	R	N	30.1	21.4	23.9	23.7	22.9	20.6	24.5
Objective	40								
Exceedances of the objective in bold									
^a Start operation in 2013									
^b Stop operation in 2014									
K=Kerbside; R= Roadside; UB= Urban Background									
*Used for model verification									
Monitoring data for CCC obtained from 2015 Updating and Screening Assessment CCC ¹³ . Monitoring data for 2015 and 2016 have been provided by CCC									
Monitoring data for SCDC obtained from the 2015 Updating and Screening Assessment for SCDC ¹⁴ . Monitoring data for 2015 and 2016 has been provided by SCDC.									

11.3.2 Monitored concentrations within Cambridge seem to be on a reducing trend between 2014 and 2016. Table 11.2 shows that concentrations are significantly lower in 2016 than in 2010.

Table 11.2 Measured PM₁₀ concentrations, (2010 – 2016)

ID	Annual Mean (µg/m ³)						
	2010	2011	2012	2013	2014	2015	2016
South Cambridgeshire District Council Automatic Monitors							
Impington (A14)	42	54	58	55	22	18	17
Girton	-	-	26	30	16	11	17
Objective	40						
Exceedances of the objective in bold							
Monitoring data for SCDC obtained from the 2015 Updating and Screening Assessment for SCDC ¹⁴							

¹⁴ South Cambridgeshire District Council (2015). '2015 Updating and Screening Assessment for South Cambridgeshire District Council'. South Cambridgeshire, UK

Table 11.3 Measured PM_{2.5} concentrations, (2010 – 2016)

ID	Annual Mean (µg/m ³)						
	2010	2011	2012	2013	2014	2015	2016
South Cambridgeshire District Council Automatic Monitors							
Girton	-	-	13	14	12	11	13
Objective	25						
Monitoring data for SCDC obtained from the 2015 Updating and Screening Assessment for SCDC ¹⁴							

Background concentrations

11.3.3 The maps of background pollutant concentrations published by Defra have been updated in line with the most recently published emission factors. The updated Table 11.4 is shown below.

Table 11.4 Estimated annual mean background concentrations

Grid Ref	Annual Mean (µg/m ³)											
	NO _x			NO ₂			PM ₁₀			PM _{2.5}		
	2016	2018	2025	2016	2018	2025	2016	2018	2025	2016	2018	2025
538_263	20.9	18.4	13.8	14.9	13.3	10.2	18.5	18.2	17.7	12.5	12.2	11.8
539_262	17.8	15.8	12.0	12.8	11.5	9.0	17.6	17.3	16.8	11.9	11.7	11.2
540_259	15.3	13.8	10.7	11.2	10.1	8.0	15.6	15.3	14.9	10.9	10.7	10.2
540_262	21.8	19.1	14.0	15.5	13.7	10.3	19.6	19.3	18.8	13.0	12.7	12.2
541_258	18.5	16.5	12.5	13.3	12.0	9.3	16.9	16.7	16.2	11.6	11.4	10.9
541_259	15.8	14.2	11.0	11.5	10.4	8.2	15.6	15.4	14.9	10.9	10.7	10.2
541_261	24.8	21.6	15.6	17.4	15.4	11.5	18.5	18.2	17.7	12.5	12.2	11.8
542_258	17.7	15.8	12.1	12.8	11.5	9.0	17.1	16.9	16.4	11.7	11.5	11.0
542_259	20.2	17.9	13.4	14.4	12.9	9.9	17.1	16.8	16.3	11.7	11.5	11.0
542_260	19.6	17.5	13.3	14.0	12.6	9.9	16.9	16.7	16.2	11.7	11.4	11.0
542_261	23.0	20.3	15.1	16.2	14.5	11.1	18.0	17.7	17.2	12.3	12.0	11.5
543_259	19.8	17.7	13.7	14.1	12.8	10.1	16.0	15.7	15.2	11.2	11.0	10.5
543_260	18.3	16.5	12.9	13.2	12.0	9.5	15.8	15.6	15.1	11.1	10.9	10.4
544_258	24.3	22.2	17.9	16.8	15.5	12.9	15.5	15.3	14.7	11.1	10.9	10.4
544_259	25.5	23.1	18.3	17.6	16.1	13.1	16.1	15.8	15.3	11.5	11.2	10.7
Objectives	30^a			40^b			40^b			25^b		

^a Ecosystem; ^b Human Health

11.3.4 Background concentrations of all pollutants are below or well below the relevant objectives across the study area.

11.4 Impact assessment

Operation

11.4.1 Contour plots of the annual and hourly average NO₂ concentrations from the energy centre at elevations of 1.5m and 22.5m are contained in Figures 11.2 to 11.5. The differences in the contour plots show the effect of buildings on the dispersion of emissions albeit the buildings can only be modelled as blocks at present as detailed design work has not been undertaken.

11.4.2 Table 11.5 below provides a summary of the operation phase effects for the proposed development.

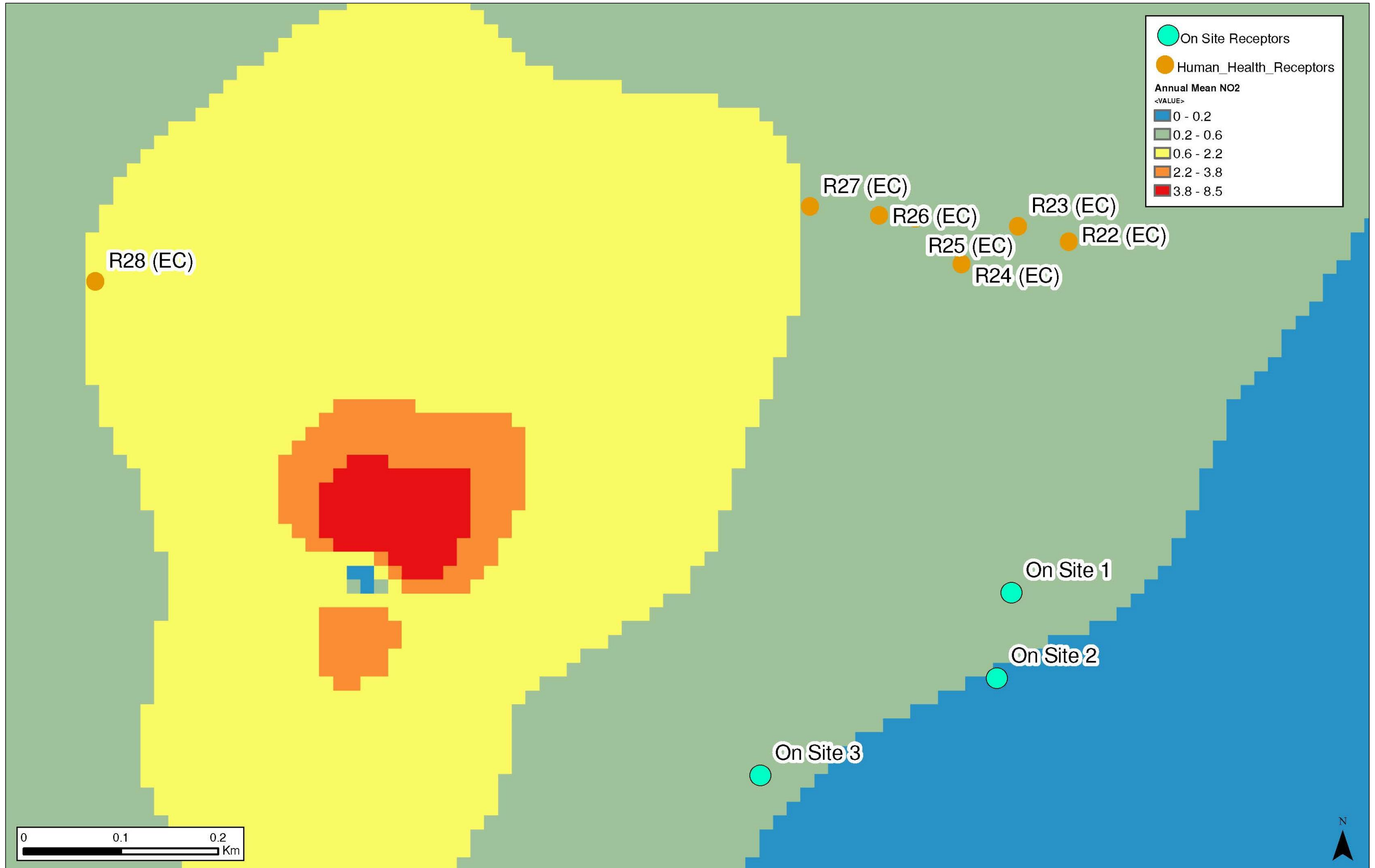


Figure 11.2 Annual mean NO₂ concentrations at 22.5m

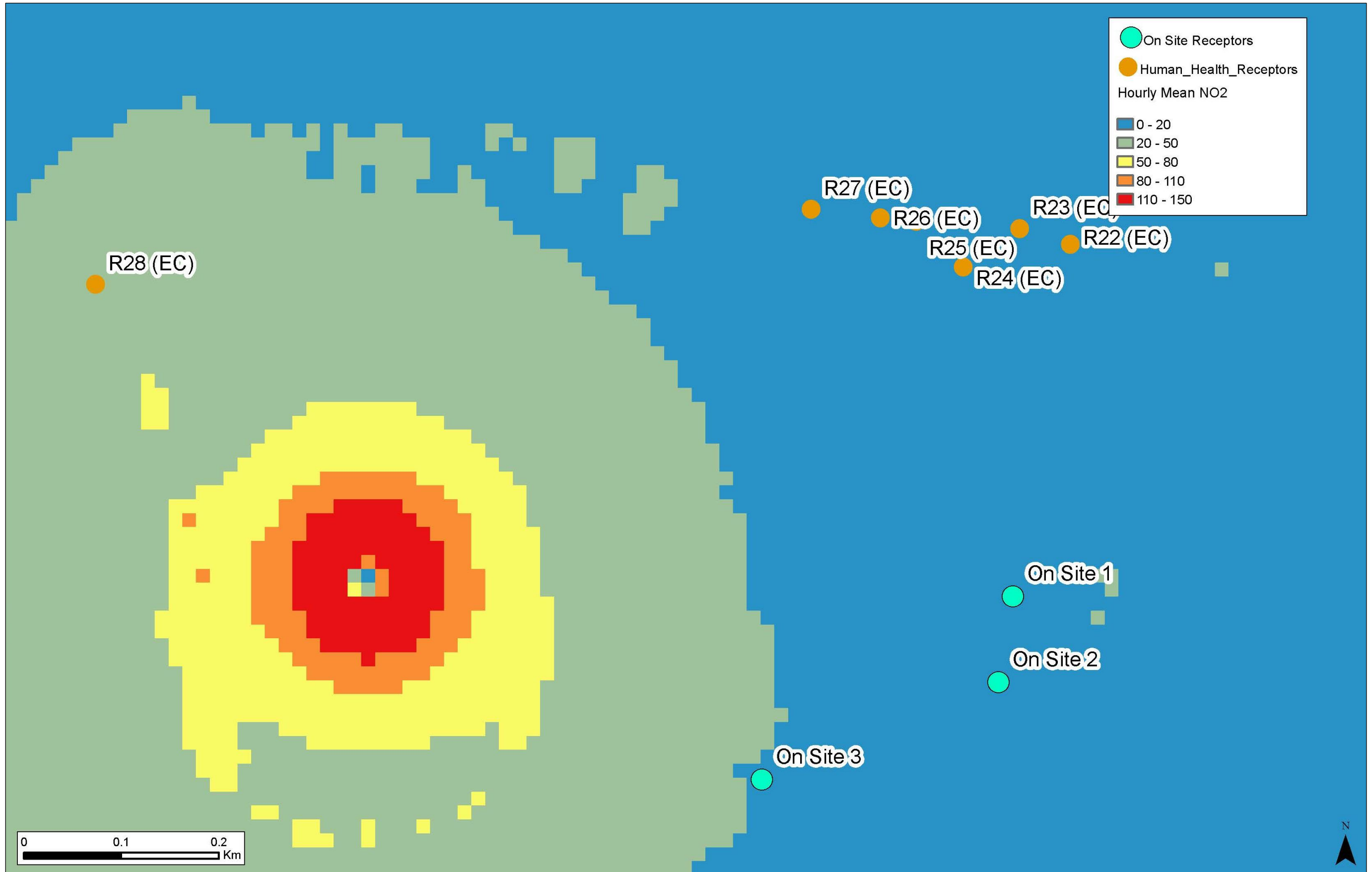


Figure 11.3 Maximum hourly mean NO₂ concentrations at 22.5m

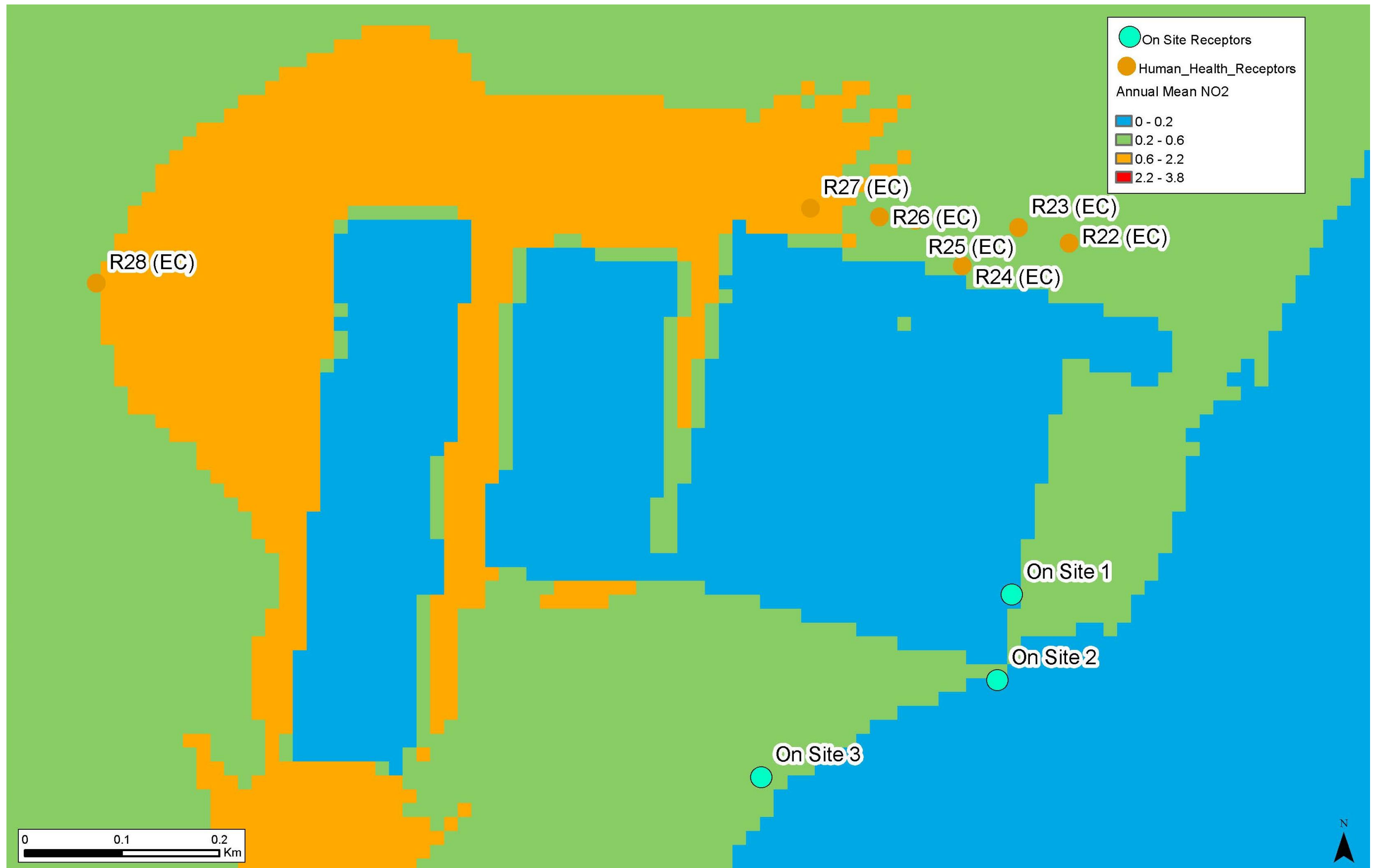


Figure 11.4 Annual mean NO₂ concentrations at 1.5m

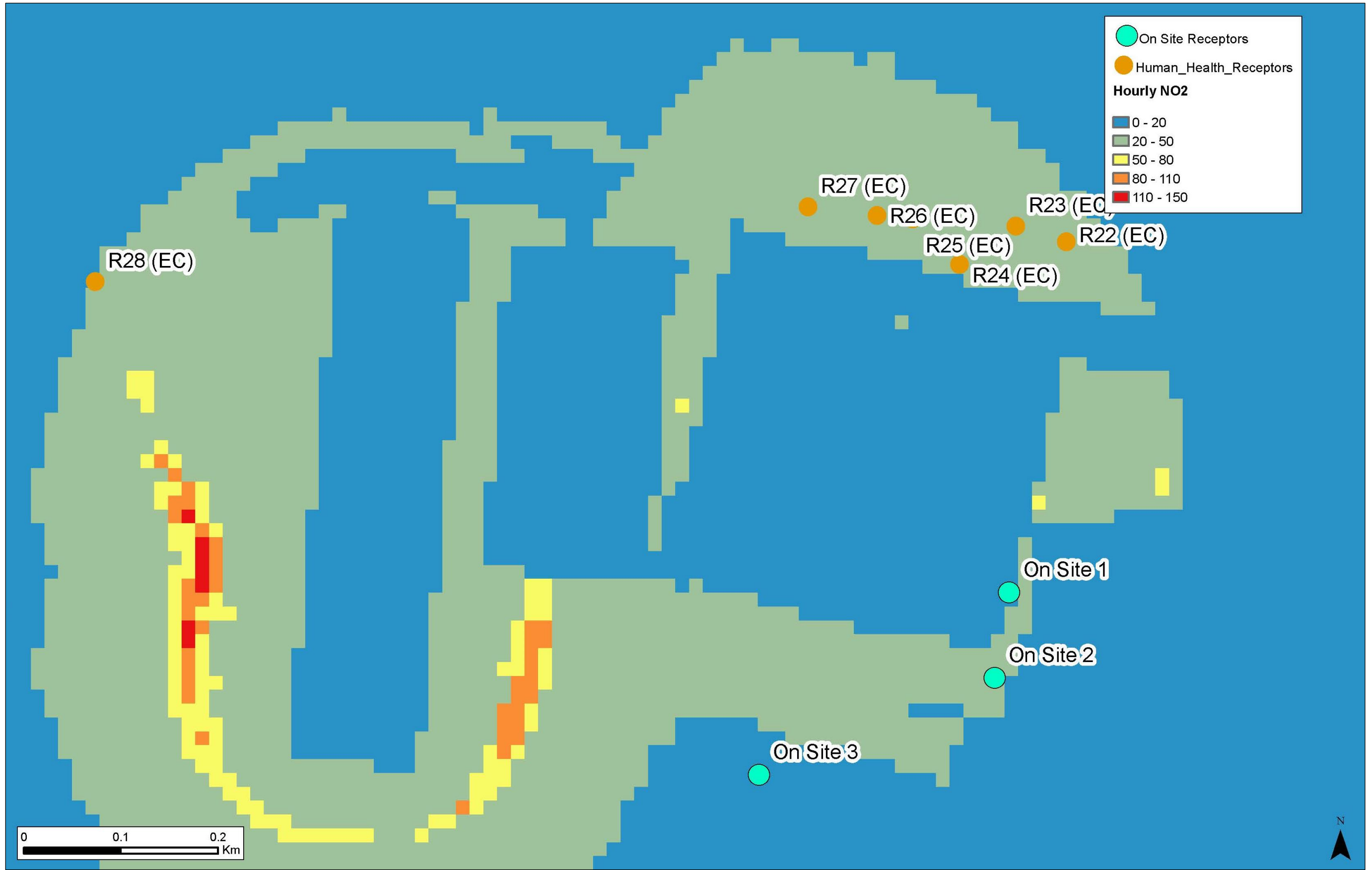


Figure 11.5 Maximum hourly NO₂ concentrations at 1.5m

Table 11.5 Operational phase effects

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Human Health Receptors off-site	High	Increase in road traffic emissions leading to elevated NO ₂ , PM ₁₀ and PM _{2.5} concentrations	Not required	Negligible	<p>Predicted concentrations of NO₂, PM₁₀ and PM_{2.5} at existing receptors in 2021 (Interim Scenario) and 2031 (Full Development), both without and with the Proposed Development in place are presented in Appendix 11.6.</p> <p>2021 Interim scenario</p> <p>In 2021, without and with (interim scenario) the development in place NO₂, PM₁₀ and PM_{2.5} concentrations are not predicted to exceed the air quality strategy objectives at any of the existing residential receptor locations.</p> <p>The changes in annual mean concentrations are presented in Appendix 11.6. The changes in the annual mean NO₂ concentrations are imperceptible at the majority of the receptor locations with small changes at 5 receptors and medium changes at 13 receptors. The changes in PM₁₀ annual mean concentrations are imperceptible at the majority of receptors and small at 2 receptors. The annual mean of 32 µg/m³ equating to 35 days above 50 µg/m³ is described as imperceptible at most receptor locations and small at 4 receptor locations. The changes in PM_{2.5} concentrations are described as imperceptible at most receptor locations and small at 5 receptor locations.</p> <p>The impact on pollutant concentrations is classed as negligible at all receptor locations.</p> <p>2031 With full development scenario</p> <p>In 2031, without and with the full development in place NO₂, PM₁₀ and PM_{2.5} concentrations are not predicted to exceed the air quality strategy objectives at any of the existing residential receptor locations.</p> <p>The changes in annual mean concentrations are presented in Appendix 11.6. The changes in the annual mean NO₂ concentrations are imperceptible at the majority of the receptor locations with small changes at 12 receptors and medium changes at 5 receptors. The changes in PM₁₀ annual mean concentrations are imperceptible at the majority of receptors and small at 6 receptors. The annual mean of 32 µg/m³ equating to 35 days above 50 µg/m³ is described as imperceptible at most receptor locations and small at 11 receptor locations. The changes in PM_{2.5} concentrations are described as imperceptible at most receptor locations and small at 12 receptor locations.</p> <p>The impact on pollutant concentrations is classed as negligible at all receptor locations.</p>	Negligible Not significant
Human Health Receptors off-site and on-site	High	Energy Centre emissions leading to elevated NO ₂ concentrations	Not required	Negligible	<p>Predicted concentrations from the energy centre emissions are presented in Appendix 11.8. The significance of the impacts has been judged in accordance with the IAQM/EPUK criteria.</p> <p>There are no predicted exceedances of air quality strategy objectives as a result of emissions from the energy centre. The maximum change in annual mean NO₂ concentrations is described as small. The maximum change in hourly NO₂ concentrations is medium. When considered in conjunction with the baseline concentrations the impact at the worst case receptor is described as negligible.</p> <p>Given that there are no exceedances of air quality strategy objectives the effect of the energy centre emissions is considered to be not significant.</p> <p>Contour plots of the predicted annual average and 1-hour average NO₂ concentrations at elevations of 1.5m and 22.5m are shown in Figures 11.2 to 11.5 to demonstrate the effect of buildings on the dispersion; only the results at the specific receptor sites are relevant for the assessment.</p>	Negligible Not significant
Human Health Receptors off-site and on-site	High	Combined Road Traffic and Energy Centre emissions leading to elevated NO ₂ concentrations	Not required	Negligible	<p>The predicted environmental concentrations in Appendix 11.8 for the energy centre include the contribution from the road traffic in the baseline concentration. The combined impact of road traffic and energy centre emissions is to increase NO₂ concentrations by a maximum of 2.3 and 0.8 µg/m³ in 2021 and 2031 respectively. This magnitude of change, in combination with the total concentration is described as a negligible impact.</p>	Negligible Not significant
Human Health Receptors on-site	High	Emissions from on-site laboratories	Additional abatement may be required.	Negligible	<p>Process abatement will be designed to ensure environmental concentrations do not breach environmental assessment levels specific to the chemical species being released. This will be undertaken during the detailed design stage of the specific laboratory building.</p>	Negligible Not significant
Madingley Wood SSSI	High	Road traffic emissions leading to elevated NO _x concentrations and Nitrogen / Acid Deposition	Not required	Negligible	<p>Predicted concentrations and deposition rates without and with the Proposed Development in place in 2021 and 2031 are contained in Appendix 11.7.</p> <p>2021 Interim scenario</p> <p>The NO_x critical level is predicted to be exceeded only at the kerb of the road without or with the development in place. The increase in NO_x concentrations is only 1.5% of the critical level at the kerb of the road, and therefore the increase in NO_x concentrations is unlikely to have a significant effect. The nitrogen and acid deposition critical loads are predicted to be exceeded at all of the receptor locations within the habitat in 2021. The increase in nitrogen and acid deposition is less than 1% and therefore not significant.</p> <p>2031 With full development scenario</p> <p>The NO_x critical level is not predicted to be exceeded with or without the development in place. The nitrogen and acid deposition critical loads are predicted to be exceeded at all of the receptor locations within the habitat in 2031. The increase in nitrogen and acid deposition is less than 1% and therefore not significant.</p>	Negligible Not significant

11.5 Mitigation measures

Construction

- 11.5.1 Because of the uncertainty around construction works the mitigation measures listed in this section are intended to be a starting point based on the assumptions used for the impact assessment and the subsequently predicted effects. Once details of the construction works activities are known the list will need to be refined based on any change in risk as per the IAQM guidance.
- 11.5.2 The following mitigation measures are specified in the IAQM guidance for a medium risk site and will be appropriately implemented during construction. The CEMP will specify which works activities will be subject to which specific mitigation measures.

Communication

- Develop and implement a stakeholder communications plan.
- Display the name and contact details of persons accountable on the site boundary.
- Display the head or regional office information on the site boundary.

Management

- Develop and implement a dust management plan.
- Record all dust and air quality complaints, identify causes and take measures to reduce emissions.
- Record exceptional incidents and action taken to resolve the situation.
- Carry out regular site inspections to monitor compliance with the dust management plan and record results.
- Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken.
- Agree dust monitoring locations with the local authority and instigate monitoring 3 months in advance of works commencing in the area.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site run off of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove potentially dusty materials from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary.
- Avoid the use of diesel or petrol powered generators where possible.
- Produce a Construction Logistics Plan to manage the delivery of goods and materials.

- Only use cutting, grinding and sawing equipment with dust suppression equipment.
- Ensure an adequate supply of water on site for dust suppressant.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate.
- Ensure equipment is readily available on site to clean up spillages of dry materials.
- No on-site bonfires and burning of waste materials on site.

Earthworks

- Re-vegetate earthworks and exposed areas /soil stockpiles to stabilise surfaces as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Demolition

- Incorporate soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure water suppression is used during demolition operation.
- Avoid explosive blasting, using appropriate manual and mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tanker sand stored silos with suitable emissions control systems.

Trackout

- Use water assisted dust sweepers on the site access and local roads.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials.
- Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable.
- Install hard surfaced haul routes which are regularly damped down.
- Install a wheel wash with a hard-surfaced road to the site exit where site layout permits.
- The site access gate to be located at least 10m from receptors where possible.

Operation

- 11.5.3 The effects of the development on local air quality are judged to be not significant. No additional mitigation measures are required to reduce the direct effects of the development. Mitigation measures to reduce vehicular trip generation of the Proposed Development and to reduce vehicle use on the network are described in the Transport Chapter. These mitigation measures will reduce both the transport and air quality effects of the development.
- 11.5.4 In particular, a fully-funded Framework Travel Plan has been submitted in support of this application. It sets out a wide-ranging series of measures to maximise movement by all non-car modes of travel to the development. It will be reviewed and approved by the Joint Authorities, and delivered in an agreed manner.
- 11.5.5 The design of the development incorporates appropriate separation distances between sources of pollution and residential receptor locations. There are no residential receptors alongside Madingley Road and the centralized energy centre is located on the west side of the development, well away from the nursery and student accommodation.
- 11.5.6 Combustion equipment installed as part of the energy centre will be gas fired and therefore there will be no particulate emissions. NO_x emissions will comply with the requirements of the Medium Combustion Plant Directive which is designed to limit emissions from combustion equipment in the size range proposed.
- 11.5.7 An appropriate number of electric vehicle (EV) charging stations will be provided to cater for both all-day parking slow charging as well as the fast charging points which may be more attractive for visitors, pool vehicles, Car Clubs and taxis. The number of EV charging points will be periodically reviewed so that the provision matches demand.
- 11.5.8 As part of the Sustainability objectives for the development, the aim is to Incorporate at least two exemplar sustainable University buildings as part of the masterplan. The aim to achieve BREEAM Outstanding or equivalent for each of the exemplar buildings. All other buildings will have to demonstrate why Outstanding is not viable, and will have to achieve BREEAM Excellent as a minimum.

11.6 Summary

- 11.6.1 Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted for a number of worst-case locations representing existing properties adjacent to the road network. Predicted concentrations are below the relevant air quality objectives at all of the existing receptor locations in 2021 and 2031 with the proposed development in place. No additional mitigation measures are therefore required to reduce the direct effects of the development.
- 11.6.2 The increase in NO_x concentrations, nitrogen and acid deposition is unlikely to have a significant effect on the integrity on the Madingley Wood SSSI.
- 11.6.3 Modelling of the emissions from the energy centre have shown that a flue height of 8m above building parameter plan height is sufficient to disperse emissions without leading to exceedances of air quality objectives.
- 11.6.4 The operational effects of the proposed development are judged to be negligible and not significant.

12. Noise and vibration

12.1 Introduction

12.1.1 This chapter updates the noise and vibration assessment in the submitted ES to show the changes resulting from the amended Proposed Development. The assessment requires updating due to changes in the predicted traffic flows and due to the energy strategy which now allows for air source heat pumps which can be a source of noise. In addition new noise surveys have been undertaken for specific projects within West Cambridge and the results of these have been used to update the baseline conditions section. Following further discussions with the Cambridge City Council Environmental Health Officer (EHO) further assessments have been undertaken to identify noise impacts from a potential multi-storey car park and access route on to Clerk Maxwell Road. The method of assessment section requires updating to explain how these assessments were undertaken.

12.1.2 The following sections remain unchanged from the submitted ES and have not been replicated within this document.

- Scope of assessment;
- Relevant legislation and policy;
- Mitigation measures.

12.1.3 The following sections require updating to reflect the amended Proposed Development and are presented in this chapter:

- Method of assessment (Operational multi-storey carpark assessment and Operational access route assessment only);
- Baseline conditions;
- Impact assessment – Operational phase only. Construction phase effects remain unchanged;
- Summary

12.2 Method of assessment

Operational multi-storey car park noise impact assessment

12.2.1 A new multi storey car park is proposed towards the north-east boundary of the site providing 540 car parking spaces. The proposed multi-storey car park replaces an existing ground level car ..

12.2.2 The closest residential dwellings lie approximately 50 m to the west of the site at 53 Madingley Road and approximately 150m to the south east of the proposed multi-storey car park at The Lawns of Clerk Maxwell Road. For the purpose of the assessment, sound levels associated with the car park movements and activities have been calculated at these receptors

12.2.3 Local trip generation for the proposed car park has been established based on methodologies detailed in the Transport Chapter.

12.2.4 The AM and PM peak hours have been identified by the associated transport assessment as 08:00 – 09:00 (AM) and 17:00 – 18:00 (PM).

12.2.5 Table 12.1 details the estimated AM peak hour and PM peak hour car movements associated with the proposed development.

Table 12.6 Proposed peak hour car movements

Time Period	Proposed Car Park (540 Spaces)	
	Arrive	Depart
AM Peak Hour 08:00-09:00	262	52
PM Peak Hour 17:00-18:00	48	139

12.2.6 Due to the nature of the proposals, it is anticipated that the key noise impact to existing noise sensitive receptors would be associated with changes in ambient noise levels due to additional vehicle movements and activities (i.e. door slams and switching engines on) during the operation of the proposed new car park. However, the assessment should take into consideration the historical use of the site as a car park, and therefore assess the change in noise levels based on the increases in car park movements due to the increased capacity against the ambient noise levels measured during the peak hour.

12.2.7 The assessment calculates the change in ambient noise levels due to the sound levels generated by the existing and proposed car parks during the AM and PM peak hours at the nearest sensitive residential receptors.

12.2.8 Measurements of car movements associated with the car park have previously been undertaken. Activities measured included:

- Car driving in, manoeuvring and stopping including occupant exiting the car and door slam;
- Occupant getting in car, slamming door and driving away.

12.2.9 The likely noise impact of the car park operations has been assessed based on car arrival (including door slam) and car departure (including door slam). Sound levels used in the assessment for are provided in Table 12.2.

Table 12.7 Typical sound level associated with car park activity

Source	LAE at 3 m (dB)
Car pass by and park	74
Engine starting and car pulling away	77

12.2.10 The assessment of vehicle related noise has been based upon the noise prediction methods detailed in CRTN. This methodology compares changes between the existing ambient sound levels during the peak hours and the potential cumulative ambient sound level at the nearest noise sensitive residential receptor. The calculation methodology also accounts for distance attenuation, angle of view and screening.

12.2.11 Based on national planning requirements and relevant standards the assessment criteria are set out in Table 12.3.

Table 12.8 NOEL, LOAEL and SOAEL for changes in ambient sound levels

Increasing Effect Level	Change in Ambient Sound Level Daytime Free-Field LAeq,16h (dB)	Comments
NOEL	0	No effect; not noticeable.
LOAEL	+3 dB	Noticeable and not intrusive. Unlikely to cause a change in attitude or behaviour. Generally just noticeable.
SOAEL	+10 dB	Noticeable and disruptive. The noise causes a material change in behaviour and/or attitude.

Operational access route noise impact assessment

- 12.2.12 Servicing access is proposed at certain points along Clerk Maxwell Road. These are identified as I-J (North of Clerk Maxwell Road), K-L (mid-way down Clerk Maxwell Road) and M-N (South of Clerk Maxwell Road) on Parameter Plan: Access and Management.
- 12.2.13 An indicative assessment has been undertaken in general accordance with BS 4142:2014 to determine the likely noise impact associated with the use of Clerk Maxwell Road for deliveries, servicing and access.
- 12.2.14 As full details of the specific delivery and servicing activities are not available it has been assumed that activities generating noise along the proposed access road and at the nearest proposed building to the east of the site are likely to include the following:
- Delivery vehicles arriving, parking and departing;
 - General loading activities (loading/unloading/movement of trolleys).
- 12.2.15 The specific sound level of the combined servicing operations has been calculated by considering each activity as an individual sound event and then combining them to obtain the specific sound level within a worst case one-hour period.
- 12.2.16 The assessment undertaken is based on 1 HGV movement in any worse case hour during a typical day as per the 'Servicing the East of the West Cambridge Site Note – AECOM dated 30/06/17'.
- 12.2.17 Table 12.4 details the activities associated with the servicing operations, the associated noise level and the number of activities taking place during a worst case 1-hour daytime period. As night-time deliveries are not anticipated; a night time assessment has not been undertaken. Unless otherwise stated, sound levels are based on measurements from our in-house database.

Table 12.9 Noise levels associated with deliveries

Measurement Description	Sound Pressure Level SEL (dB)	Source Level Measurement Distance (metres)	Number of Events During 1 Hour Period (Daytime)
Lorry Arriving	68	1	1
Lorry door slam	83	1	1
Opening lorry shutter	76	1	1
Removing support bars	88	4	14
Moving roll cages inside lorry	93	3	14
Loading roll cages	94	1	14
Wheeling roll cages off into facility	97	1	14
Wheeling empty roll cages from inside the facility to outside	92	3	4
Loading empty roll cages onto lorry	95	1	14
Securing support bars	88	4	3
Closing lorry shutter	76	1	1
Door slam	83	1	1
Lorry Starting	89	1	1
Reversing Alarm	94	1	1
Lorry Driving Away	90	1	1

- 12.2.18 During the survey to obtain delivery activity source data, the temperature was cool (approx. 10°C), with light winds (< 5m/s), approximately 50% cloud cover and no precipitation. These conditions were considered suitable for obtaining representative source levels.

Noise sensitive receptors

- 12.2.19 It has been assumed that the nearest noise sensitive receptors to both the access route and the closest proposed building associated with delivery noise will be the existing residential dwellings located identified as noise sensitive receptor K located approximately 20m from the access route and 70m from the closest proposed building associated with delivery noise.

Acoustic feature corrections and reflections

- 12.2.20 As stated in the Noise and Vibration Impact Assessment prepared by Prepared by Max Fordham. Submitted as part of the planning application for the Civil Engineering Building On the West Cambridge Site, Madingley Road, Cambridge, there is an earth mound between the proposed servicing area and the closest noise sensitive receptors. Along the length of the access road, the height of the earth mound varies. A height of 1.5m above ground level is taken for the purposes of this assessment. Based on line of sight screening the attenuation provided by the barrier is likely to be around 5dB.

12.2.21 Acoustic feature corrections have been applied where considered appropriate. Table 12.5 details the acoustic feature corrections applied.

Table 12.10 Acoustic feature corrections

Source	Acoustic Feature Correction (dB)
Lorry Door Slam	+ 3
Reversing Alarm	+ 6
Earth Mound	- 5

Background sound levels

12.2.22 For the purpose of this assessment background sound levels during the operational periods are detailed in Table 12.6. These noise levels have been derived from the environmental sound survey undertaken for the Noise and Vibration Impact Assessment prepared by Prepared by Max Fordham. Submitted as part of the planning application for the Civil Engineering Building On the West Cambridge Site, Maddingley Road, Cambridge.

Table 12.11 Background sound levels

Operational Period	Background Sound Level (dB) LA90,15mins
Daytime (07:00 – 23:00 hours)	47

Uncertainty

12.2.23 Care has been taken to reduce uncertainty as far as reasonably possible. However, it should be recognised that in any environmental sound survey and assessment process uncertainty exists.

12.2.24 The sound level data that forms the basis of the assessment are considered representative of future operations. A degree of uncertainty is therefore inherent in the source level data used. It is considered, however, that the measured operations are an accurate representation of the operation of the access route.

12.3 Baseline conditions

12.3.1 The Site is bounded to the west by the M11 motorway and to the north by the A1303 Maddingley Road. These are deemed to be the dominant sources of noise across the Site.

2014 Baseline

Noise

12.3.2 Appendix 12.2, Volume 3 of the submitted ES, contains the detailed results of the noise and vibration surveys undertaken at the Site including time history graphs of the unattended noise survey and vibration surveys.

12.3.3 Table 12.7 presents a summary of the results of the 24-hour unattended noise survey. These results have been used to calibrate the noise model.

Table 12.12 Summary of unattended noise survey results

Measurement location	Daytime LAeq,16h (dB)	Night-time LAeq,8h (dB)	Typical night-time LAFmax (dB)	Typical daytime LA90,15min (dB)	Typical night-time LA90,15min (dB)
LT1	75	70	80	72	52
LT2	69	62	82	54	41
LT3	50	44	57	46	43
LT4	59	55	63	58	47
LT5	55	49	58	52	44

12.3.4 Noise levels across the existing site vary considerably due to the large distances between the road traffic sources along the northern and western boundaries and the eastern and southern boundaries as well as the distances between developed areas of the Site. The dominant noise sources across the Site are the M11 motorway and the A1303 Maddingley Road with plant noise from some existing buildings on Site contributing to the sound climate in developed areas of the Site.

12.3.5 Temporary traffic lights were located at the junction of Maddingley Road and High Cross Road to enable the utilities and highway works for the North West Cambridge project to be undertaken. This caused queues of traffic adjacent to the unattended sound survey location LT2 at busier times of the day. The vibration survey at this location (VS2) was undertaken during free-flowing, evening traffic towards the end of the peak period.

12.3.6 Ambient sound levels measured at Location LT3 were the lowest of the unattended noise survey. This location is well-screened from road traffic noise by existing on-Site buildings and a large bund along the eastern boundary of the Site. Dominant noise sources included vehicles accessing the adjacent car park, pedestrians and cyclists passing the measurement location and plant noise from the Nano-science Centre building.

Vibration

12.3.7 The measured PPV levels at Location VS1 do not exceed 0.14mm/s despite the measurement being undertaken during a peak period of continuous, free-flowing traffic. It was observed that the free flowing traffic contained a high volume of HGVs on the day of measurement.

12.3.8 Some large PPV levels including two incidents where levels exceeded 1 mm/s were measured at VS2 due to the close proximity of passing HGVs and busses to the vibration equipment. Traffic was flowing freely during this measurement.

12.3.9 During the unattended vibration survey at VL1, PPV levels did not exceed 0.8mm/s in any direction. It is noted that Charles Babbage Road (approximately 10m from the measurement location) includes speed bumps at pedestrian crossing points and a 20mph speed limit.

12.3.10 Additional environmental sound surveys have been undertaken by Ramboll UK Limited and Max Fordham to support the 'Cavendish III' and the 'Civil Engineering Building' projects, respectively. With the permission of both consultants the additional data has been used to inform the baseline conditions which form the basis of assessments used within this ES Addendum. These have been reported in this document and have been used to determine appropriate background sound levels at existing dwellings. The additional survey locations are in Figure 12.1

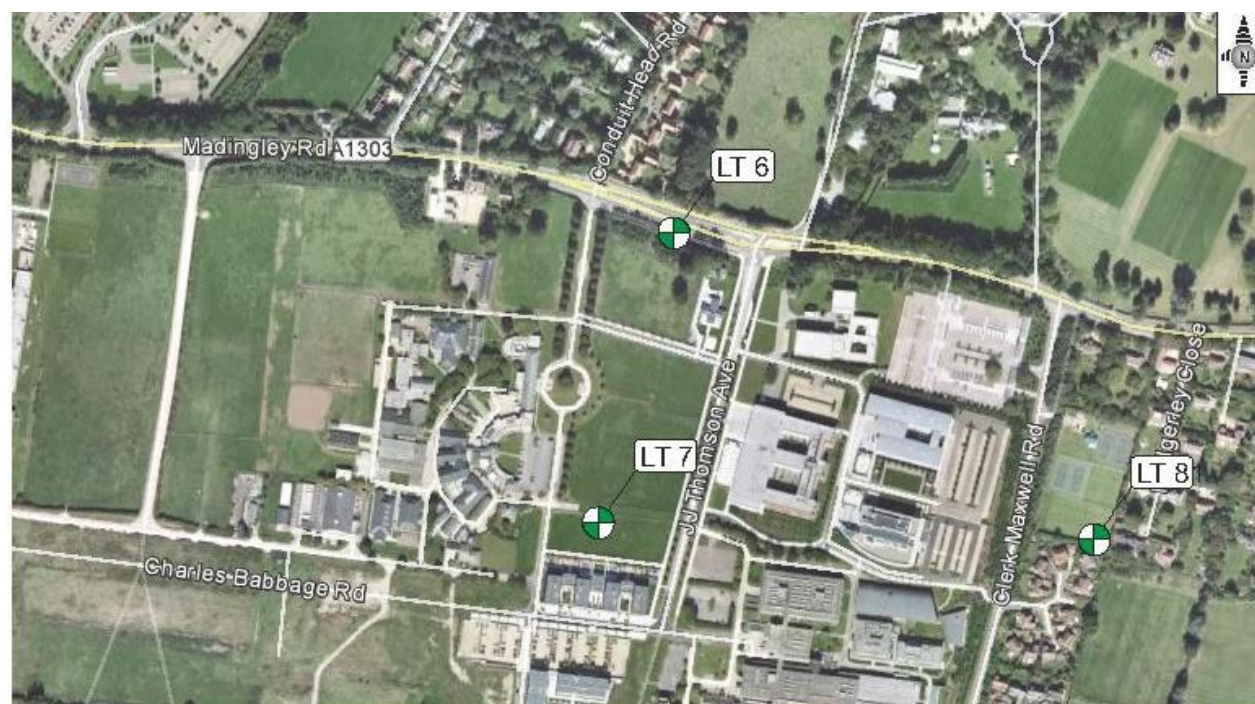


Figure 12.1 Additional noise survey locations

Cavendish III (Ramboll) baseline sound survey results

- 12.3.11 Ramboll have previously undertaken an environmental sound survey to support the Cavendish III project. The survey methodology and results are detailed in their report referenced 'R01/rev.01'. A summary of the key results is presented in this ES Addendum.
- 12.3.12 Based on the baseline sound survey the calculated results are summarised in Table 12.8 below. Where appropriate the corresponding noise sensitive receptor has been identified.
- 12.3.13 Full results are presented in Appendix 12.5

Table 12.13 Cavendish III baseline sound survey results summary

Measurement Position	Time Period	L _{Aeq, T}	Typical L _{A90}	Closest Noise Sensitive Receptor
LT6	Daytime (07:00 – 23:00)	57	55	Closest Residential dwellings on Conduit Head Road
	Night time (23:00 – 07:00)	53	47	
LT7	Daytime (07:00 – 23:00)	52	51	N/A
	Night time (23:00 – 07:00)	51	48	

The Civil Engineering Building (Max Fordham) baseline sound survey results

- 12.3.14 Max Fordham have previously undertaken an environmental sound survey to support the Cavendish III project. The survey methodology and results are detailed in their report referenced Revision Version F. A summary of the key results is presented in this ES Addendum.
- 12.3.15 The results of the baseline sound survey are summarised in Table 12.9 below. Where appropriate the corresponding noise sensitive receptor has been identified
- 12.3.16 Full results are presented in Appendix 12.6

Table 12.14 Cavendish III baseline survey results summary

Measurement Position	Time Period	L _{Aeq, T}	Typical L _{A90}	Closest Noise Sensitive Receptor
LT8	Day (07:00 – 18:00)	51	47	Closest Residential Dwellings on The Lawns
	Evening (18:00 – 23:00)	49	47	
	Night (23:00 – 07:00)	49	43	

12.4 Impact assessment

Operational phase

Operational road traffic noise

- 12.4.1 The impact of the Proposed Development on the noise climate in the surrounding areas is based on the change in noise levels at noise sensitive receptors due to a change in the volumes of road traffic generated by the proposed development. Therefore, based on updated traffic flows provided by the transport consultant a revised assessment has been undertaken. These flows are presented in Appendix 12.4. The assessment criteria detailed in the ES has been used to determine the significance of the impacts. Technical details regarding the updated flows are contained in the traffic and transport chapter.
- 12.4.2 The assessment has been undertaken to consider the likely impact during daytime (07:00 – 23:00) periods during the week which is considered to be the worst case. A night-time assessment has not been undertaken as the resultant traffic flows are equal to or less than 3 % of the overall AAWT traffic flows. Similarly, an assessment based on the weekend periods has not been undertaken as the resultant weekend 24-hour traffic flows are equal to or less than 30% of the overall AAWT 24 hour traffic flows.
- 12.4.3 Figure 12.2 presents the change in noise levels due to road traffic in the long term. A comparison has been made between the 2021 Do Minimum - 'Without Development' and 2031 Do Something – 'With Development' scenarios. Table 12.10 presents a summary of the predicted change in road traffic noise levels in the long term based on the supplied traffic flow predictions.



Figure 12.2 Change in noise levels due to road traffic and operational multi-storey car park assessment

Table 12.15 Summary of predicted change in noise levels due to the increase in long term road traffic noise

Noise sensitive receptor	Reference letter (see Figure 12.1 in submitted ES)	Long term changes in ambient noise levels due to the increase in traffic flows. (dB)	Adverse Effect Level
1 + 2 Rosemary Cottages	A	< 3	< LOAEL
1 Lansdowne Rd	B	< 3	< LOAEL
2 Lansdowne Rd	C	< 3	< LOAEL
34 + 36 Madingley Rd	D	< 3	< LOAEL
Whitehouse Apartments	E	< 3	< LOAEL
14 Conduit Head Rd	F	< 3	< LOAEL
53 Madingley Rd	G	< 3	< LOAEL
51 Madingley Rd	H	< 3	< LOAEL
Blenheim Court	I	< 3	< LOAEL
Churchill Court	J	< 3	< LOAEL
1+2 The Lawns	K	< 3	< LOAEL
1+2 Perry Court	L	< 3	< LOAEL

Operational multi storey car park assessment

12.4.4 Table 12.11 details the calculated sound level at the nearest noise sensitive residential receptors and the subsequent change in ambient sound level.

Table 12.16 Car park noise impact assessment summary

Noise Sensitive Receptor (see Figure 12.2 submitted ES)	Time period	Measured Existing Sound Level (dB LAeq,1hour)	Calculated Proposed Sound Level (Car Park Only) (dB LAeq, 1hour)	Cumulative Ambient Sound Level at Receptor (dB LAeq, 1hour)	Subsequent Change in Car Park Sound Level (dB)	Subjective Effect
K	AM Peak Hour 08:00-09:00	51	51	54	3	LOAEL
	PM Peak Hour 17:00-18:00		50	53	3	LOAEL
G	AM Peak Hour 08:00-09:00	57	55	59	2	< LOAEL
	PM Peak Hour 17:00-18:00		54	59	2	< LOAEL

12.4.5 Calculations indicate that the change in ambient sound level following the introduction of the new car park are unlikely to exceed proposed LOAEL during AM and PM peak hours and should therefore be considered acceptable.

12.4.6 Example calculations are presented in Appendix 12.8.

Operational access route noise impact assessment

12.4.7 The rating level associated with servicing activities has been calculated and the assessment summarised in Table 12.12.

Table 12.17 Indicative Access Route Assessment

Time Period	HGV Delivery Assessment	
	Daytime (07:00 – 23:00 hours) Typical Week Day	Daytime (07:00 – 23:00 hours) Weekend Day
Combined Rating Level (dB LAr,Tr) at Existing Noise Sensitive Receptor	42	42
Background Sound Level (dB LA90, 15 min)	47	42
Excess of Rating over Background Sound Level (dB)	-5	0
Assessment of Impact	indication of the specific sound source having a low impact, depending on the context	indication of the specific sound source having a low impact, depending on the context

12.4.8 The initial numerical assessment should be considered in relation to the context of the site and any mitigating factors.

12.4.9 The initial numerical assessment of sound levels associated with the proposed access route and associated delivery noise at the nearest proposed noise sensitive receptor indicates that the operation of Clerk Maxwell Road for servicing and access is likely to result in a less than adverse impact during the daytime.

12.4.10 Example Calculations are presented in Appendix 12.9.

Operational plant noise emissions

12.4.11 At this stage, it is unknown what type of plant services will be required to serve the range of potential uses.

12.4.12 Based on the plant noise emissions criteria and the background noise levels measured during the additional environmental sound surveys, cumulative plant noise emissions at the nearest noise sensitive receptor should not exceed the values in Table 12.13.

Table 12.18 Cumulative plant noise emission levels

Time period	Façade of Noise sensitive Receptor	Cumulative Plant Noise Emission Criteria (L _{Aeq,T})
Daytime (07:00 – 19:00)	LH	55
	On site Receptors	50
Evening (19:00 – 23:00)	K	47
	H	51
	On site Receptors	49
	K	47
Night-time (23:00 – 07:00)	H	47
	On site Receptors	48
Time period	K	43

12.4.13 Operational phase impacts are assessed in Table 12.14.

Table 12.19 Operational phase effects

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Off-site noise sensitive receptors (residential and academic/commercial buildings)	Medium-High	Increase in road traffic noise levels due to increased road traffic volumes	No additional mitigation measures suggested.	Negligible	Based on the results of the assessment, the predicted increase in road traffic noise for the closest noise sensitive receptors does not exceed the proposed LOAEL in the long term.	Negligible Not significant
On-site, external amenity areas	Low	Road traffic noise	<ul style="list-style-type: none"> Positioning of proposed buildings to screen noise source 	Low		Minor Adverse Not significant
All off-site and on-site noise sensitive receptors	Low-High	Noise from plant/Energy Centre	<ul style="list-style-type: none"> Meet noise limits agreed with CCC Enclose plant within the building envelope; 	Negligible (Provided plant noise emission limits are met)	Noise from plant has the potential to be a direct, permanent adverse effect associated with the development. Depending on the type and use of the plant, the effect may be episodic, particularly if the plant is used intermittently. Mitigation measures would minimise any effects including meeting noise limits agreed with CCC.	Negligible Not significant
Off-site noise sensitive receptors (residential and academic / commercial buildings)	Medium-High	Increase in road traffic noise levels due to increased road traffic volumes	<ul style="list-style-type: none"> Selecting suitably attenuated 'low noise' plant; Positioning air intake/discharge louvres away from noise sensitive receptors; Orientating air intake/discharge louvres away from noise sensitive receptors; Attenuation of air intake/discharge louvres with duct mounted attenuators; and Sound insulating plant housings/enclosures. No additional mitigation measures suggested. 	Negligible	Based on the results of the assessment, the predicted increase in road traffic noise for the closest noise sensitive receptors does not exceed the proposed LOAEL in the long term.	Negligible Not significant

12.5 Mitigation Measures

Construction phase

Construction noise

12.5.1 The following mitigation measures will be implemented during construction.

- Best practice construction methods to control noise and vibration from demolition and construction activities would be specified in a site-specific Construction Environmental Management Plan (CEMP). The CEMP would be agreed in consultation with Cambridge City Council at the reserved matters stage and could include the following routine noise and vibration management controls:
 - Breaking out of concrete structures would be undertaken, where possible, using low noise effect methods including bursting and splitting rather than percussive breaking;

- Detailed programming of works to make maximum use of existing barriers to noise;
- Retention of the outer walls of structures for as long as possible before demolition is necessary;
- Careful selection of demolition/construction methods and plant to be used;
- Switching off of plant and vehicle engines when not in use;
- Restriction of drop heights onto lorries;
- Regular maintenance and servicing of vehicles, equipment and plant;
- Appropriate handling and storage of materials;
- Appropriate operational hours (to be agreed with the local authority);
- Enforcement of restricted working hours for excessively noisy activities;
- Implementation of an appropriate traffic management strategy; and

- Use of temporary acoustic barriers where appropriate and other noise containment measures such as screens, sheeting and acoustic hoardings at the construction site boundary to minimise noise breakout and reduce noise levels at the potentially affected receptors.
- Agreement with Cambridge City Council and neighbours on suitable approach to noisy activities if a temporary source of noise cannot reasonably be prevented and the works being undertaken are crucial to progressing the particular project phase.
- Keep neighbours and stakeholders (including the existing commercial and university occupants as well as nearby residential inhabitants) informed about construction activities. Measures for community liaison would be dealt with by a dedicated Community Liaison Officer to co-ordinate the dissemination of information (for example, by means of a regular newsletter) and to program those operations at time that would minimise the potential for disturbance.

Construction vibration

- 12.5.2 Further controls may be required to ensure vibration sensitive equipment or experiments in the existing buildings are protected from damage or malfunction. Appendix B.5 of BS 5228 Part 2 reviews the assessment of vulnerability of contents of buildings such as scientific laboratories or microelectronics manufacturing.
- 12.5.3 Precise details and locations of vibration sensitive equipment or long-term vibration sensitive experiments are unknown at this stage. Additionally, some buildings which are likely to house vibration sensitive uses, such as the Cavendish Laboratory, are scheduled for demolition as part of the masterplan. Once a demolition and construction programme is available, suitable vibration limits and the requirement for vibration monitoring will be determined. This could include the following measures:
- Specification in the CEMP for further measures;
 - Further investigation into existing vibration levels;
 - Setting vibration limits; and
 - Continuous vibration monitoring

Operational phase

Operational road traffic noise

- 12.5.4 An additional assessment of operational road noise has been undertaken to reflect the change in traffic flows due to additional works on the transport chapter of the ES. The additional assessment indicates that the changes in noise levels at all noise sensitive receptors fall below the proposed LOAEL.

Operational plant noise emissions

- 12.5.5 Plant will be selected, located and attenuated so that planning conditions attached to the development by Cambridge City Council are satisfied. This is likely to require meeting noise limits provided in Table 3.12 at nearby receptors through a combination of the following environmental noise control techniques which could be implemented:
- Enclosing noisy plant within the building envelope;
 - Selecting suitably quiet 'low noise' plant;
 - Positioning air intake/discharge louvres away from noise sensitive receptors;

- Orientating air intake/discharge louvres away from noise sensitive receptors;
- Attenuation of air intake/discharge louvres with duct mounted attenuators; and
- Sound insulating plant housings/enclosures.

Energy strategy

- 12.5.6 The above mitigation measures should also be considered in the design of the Energy strategy as this is likely to be a major plant noise source.
- 12.5.7 As the Energy Centre could be housed within a building, particular attention to the orientation and attenuation of air intake / discharge louvres and flues will be considered at detailed design.

12.6 Summary

- 12.6.1 The ES Addendum has presented an additional assessment of potential noise impacts during the operational phase.
- 12.6.2 An additional assessment of operational road noise has been undertaken to reflect the change in traffic flows due to additional works on the transport chapter of the ES. The additional assessment indicates that the changes in noise levels at all noise sensitive receptors fall below the proposed LOAEL.
- 12.6.3 An assessment has been undertaken to consider the potential impact of the proposed multi-storey car park towards the north east of the development site. The initial assessment indicates that the change in car park sound levels are not likely to exceed the proposed LOAEL and should therefore be considered acceptable.
- 12.6.4 An assessment of the proposed servicing and access route has been undertaken to consider the potential noise impact associated with HGV movements on Clerk Maxwell road. The initial assessment of sound levels at the nearest proposed noise sensitive receptor indicates that the operation of the proposed access route is likely to result in a less than adverse impact and therefore not exceed the proposed LOAEL during the daytime. No deliveries are anticipated during the night time periods; therefore, an assessment of night time impact has not been undertaken.

13. Water environment

13.1.1 This chapter updates the water environment in the submitted ES to show the changes resulting from the updated drainage strategy. The only changes relate to the mitigation measures and these have not resulted in any change to the impact assessment itself. The following sections remain unchanged from the submitted ES and have not been replicated within this document.

- Scope of assessment;
- Relevant legislation and policy;
- Method of assessment;
- Baseline conditions;
- Impact assessment;
- Summary.

13.1.2 The following sections require updating to reflect the amended Proposed Development and are presented in this chapter:

- Mitigation measures (operational phase only).

8.5 Mitigation measures

Operational phase

13.1.3 Operational effects will typically be avoided through the incorporation of measures within the design process. the following controls are integral to the design:

- Discharge from the Site will be designed to be the equivalent of 1 in 1 year Greenfield run off rate. The 1 in 1 year Green field run off rate has also been reduced by 10% from the rates originally agreed with the Environment Agency for the 1999 consented master plan.. This will be achieved through Site-wide measures (e.g. the operation of the drainage system on the Site's southern boundary) and plot specific controls (e.g. permeable paving and temporary storage). The appropriate sustainable urban drainage (SuDs) standards will be applied where appropriate;
- An allowance of 40% has been used to take account of increased rainfall intensities resulting from predicted climate change. Flood risk will be mitigated up to and including the 1 in 100 year return period, including climate change. An additional 40% in storage volume to accommodate post development flows will be provided. This requires significant attenuation to be provided across the site to mitigate flood risk. Mitigation measures include modifications to the existing Western Lake, Canal and South Eastern pond, to provide increased storage capacity for the Western and Central catchments. Development located within the Eastern catchment will provide attenuation by the provision of on plot storage. Discharges will be limited to the 1 in 1 year Greenfield run off rate;
- Where spatial constraints allow, roadside bio retention areas will be constructed to facilitate the treatment and conveyance of highway run off;
- The Canal and South Eastern pond will be planted with suitable aquatic planting such as reed beds which will facilitate removal of potential contaminants;

- The drainage system will be designed to include the treatment of runoff to manage the removal of silt and other pollutants. Proprietary pollution mitigation systems will be installed at strategic locations on the proposed network to supplement SuDs treatment measures. Sediment monitoring is proposed to characterise current operational effects and inform the detailed design of drainage systems for the plots as they are developed;
- The majority of drainage from the Site will be routed in a southerly direction, reducing potential effects on the Washpit Brook and the North West Cambridge development. The design of the revised system will, as a minimum, reflect its current ecological and amenity value:
- Periodic CCTV inspections of on Site sewers and cyclic jetting will be undertaken as part of the Site wide maintenance;
- Cyclic maintenance of on Site surface water drainage assets will be undertaken in accordance with LLFA guidance. Attenuation will be provided a on phased basis as plots are developed; and
- Anglian Water is assessing the capacity available through a foul water impact study. If required tanked sewers would be provided to mitigate increased demand.

13.1.4 Reflecting the nature of the operational use of the Site, it is recommended that measures are implemented to ensure that the operation of facilities aligns to appropriate legislative requirements for the storage, use and disposal of chemicals which may be harmful to the aquatic environment. As a minimum, a review will be conducted to ensure that all activities using and disposing of chemicals, plus all chemical and material stores comply with current consenting requirements and include adequate pollution prevention measures. The findings of this review will be presented spatially alongside the existing foul and surface water drainage systems to identify potential vulnerabilities in the system. This could also be conducted alongside awareness raising for staff using the Site to ensure that they are aware of procedures and the potential consequences of not complying with prescribed procedures (e.g. ecological effects, prosecution, reputational damage).

14. Ground conditions

14.1 Introduction

14.1.1 This chapter updates the ground conditions assessment in the submitted ES to show the changes resulting from the amended Proposed Development. The assessment requires amending due to the amended energy strategy which now includes an option for ground source heat pumps. The following sections remain unchanged from the submitted ES and have not been replicated within this document.

- Scope of assessment;
- Relevant legislation and policy;
- Method of assessment;
- Baseline conditions.

14.1.2 The following sections require updating to reflect the amended Proposed Development and are presented in this chapter:

- Impact assessment;
- Mitigation measures;
- Summary.

14.2 Impact assessment

Construction phase

14.2.1 Construction phase impacts are assessed in Table 14.1.

Table 14.20 Construction phase effects

Baseline		Impact assessment				
Receptor / hazard	Assessed risk	Impact	Mitigation measure	Assessed risk	Residual effect	Significance of effect
Site workers	Low	There is a possibility that other sources of contamination may be encountered during the construction works that have not been identified by the Phase 1 study or future ground investigation. Site workers encountering potential localised areas of contamination on Site.	<ul style="list-style-type: none"> • Appropriate protective clothing and equipment will be worn by site workers; and good standards of hygiene adopted to prevent prolonged skin contact, inhalation and ingestion of soils during construction • In addition, the methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site. • Ensure workers at risk of encountering potentially hazardous materials have had appropriate training. • As part of the CEMP, a watching brief for the visual and olfactory assessment of the soil quality will be maintained with sampling and testing for verification and assessment purposes where necessary, together with treatment as required 	Low	The risk to Site workers during construction will be minimal providing mitigation is implemented.	Negligible / minor adverse Not significant

Baseline		Impact assessment				
Receptor / hazard	Assessed risk	Impact	Mitigation measure	Assessed risk	Residual effect	Significance of effect
Site users / neighbours	Low	Site users / neighbours potential exposure to contaminated dust mobilised during construction activity	Methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site. These are detailed in Chapter 11 and will be specified within the Soils Management Strategy which will form part of the CEMP.	Low	The risk to Site users / neighbours during construction will be minimal providing mitigation is implemented.	Negligible / minor adverse Not significant
Ground water	Very Low	Potential introduction of new contaminant sources due to the release of contaminants from construction activity e.g. spill / leaks from defective plant and un-bunded fuel storage areas, silt-laden runoff from poorly managed stockpiles and poor site surface water management. Potential migration of new and existing contaminants in groundwater due to construction activity e.g. creation of contaminant pathways due to the introduction of service trenches, areas of loosely compacted fill, boreholes for ground source heat pumps, piling etc.	Implementation of standard environmental protection measures during construction as set out in CIRIA C532 and the Environment Agency's former Pollution Prevention Guidance (PPG) series as further detailed in Chapter 13 water environment. Preparation of appropriate application documents and associated assessments and adherence to Environment Agency consent and licence requirements for any proposed engineering works (e.g. for possible open loop ground source heat pumps) penetrating the base of the Gault Clay and abstracting groundwater from the underlying strata and/or discharging into the same strata.	Low	The risk to ground water during construction will be minimal providing mitigation is implemented. Groundwater on the Site is not in continuity with off-site Principal Aquifers. The Site is situated on a significant thickness of clay soil with very low permeability. Therefore, the risk to the off-site Principal Aquifers is considered to be negligible during construction.	Minor adverse Not significant
Ecology and wildlife	Very Low	Potential migration of new and existing contaminants in surface water and groundwater due to construction activity e.g. creation of contaminant pathways due to the introduction of service trenches, areas of loosely compacted fill, piling etc.	Implementation of standard environmental protection measures during construction as set out in CIRIA C532 and the Environment Agency's former Pollution Prevention Guidance (PPG) series as further detailed in Chapter 13 water environment	Low	The risk to ecology and wildlife during construction will be minimal providing mitigation is implemented.	Minor adverse Not significant

Operational phase

14.2.2 Operational phase impacts are assessed in Table 14.2.

Table 14.21 Operational phase effects

Baseline		Impact assessment				
Receptor / hazard	Assessed risk	Impact	Mitigation measure	Assessed risk	Residual effect	Significance of effect
Site occupants	Low	Exposure of occupants to potential localised areas of contamination present on Site.	Further to the results of future ground investigation, appropriate gas protection measures may be required in new buildings.	Very Low	Where future ground investigation and contamination risk assessment indicates that localised remedial action may be required, this will be undertaken as part of the construction works such that the residual risks will be not significant. This will be a benefit of the Proposed Development which will reduce the risk to Site occupants.	Minor beneficial Not significant
Site users / neighbours / workers	Low	Exposure of Site users / neighbours to potential localised areas of contamination present on Site. Potential for hazardous ground gases to be present emanating from Gault Clay.	<ul style="list-style-type: none"> Further to the results of future ground investigation, appropriate gas protection measures may be required in new buildings. In accordance with current health and safety legislation, the maintenance contractor will be required to adopt measures to mitigate the risk to Site workers. 	Very Low	Where future ground investigation and contamination risk assessment indicates that localised remedial action may be required, this will be undertaken as part of the construction works such that the residual risks will be not significant. This will be a benefit of the Proposed Development which will reduce the risk to Site users and neighbours.	Minor beneficial Not significant

Baseline		Impact assessment				
Receptor / hazard	Assessed risk	Impact	Mitigation measure	Assessed risk	Residual effect	Significance of effect
Ground water	Very Low	Uncontrolled / accidental discharge of potential pollutants used on Site during operation.	<ul style="list-style-type: none"> The placement of buildings / hardcover, as well as replacement of the existing surface water drainage system will mitigate against the risk of potential mobilisation / migration of any residual potential contaminants. The removal and / or remediation of any contamination sources discovered, together with any localised remedial action necessary, will reduce the risk of migration of contaminants impacting ground waters. 	Very Low	The risk to ground water during operation will be minimal providing mitigation is implemented.	Negligible Not significant
Ecology and wildlife	Very Low	Uncontrolled / accidental discharge of potential pollutants used on Site during operation.	Incorporation of measures to mitigate against potentially contaminated run-off e.g. bunding in areas of fuel and chemical storage, adoption of oil / silt interceptors in drainage design, control valves on outlet structures to ponds and drainage features etc.	Very Low	The risk to ecology and wildlife during operation will be minimal providing mitigation is implemented.	Negligible Not significant

14.3 Mitigation measures

14.3.1 The confirmation of ground conditions at the Site by intrusive investigation will enable a further assessment of the potential ground hazards and the presence / extent of potential sources of contamination identified within the Phase 1 assessment. Mitigation measures proposed are generally considered as a worst case scenario, based on the currently available information.

Construction phase

14.3.2 Site workers – The risk to Site workers during the construction works relates to the risk of skin contact, inhalation and ingestion of contaminated material on Site. In accordance with current health and safety legislation, the contractor will be required to adopt the following measures to mitigate the risk to Site workers, and these will be incorporated in the CEMP:

- Appropriate protective clothing and equipment will be worn by site workers; and good standards of hygiene adopted to prevent prolonged skin contact, inhalation and ingestion of soils during construction;
- In addition, the methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site;
- Ensure workers at risk of encountering potentially hazardous materials have had appropriate training
- As part of the CEMP, a watching brief for the visual and olfactory assessment of the soil quality will be maintained with sampling and testing for verification and assessment purposes where necessary, together with treatment as required.

14.3.3 Site users / neighbours – Methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site. These are detailed in Chapter 11 and will be specified within the Soils Management Strategy which will form part of the CEMP.

14.3.4 Ground water – Implementation of standard environmental protection measures during construction set out in CIRIA C532 and the Environment Agency's former Pollution Prevention Guidance (PPG) series as further detailed in Chapter 13 water environment (refer to the submitted ES). Preparation of appropriate application documents and associated assessments and adherence to Environment Agency consent and licence requirements for any proposed engineering works (e.g. for possible open loop ground source heat pumps) penetrating the base of the Gault Clay and abstracting groundwater from the underlying strata and/or discharging into the same strata.

Operational phase

14.3.5 The mitigation measures outlined below will be implemented during the operational phase of the Proposed Development.

- Site occupants / users / neighbours – Further to the results of future ground investigation, appropriate gas protection measures may be required in new buildings.
- Site workers – The risk to Site workers during any subsequent maintenance works relates to the risk of skin contact, inhalation and ingestion of any residual as yet undetermined contaminated material on Site. In accordance with current health and safety legislation, the maintenance contractor will be required to adopt measures to mitigate the risk to Site workers.
- Ground water – The placement of buildings / hardcover, as well as replacement of the existing surface water drainage system will mitigate against the risk of potential mobilisation / migration of any residual potential contaminants. The removal and / or remediation of any contamination sources discovered, together with any localised remedial action necessary, will reduce the risk of migration of contaminants impacting ground waters.
- Ecology and wildlife – Incorporation of measures to mitigate against potentially contaminated run-off e.g. bunding in areas of fuel and chemical storage, adoption of oil / silt interceptors in drainage design, control valves on outlet structures to ponds and drainage features etc.

14.4 Summary

- 14.4.1 The potential adverse effects of the Development related to ground contamination are assessed as the risk to Site workers during the construction works associated with any ground contamination and to ground / surface waters and ecology due to the potential migration of contaminants from construction activities. Effects of these risks will be mitigated through the implementation of appropriate mitigation measures.
- 14.4.2 As noted in the Scoping Opinion a soil management strategy will be prepared at the reserved matters stage and included in the CEMP.
- 14.4.3 It is therefore concluded that the adverse potential effects associated with ground contamination do not pose an unacceptable constraint to the Proposed Development and no significant environmental effects will arise.

15. Cumulative effects

15.1 Introduction

15.1.1 This chapter updates the cumulative effects assessment in the submitted ES to show the changes resulting from the amended Proposed Development. The chapter requires updating to reflect the amendments in the assessments undertaken as part of this addendum. The following sections remain unchanged from the submitted ES and have not been replicated within this document.

- Scope of assessment;
- Relevant legislation and policy;
- Method of assessment;
- Baseline conditions;
- Mitigation measures.

15.1.2 The following sections require updating to reflect the amended Proposed Development and are presented in this chapter:

- Impact assessment – Cumulative effects – Operational phase only;
- Summary.

15.2 Impact Assessment

Cumulative effects

Operational phase

15.2.1 Table 15.1 lists all those receptors that will be impacted during operation of the Proposed Scheme and notes any impacts from the other developments shown on Figure 10.1, summarising the potential for significant cumulative effects

Table 15.1 Operational phase cumulative effects assessment

Baseline		Impact assessment								
Receptor	Value	Proposed Development	north west Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Designated ecological sites	National to local	Minor adverse effects will occur to Adams Road Sanctuary City Wildlife Site (CIWS) due to works in the upper reaches of Coton Brook impacting downstream water quality.	None	None	Potential to affect King's Hedges Hedgerow CIWS due to dust.	None	Negligible effect on designated sites due to intervening distances.	None of the developments will affect the same designated ecological site. Cumulative effects to any individual designated ecological site will not arise.	Negligible	Negligible Not significant
Habitats	Site	Minor adverse effects will occur to water bodies and green corridors on site during construction due to temporary habitat loss and impacts to water quality.	Adverse effect due to the loss of short sections of hedgerow.	Locally significant effects due to the loss of on-site arable farmland, scrub, ditches, ponds, and small sections of hedgerow.	Habitats within the site which will be lost are of negligible to site value.	Moderate adverse effect due to loss of grassland and arable habitats.	Minor to negligible effects due to the removal of hedgerows,	Across all sites existing habitats will inevitably be lost. The value of most habitats on Site is at the site or local level only and the most important habitats are the waterbodies and green corridor. Impacts to water bodies will be temporary whilst physical works are undertaken to increase their volume after which they will be restored and improved. This will not result in cumulative effects with the NIAB development where surface water bodies will be completely lost. The green corridor is orientated east-west and links the M11 Scrub CIWS with sites within the City such as the Adams Road Sanctuary CWS. It does not link to habitats north of Madingley Road which are effectively severed by the road. Temporary loss of the corridor during construction will not result in adverse cumulative effects and will be enhanced and improved after construction.	Negligible	Negligible Not significant
Protected species	Local	Minor adverse effects will occur to Badgers, bats, and birds during construction due to increased disturbance and loss of foraging habitats.	Adverse effect to great crested newts, common toads, badgers, breeding birds, and brown hares due to the loss of habitat.	Adverse effects to bats foraging on site due to construction lighting. Locally to district significant adverse effects to badgers, brown hare, and birds due to a reduction in foraging habitat. Positive and adverse effects to water voles.	Loss of habitats will impact bird populations on site.	Moderate adverse effects due to the loss of skylark nesting habitat.	Major to moderate adverse effect to skylark due to a loss of habitat, minor adverse effect to yellow wagtail due to habitat loss and disturbance, temporary moderate to minor beneficial effect to corn bunting and grey partridge due to phasing creating set aside land.	All developments have reported an adverse impact to birds during construction due to habitat loss and disturbance. Cumulative effects to birds are likely to occur particularly around the West Cambridge, North West Cambridge and NIAB sites which all located relatively closely. As all these sites are at the edge of the city there is ample habitat in the surrounding countryside for birds to be displaced to so the loss of habitat from these sites is a minor cumulative impact. The same applies to the local badger population at West Cambridge, North West Cambridge and NIAB.	Minor	Minor Not significant
Invasive species	No conservation value	Minor beneficial effect due to the treatment and removal of invasive species on Site.	None	None	None	None	None	No invasive species impacts have been reported on any of the other developments. No cumulative effects will arise.	Neutral	Neutral Not significant

Baseline		Impact assessment								
Receptor	Value	Proposed Development	north west Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Conservation areas	High	Negligible to slight adverse effect to Central Cambridge Conservation Area, minor to moderate adverse effect to Conduit Head Road Conservation Area and minor adverse effect to West Cambridge Conservation Area due to the impact of the Proposed Development on their setting.	Negligible effects on Conservation Areas.	None	None	Medium to small change to the setting of Longstanton Conservation Area due to the increased presence of development, minor changes to key views, and loss of the agricultural context.	None	The Proposed Development will impact Central Cambridge Conservation Area, Conduit Head Road Conservation Area and West Cambridge Conservation Area. None of the other developments will impact these Conservation Areas so no cumulative effects will occur.	No change	Neutral Not significant
Listed buildings	Medium to high	Moderate adverse effect to White House grade II listed building Schlumberger Gould Research Centre grade II* listed building, and minor adverse effects to five other listed buildings due to the impact of the Proposed Development on their setting.	Moderate to minor adverse effects to one locally listed building, Ascension burial ground chapel, due to impacts to setting.	None	None	Negligible effects to two listed churches in Longstanton.	Moderate adverse effect to two scheduled monuments due to change in setting. Minor adverse effects to the non-designated Swansley Farm moated site due to a change in setting.	The Proposed Development will impact the setting of White House, Schlumberger Gould Research Centre and five other listed buildings. None of these will be impacted by any of the other developments so no cumulative effects will arise.	No change	Neutral Not significant
Landscape character areas (LCA)	Low to high	Large adverse effect to Coton, and Grantchester LCAs, large to moderate adverse effect to West Cambridge Central Core LCA, moderate adverse effect to Madingley LCA, and slight adverse effect to north west Cambridge, and High Cross LCAs due to the urbanising effect of the Proposed Development.	Minor adverse effects to Regional Character Area 3 – Western Claylands, major adverse effects to LCA 5 and minor adverse effects to LCA 2 due to re-definition of the western urban edge of Cambridge.	Slight beneficial impact to Southern Fen Edge LCA., Western Arbury and King's Hedges LCA, and Huntingdon Road LCA due to improved landscape design on the site.	None	Slight adverse effects to Lowland Village Farmlands LCA, Planned Silt Fen LCA, Planned Peat Fen LCA, and Wooded Village Farmlands due to visibility of development.	Negligible effect due to screening planting.	All of the developments will result in an increase in urban development in the north west of Cambridge. Northstowe and West Cambourne are sufficiently distant from Cambridge so as to not affect the city's urban expansion. The Proposed Scheme combined with north west Cambridge, NIAB, and Orchard Park collectively represent a significant urban extension to the north west quadrant of Cambridge by extending the urban environment towards the green belt. The cumulative magnitude of impact for this urban extension is large adverse.	High adverse	Moderate to large adverse (depending on LCA) Significant

Baseline		Impact assessment								
Receptor	Value	Proposed Development	north west Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Key viewpoints	Low to high	Large adverse effects to two viewpoints, large to moderate adverse effects to two viewpoints, moderate adverse effects to three viewpoints, moderate to slight adverse effects to five viewpoints, and slight adverse effects to six viewpoints due to the introduction of new urban elements into existing views.	Minor adverse effects to nine viewpoints, moderate adverse effects to one viewpoint, and major adverse effects to two viewpoints due to the introduction of new urban elements into existing views.	Slight adverse effects to six viewpoints fifteen years after construction due to an urbanising effect on views.	None	Slight adverse effects to nine viewpoints, moderate adverse effects to four viewpoints, substantial adverse effects to nine viewpoints, and very substantial adverse effects to three viewpoints due to the proposed scheme appearing in views.	Moderate adverse to negligible effects due to varying degrees of views being impinged by the proposed scheme.	With the exception of Orchard Park all of the developments will result in adverse effects to visual receptors. The only visual receptor impacted by the Proposed Scheme which also has views of the other developments is Viewpoint 1 at the Coton Countryside Reserve which has commanding views of both the Site and the north west Cambridge site. The combination of both developments within this view will increase the perception of urban encroachment resulting in cumulative effects on this high value viewpoint.	Medium adverse	Moderate adverse Significant
Employment	Medium	Moderate beneficial effects will arise due to the direct and indirect creation of 1,000 jobs at the local level and 1,200 jobs at the regional level.	Significant benefits will arise due to job creation during construction. It is expected many of these will be sourced nationally resulting in leakage.	Beneficial effect due to job creation during construction. It is anticipated these jobs will mainly be sourced from outside of the region.	None	Small beneficial effects will arise from the direct employment of up to 250 construction workers on-site. Likely to be a mix of local workers and workers from further afield.	Moderate to minor beneficial effects due to the creation of 331 construction jobs per month.	All of the developments will result in an increase in construction work opportunities although as not all the developments have quantified the predicted number of construction workers required this is difficult to quantify. As the construction programmes of all the developments are likely to overlap to some degree, given the large time scales involved, there is likely to be a cumulative benefit to employment. The construction sector in Cambridge and South West Cambridge is generally under represented compared to national averages so the cumulative benefits of this increased employment is likely to be felt outside the region.	Moderate beneficial	Moderate beneficial Significant
Local economy	Moderate	Minor beneficial effects to the local economy will result due to the use of local supply chains and construction worker expenditure.	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	None	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	Although employment benefits from construction are likely to be mainly felt outside the region, a proportion of new construction jobs will be catered for by local demand. In addition there will be the local economic benefits of supply chains, and businesses catering for construction workers. There will be a cumulative benefit to the local and regional economy from all of the developments collectively.	Low beneficial	Minor beneficial Not significant
Local residents / businesses	Moderate	Minor adverse effects to local businesses and residents will arise during construction due to temporary disruption.	None	None	None	None	None	No other developments anticipated effects to local residents and businesses so cumulative effects to these receptors are unlikely to arise.	Negligible	Negligible Not significant
Security	Low	Negligible security effects will occur as the work site will remain secure and guarded throughout construction.	None	None	None	None	None	No other developments anticipated effects to security so cumulative effects are unlikely to arise.	Negligible	Negligible Not significant
Housing and services	Low	Negligible adverse effects to housing and services will result from increased demand from construction workers.	None	None	None	None	Negligible	No other developments anticipated effects to housing and services so cumulative effects to these receptors are unlikely to arise.	Negligible	Negligible Not significant

Baseline		Impact assessment								
Receptor	Value	Proposed Development	north west Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Dust receptors	Medium	Negligible effects from dust will occur due to effective implementation of standard mitigation measures.	Negligible effects from dust will occur with mitigation in place.	None	Minor to negligible adverse effects to residential and school receptors with mitigation.	Moderate adverse effects to residential receptors and schools within 200m of construction works.	Negligible effects from dust will occur due to effective implementation of standard mitigation measures.	With the exception of Northstowe, all projects are predicted to result in negligible or minor effects from dust due to the implementation of effective standard mitigation measures. At Northstowe only receptors within 200m of dust generating activities will be impacted. As the Site is substantially further than 200m from Northstowe none of the receptors impacted by Northstowe could be impacted by the Proposed Development	No change	Negligible Not significant

15.3 Summary

- 15.3.1 Changes to individual receptors as a result of the amended Proposed Development have not resulted in any overall change to the conclusions of the cumulative effects chapter. Significant adverse cumulative effects still result to landscape character areas and visual receptors.

16. Schedule of mitigation

16.1.1 Table 16.1 below provides a summary of all the updated mitigation measures sections where these have been amended. It does not include the mitigation measures in chapters that did not require the mitigation measures sections to be updated so should be read in conjunction with the schedule of mitigation in the submitted ES. The chapters which have updated mitigation measures are:

- Historic environment;
- Landscape and visual;
- Traffic and transport;
- Air quality
- Noise and vibration
- Water environment
- Ground conditions.

Table 16.1 Schedule of proposed mitigation measures

Assessment chapter	Mitigation measure	Secured through:
Historic environment	As confirmed by the 2011 Whittle Laboratory excavations (Slater 2011), the north western side of the Vicar's Farm Roman settlement extends into the eastern portion of that facility's grounds. This will require excavation over approximately 3,375m ² . Of this, excluding the 2011-area, approximately 2,100m ² lie exterior to that building's footprint and will require full excavation prior to the Laboratory's demolition; occurring within the footprint-area, the remaining portion (approximately 1,275m ²) will require more summary investigation concurrent with the Laboratory's demolition.	Planning condition
	A limited degree of Iron Age occupation evidence was found during the course of the 2001 Nano-Fabrication Building Site investigations. The settlement is likely to have extended across at least part of the area of the Cavendish Laboratory complex, but where it was unfeasible to cut any trial trenches during the 2015 evaluation programme. Accordingly, upon vacating the Laboratory buildings (but prior to their demolition), a limited trenching programme will be conducted within the grounds; should further evidence of early settlement be recovered, then an appropriate excavation programme will occur in conjunction with the demolition works.	Planning condition
	Site 2 will require full open-area excavation when development proceeds there. The further investigation of the Site 3 field system and trackway – aside from its incidental exposure in Site 2 – can, within Field 1, be limited to the area of new major building footprints and any further areas that will be disturbed through excavation, augmented by additional trenching.	Planning condition
	Nano-Fabrication Building Site - A limited degree of Iron Age occupation evidence was found during the course of the 2001 investigations ²⁰ . The settlement is likely to have extended across at least part of the area of the Cavendish Laboratory complex, but where it was unfeasible to cut any trial trenches during the 2015 evaluation programme. Accordingly, upon vacating the Laboratory buildings (but prior to their demolition), a limited trenching programme will be conducted within the grounds; should further evidence of early settlement be recovered, then an appropriate excavation programme will occur in conjunction with the demolition works.	Planning condition
	The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m.	Approval (Design Guidelines)
	At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD.	Approval (Design Guidelines)
	Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site.	Approval (Design Guidelines)
	Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development.	Approval (Design Guidelines)
	Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing.	Approval (Design Guidelines)
	Treatment of façades shall be sensitive in scale and the use of materials.	Approval (Design Guidelines)
	Woodland infill planting at the site edges shall be native trees and shrubs and shall be in accordance with the Woodland Management Plan, Appendix 8.4, Volume 3.	Approval (Design Guidelines)
	The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development. The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3).	Approval (Design Guidelines)
	Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge.	Approval (Design Guidelines)
Rooftop plant shall be set back from the predominant building line adjacent to Clerk Maxwell Road or effectively screened.	Approval (Design Guidelines)	

Assessment chapter	Mitigation measure	Secured through:
	External plant and/or storage structures (on frontage or separate structures) shall be minimised and shall not be visible from the West Cambridge and Conduit Head Road Conservation Areas, or associated listed buildings.	Approval (Design Guidelines)
	The Listed Schlumberger Research building shall remain the primary landmark for the site. New development and spaces shall work together to define a new and appropriate setting for this building.	Approval (Design Guidelines)
	A view corridor with a minimum 20m width will be preserved between JJ Thomson Avenue and High Cross to protect views through the Site of the Schlumberger Research Building.	Approval (Design Guidelines)
	On the west side of High Cross, the Listed Schlumberger Research building shall remain visible as a key site landmark.	Approval (Design Guidelines)
	In the central part of High Cross Avenue, a zone of lower development height shall be established to maintain the views of the Schlumberger Research building roof structure. The exact positioning of this lower zone shall be such to allow views of the roof-line (tent structure) from The Green.	Approval (Design Guidelines)
	Rooftop plant shall not be located within the 32m AOD zone along Madingley Road.	Approval (Design Guidelines)
	Any rooftop plant within the 37m or 41m AOD zones along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road.	Approval (Design Guidelines)
Landscape and visual	Vegetation on Site that will be retained will be protected from accidental damage during construction by erecting temporary fencing.	Planning condition
	Temporary hoarding will be used around all construction compounds and work sites to screen views of construction activities.	Planning condition
	The use of security lighting during construction will be minimised. Where it is needed Institute of Lighting Engineers guidance will be followed to minimise light spill.	Planning condition
	Construction traffic travelling to and from the Site will travel along haul routes agreed with Cambridgeshire County Council. The haul routes will avoid Cambridge city centre and Madingley Road west of the M11 where possible.	Planning condition
	Mitigation measures to minimise construction noise and dust will help to preserve the tranquil character of the adjacent landscape character areas.	Planning condition
	Operation of a clean and tidy construction site, including covering of stockpiles.	Planning condition
	Existing north-south streets shall be further greened through the use of development setbacks and landscaped areas formed alongside High Cross and Western Access/Ada Lovelace Road.	Approval (Design Guidelines)
	The maximum length of an uninterrupted building frontage and/or roof line shall not exceed 50m – The frontages longer than 50m shall employ at least one of the strategies described in Figure 24 of the Design Guidelines for breaking the long frontages. The choice of one or more of the strategies will depend on the location on the site: some strategies will be better suited for the site edges (for example using planting adjacent to woodland buffers) others will be required along streets or key spaces (for example varying roof lines and building lines).	Approval (Design Guidelines)
	Lengths of unbroken frontages on multi storey car parks shall be limited to 50m – Frontage lengths of multi storey car parks longer than 50m shall be broken by introducing one or more of the strategies and/or other measures described in in Figure 25 of the Design Guidelines, which achieve the effect of introducing variety and breaking down the frontage length.	Approval (Design Guidelines)
	Maximum build-to lines along High Cross Avenue shall be setback from the road corridor by at least 8m on the eastern side and by at least 5m on the western side of the street – Thus, together with the road corridor of 25.3m, the width between buildings along High Cross shall be minimum 38.3m in the south and 44.8m minimum in the north.	Approval (Design Guidelines)
	At the southern end of High Cross Avenue, an additional frontage height restriction of 33m AOD (to the west) and 35m AOD (to the east) shall be applied. Any development above these heights shall be set back by a minimum of 5m from the primary frontage line.	Approval (Design Guidelines)
	Building Zones along JJ Thompson Avenue are set to allow for a 10m buffer between the stems of the existing trees and the proposed building faces (maximum Build to Line) – This provides an additional zone of minimum 4m between the edge of the road corridor and the building faces on each side. Thus, together with the road corridor width of 25.3m, the width between buildings along JJ Thomson Avenue shall be minimum 33.3m.	Approval (Design Guidelines)
	Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary (such as at site entrances), shall have a high quality architectural treatment. Generally, the woodland buffer shall be reinforced to limit visibility into the Site.	Approval (Design Guidelines)
	Frontages facing the southern landscape shall have a high quality architectural treatment and materials. Materials and facade design shall respond to this south facing location.	Approval (Design Guidelines)
	Primary frontages shall be of high quality design and be well articulated with fenestration, other façade elements and/or use of materials.	Approval (Design Guidelines)
	The development of continuous roof lines of consistent height along the key spaces, streets and Green Links shall be avoided and preference shall be given to compositions with varying roof lines and accents.	Approval (Design Guidelines)
	Development along the Southern Edge shall respond to long distance views. Long frontages here shall be broken/varied and additional tree planting and landscape shall be introduced to provide a softer, woodland edge.	Approval (Design Guidelines)
Along the Southern edge additional height restrictions and setbacks apply, as shown in Figures 166 and 167 of the Design Guidelines – frontages adjacent to the southern boundary shall not exceed 31m AOD.	Approval (Design Guidelines)	
At the eastern edge of the Building Zone, adjacent to Clerk Maxwell Road, the built form shall comply with an additional height restriction of 25m AOD. From this line, the development heights shall remain within envelope rising by 45° angle to the parameter height of 31m AOD.	Approval (Design Guidelines)	
Colour choice of façade materials shall be carefully considered, as very light or reflective facade treatments can have greater impact on the surrounding landscape and views to the development.	Approval (Design Guidelines)	

Assessment chapter	Mitigation measure	Secured through:
	Highly visible façades, located at sensitive edges and/or facing key spaces shall be treated using high quality materials and detailing.	Approval (Design Guidelines)
	Some research buildings will have greater requirements for servicing areas and/or sensitive technical areas which will result in some blank façades. These blank façades shall provide variation and interest through use of setbacks, varied roofline and use of materials and planting.	Approval (Design Guidelines)
	Treatment of façades shall be sensitive in scale and the use of materials.	Approval (Design Guidelines)
	Materials for less visible façades shall be robust and designed to age well.	Approval (Design Guidelines)
	Planting at the West Forum shall reinforce the visual connection from the upper areas to the wider landscape and the Southern Ecological Corridor.	Approval (Design Guidelines)
	Existing mature planting and hedgerows within the East Pond area and along the Southern edge shall be maintained with the appropriate tree buffer zone. New tree planting shall be accommodated within the East Pond space (to the north of the pond) to ensure that new development is set within landscape.	Approval (Design Guidelines)
	Large feature tree planting shall be provided at a minimum of 5 key locations within The Green public open space area, such as at the gateways to The Green or key nodes within the space – Where large trees are planted they shall be given the proper environmental conditions and space to grow to maturity.	Approval (Design Guidelines)
	Large feature tree planting shall be provided at a minimum of 5 key locations along the Southern edge – Where these trees are planted they shall be given the proper environmental conditions and space to grow to maturity and shall be provided with a 15m buffer, in accordance with the Woodland Management Plan (Appendix 8.4, Volume 3).	Approval (Design Guidelines)
	Supplemental new planting to the Southern edge must be provided to ensure a soft edge to the Site and a transition from the Site to open countryside.	Approval (Design Guidelines)
	Large feature tree planting shall be incorporated at key locations along High Cross, such as: the gateway to Madingley Road and the interface with The Green – Large tree species must be given the proper environmental conditions and space to grow to maturity.	Approval (Design Guidelines)
	Large feature tree planting shall be incorporated at key spaces along JJ Thompson Avenue such as the gateway to Madingley Road and the interface with The Green – Large tree species shall be given the proper environmental conditions and space to grow to maturity.	Approval (Design Guidelines)
	The buffer along the Madingley Road edge shall serve as a screening element for the Proposed Development – The buffer shall be supplemented where needed as set out in the Woodland Management Plan (Appendix 8.4, Volume 3).	Approval (Design Guidelines)
	Any gaps or setbacks in development frontages along Madingley Road shall contain landscape planting and greenery to soften the development edge.	Approval (Design Guidelines)
	Any new landscaped gaps between buildings along the western edge shall be a minimum of 20m from building face to building face.	Approval (Design Guidelines)
	The impact of plant (and rooftop plant in particular) on building design and on open spaces shall be carefully considered from the concept stage of design.	Approval (Design Guidelines)
	Wherever possible, plant shall be placed on roofs in locations where it will not be visible from the public realm.	Approval (Design Guidelines)
	Any plant required to be provided as a separate structure shall not be located next to or within the key open spaces.	Approval (Design Guidelines)
	Screening or parapets around plant locations shall be employed to reduce visibility of plant locations and reduce clutter.	Approval (Design Guidelines)
	Long distance views shall be considered in the location of plant.	Approval (Design Guidelines)
	Plant should be considered as a way to add variation and interest in the roofscape.	Approval (Design Guidelines)
	Medium and large plant shall be considered as part of architectural concepts and building massing as an additional storey of the building. The roof plant will unavoidably be visible from public realm and so shall be treated with appropriate materials.	Approval (Design Guidelines)
	Visual impact of large plant areas shall be reduced by breaking their volume and providing variation in rooflines.	Approval (Design Guidelines)
	Any parts of building facade related to plant shall not be inferior to the rest of the facade in materials and treatment.	Approval (Design Guidelines)
	If larger flues are required, they shall be treated as part of the architectural concept design and placed in locations that don't overwhelm key open spaces.	Approval (Design Guidelines)
	Where service areas, multi storey car parks and development 'backs' are located along the edges, they shall be screened by the existing woodland buffer, supplemented where necessary with additional planting and sensitively designed.	Approval (Design Guidelines)
	Rooftop plant shall be set back from the Southern Building Zone edge and there shall be effective screening of all rooftop plant, when viewed from the south.	Approval (Design Guidelines)
	Any new artificial lighting to buildings or spaces shall ensure that impacts of lighting on and offsite meet the Institute of Lighting Professionals – Guidance Notes for the Reduction of Obtrusive Light – GN01:2011 for the appropriate environmental zone.	Approval (Design Guidelines)
	An artificial lighting scheme shall be submitted with each reserved matters application.	Approval (Design Guidelines)
	Screening vegetation along the boundaries of the Site will be managed in accordance with the Woodland Management Plan.	Planning condition
	Rooftop plant shall not be located within the 32m AOD zone along Madingley Road.	Approval (Design Guidelines)

Assessment chapter	Mitigation measure	Secured through:
	Any rooftop plant within the 37m or 41m AOD zone along Madingley Road shall be effectively screened in views from the north, to reduce any visual impact from Madingley Road.	Approval (Design Guidelines)
	The three north-south running streets and the Central Green Link shall have building to building width with a minimum of 30m.	Approval (Design Guidelines)
Traffic and transport	Delivery routes will be agreed with the local highways authority and will preferentially access the Site from the M11 Junction 13/ Madingley Road particularly for heavy vehicles.	Planning condition
	Heavy vehicle movements will not be permitted through Cambridge City unless no alternative is available and only once agreement has been sought with the local highway authority.	Planning condition
	The travel demand management strategy, set out in the Framework Travel Plan based on: <ul style="list-style-type: none"> The benefit of a fully-funded quality FTP; The consequences of the application of “Smarter Choices” guidance to reduce vehicular trip generation from the Proposed Development; and The provision of car parking at a controlled, appropriate level of provision, and the implementation of a car parking management scheme combined with permit provision on a demonstrated needs basis; 	Section 106 agreement / planning condition
	An enhanced public transport strategy. The scale of the Proposed Development means that there will be both a high quantum of demand for public transport, and a number of locations that will need to be connected to West Cambridge. The strategy, detailed within Section 7 of the Transport Assessment, includes: <ul style="list-style-type: none"> Increased regularity of bus provision; Direct on-site routes; Provision of high quality bus stops (including real time passenger information, and the provision of comprehensive timetable information including network maps and fare details); Bus priority measures to be provided with Selective Vehicle Detection technology at any new traffic signals controlling the entrances to the Site from Madingley Road; Provision of service information and incentive measures to increase patronage; and Promote network ticketing with operators serving West Cambridge, allowing for passengers from destinations other than Cambridge city centre to make journeys on other services and transfer using the same ticket stored on a smartcard, mobile phone or EMV wave and pay card. 	Section 106 agreement / planning condition
	Quality pedestrian and cyclist facilities. The strategy, detailed within Section 6 of the Transport Assessment, includes: <ul style="list-style-type: none"> Direct, quality North-South footway and cycleway provision across West Cambridge linking between Madingley Road and Coton Path using the Western Access, High Cross, JJ Thomson Avenue and Clerk Maxwell Road.; The East - West Shared Space Link to provide the main east - west spine for Pedestrians and Cyclists connecting Clerk Maxwell Road and High Cross with access to a number of plots and lower-hierarchy Cycle routes; As with north west Cambridge, all vehicle routes being designed for a 20mph speed limit using passive speed management measures such as constrained widths and the use of shared surface areas. This low-speed environment is primarily to control vehicle speeds, but in so doing will create a safer and more attractive environment for pedestrians and cyclists; Footways being provided on both sides of the on-site streets and at the Site Access locations. Controlled crossing points would be provided, and traffic calming measures would be present to reduce traffic speed and to ease pedestrian movement; Improved links between West Cambridge and all popular destinations; including to the East, towards the City, and to the north through north west Cambridge. These links will be supported with controlled crossings; Provision of high levels of quality cycle parking, at least to the adopted Cambridge Local Plan 2014 minimum cycle parking standards, within private covered, secure, lit and well-located areas at the destinations, as well as further provision through the Development; and All major employers being encouraged to provide associated shower and changing room facilities for walkers and cyclists after their journeys. 	Section 106 agreement / planning condition
	Schemes to improve environmental conditions. The strategy, identified in Section 16 of the Transport Assessment, includes: <ul style="list-style-type: none"> Contributions to effect a lower speed limit than the existing 40mph speed limit locally on Madingley Road – thus providing environmental benefit from existing vehicular movements; Contributions to the necessary Traffic Regulation Orders to implement car parking zones or prohibitions on surrounding streets to minimise inappropriate overspill parking – potentially in the context of providing improved cycle facilities; Measures at three locations to address existing highway safety concerns – especially effecting vulnerable road users; The extension of the SCOOT and MOVA traffic signal optimisation to the proposed traffic signals along Madingley Road – JJ Thomson Avenue and Clerk Maxwell – to control any additional queuing and delays as a consequence of the Proposed Development. 	Section 106 agreement / planning condition
Guaranteeing funding for potential highway mitigation schemes that could be implemented should the cyclic monitoring strategy identify that conditions deteriorate significantly at: <ul style="list-style-type: none"> Madingley Road / High Cross junction; and Madingley Road / Clerk Maxwell Road junction. 	Section 106 agreement / planning condition	

Assessment chapter	Mitigation measure	Secured through:
	<p>Adaptive phase approach through which a mitigation scheme will be delivered at the appropriate time, and ensured through a planning condition, which sets out:</p> <ul style="list-style-type: none"> • The mitigation scheme's objectives including the targets it must meet over time; • The mitigation scheme's parameters; • The methods of achieving the mitigation scheme's objectives and reviewing and adapting those methods over time to ensure that the objectives are met; and • A review mechanism to ensure that the achievement of the objectives is kept under review and the methods adapted if further steps prove necessary. <p>The likely mitigation strategy is anticipated to consist of:</p> <ul style="list-style-type: none"> • To control and reduce vehicle trip generation: <ul style="list-style-type: none"> - Provision of appropriate levels of car parking on-site, with delivery phased to reflect development implementation; - managing the on-site car parking provision; and - review of car parking off-site, offer of further parking control measures if required. • To preserve conditions: <ul style="list-style-type: none"> - offer contributions to the delivery of a further reduction in the Madingley Road speed limit; and - review road safety and promote further local schemes if required. • To improve conditions for pedestrians and cyclists on-site: <ul style="list-style-type: none"> - quality footway / cycleway infrastructure; - high levels of conveniently located quality cycle parking; - all major occupiers providing shower and changing room facilities; and - managing cycle parking provision. • To improve conditions for pedestrians and cyclists off-site: <ul style="list-style-type: none"> - providing remedial measures to assist in resolving any identified emerging road safety issues; - improved crossing at Eddington Avenue; - improved facilities along the Corridor to the City Centre – along Grange Road, West Road, Queen's Green and Silver Street; and - contributions to the delivery of a further reduction in the Madingley Road speed limit. • To enhance Public Transport on-site: <ul style="list-style-type: none"> - provide selected vehicle detection for buses through traffic signal controlled junctions to provide bus priority; and - provide information and incentives to the site occupiers. • Enhanced bus services: <ul style="list-style-type: none"> - Citi 4 - increased frequency to every 10 minutes; - Universal – possibly introduce an extended orbital service to Addenbrooke's Hospital; or - Arc Service – increased frequency, and possibly extend service further to South Cambridge; - review a new variation of the Service B on the Guided Busway. • Enhancing travel demand management: <ul style="list-style-type: none"> - locate further Car Club vehicles on-site; - review cycling initiatives – including cycle pools, cycle buddy, training, discounted equipment; and - marketing and promotion. • To preserve local highway capacity, consider physical interventions: <ul style="list-style-type: none"> - provide localised highway enhancement to accommodate the new Western Access Road junction; and - consider further highway mitigations, if required. • To preserve strategic highway capacity, consider Corridor interventions: <ul style="list-style-type: none"> - work together with the Highway and Planning Authorities to deliver interventions strategically 	<p>Section 106 agreement / planning condition</p>
Air quality	Develop and implement a stakeholder communications plan which displays the name and contact details of persons accountable, and the head or regional office information on the site boundary.	Planning condition
	Develop and implement a dust management plan.	Planning condition
	Record all dust and air quality complaints, identify causes and take measures to reduce emissions.	Planning condition
	Record exceptional incidents and action taken to resolve the situation.	Planning condition
	Carry out regular site inspections to monitor compliance with the dust management plan and record results.	Planning condition
	Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken.	Planning condition

Assessment chapter	Mitigation measure	Secured through:
	Agree dust monitoring locations with the local authority and instigate monitoring 3 months in advance of works commencing in the area.	Planning condition
	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.	Planning condition
	Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site.	Planning condition
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Planning condition
	Avoid site run off of water or mud.	Planning condition
	Keep site fencing, barriers and scaffolding clean using wet methods.	Planning condition
	Remove potentially dusty materials from site as soon as possible.	Planning condition
	Cover, seed or fence stockpiles to prevent wind whipping.	Planning condition
	Ensure all vehicles switch off engines when stationary.	Planning condition
	Avoid the use of diesel or petrol powered generators where possible.	Planning condition
	Produce a Construction Logistics Plan to manage the delivery of goods and materials.	Planning condition
	Only use cutting, grinding and sawing equipment with dust suppression equipment.	Planning condition
	Ensure an adequate supply of water on site for dust suppressant.	Planning condition
	Use enclosed chutes and conveyors and covered skips.	Planning condition
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate.	Planning condition
	Ensure equipment is readily available on site to clean up spillages of dry materials.	Planning condition
	No on-site bonfires and burning of waste materials on site.	Planning condition
	Re-vegetate earthworks and exposed areas /soil stockpiles to stabilise surfaces as soon as practicable.	Planning condition
	Only remove the cover in small areas during work and not all at once.	Planning condition
	Incorporate soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Planning condition
	Ensure water suppression is used during demolition operation.	Planning condition
	Avoid explosive blasting, using appropriate manual and mechanical alternatives.	Planning condition
	Bag and remove any biological debris or damp down such material before demolition.	Planning condition
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.	Planning condition
	Ensure bulk cement and other fine powder materials are delivered in enclosed tanker sand stored silos with suitable emissions control systems.	Planning condition
	Use water assisted dust sweepers on the site access and local roads.	Planning condition
	Avoid dry sweeping of large areas.	Planning condition
	Ensure vehicles entering and leaving the site are covered to prevent escape of materials.	Planning condition
	Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable.	Planning condition
	Install hard surfaced haul routes which are regularly damped down.	Planning condition
	Install a wheel wash with a hard-surfaced road to the site exit where site layout permits.	Planning condition
	The site access gate to be located at least 10m from receptors where possible.	Planning condition
	Further assessment will be required at detailed design to identify potential laboratory emissions. The assessment will inform any abatement that may be required to ensure significant adverse effects do not arise	Planning condition
Noise and vibration	Breaking out of concrete structures would be undertaken, where possible, using low noise effect methods including bursting and splitting rather than percussive breaking.	Planning condition
	Detailed programming of works to make maximum use of existing barriers to noise.	Planning condition

Assessment chapter	Mitigation measure	Secured through:
	Retention of the outer walls of structures for as long as possible before demolition is necessary.	Planning condition
	Careful selection of demolition/construction methods and plant to be used.	Planning condition
	Switching off of plant and vehicle engines when not in use.	Planning condition
	Restriction of drop heights onto lorries.	Planning condition
	Regular maintenance and servicing of vehicles, equipment and plant.	Planning condition
	Appropriate handling and storage of materials.	Planning condition
	Appropriate operational hours (to be agreed with the local authority).	Planning condition
	Enforcement of restricted working hours for excessively noisy activities.	Planning condition
	Implementation of an appropriate traffic management strategy.	Planning condition
	Use of temporary acoustic barriers where appropriate and other noise containment measures such as screens, sheeting and acoustic hoardings at the construction site boundary to minimise noise breakout and reduce noise levels at the potentially affected receptors.	Planning condition
	Agreement with Cambridge City Council and neighbours on suitable approach to noisy activities if a temporary source of noise cannot reasonably be prevented and the works being undertaken are crucial to progressing the particular project phase.	Planning condition
	Keep neighbours and stakeholders (including the existing commercial and university occupants as well as nearby residential inhabitants) informed about construction activities. Measures for community liaison would be dealt with by a dedicated Community Liaison Officer to co-ordinate the dissemination of information (for example, by means of a regular newsletter) and to program those operations at time that would minimise the potential for disturbance.	Planning condition
	Precise details and locations of vibration sensitive equipment or long-term vibration sensitive experiments are unknown at this stage. Additionally, some buildings which are likely to house vibration sensitive uses, such as the Cavendish Laboratory, are scheduled for demolition as part of the masterplan. Once a demolition and construction programme is available, suitable vibration limits and the requirement for vibration monitoring will be determined. This could include the following measures: <ul style="list-style-type: none"> • Specification in the CEMP for further measures; • Further investigation into existing vibration levels; • Setting vibration limits; and Continuous vibration monitoring	Planning condition
	Plant will be selected, located and attenuated so that planning conditions attached to the development by Cambridge City Council are satisfied. This is likely to require meeting noise limits provided in Table 3.12 at nearby receptors through a combination of the following environmental noise control techniques which could be implemented: <ul style="list-style-type: none"> • Enclosing noisy plant within the building envelope; • Selecting suitably quiet 'low noise' plant; • Positioning air intake/discharge louvres away from noise sensitive receptors; • Orientating air intake/discharge louvres away from noise sensitive receptors; • Attenuation of air intake/discharge louvres with duct mounted attenuators; and • Sound insulating plant housings/enclosures. 	
	As the Energy Centre could be housed within a building, particular attention to the orientation and attenuation of air intake / discharge louvres and flues will be considered at detailed design.	
Ground conditions	The risk to Site workers during the construction works relates to the risk of skin contact, inhalation and ingestion of contaminated material on Site. In accordance with current health and safety legislation, the contractor will be required to adopt the following measures to mitigate the risk to Site workers, and these will be incorporated in the CEMP: <ul style="list-style-type: none"> • Appropriate protective clothing and equipment will be worn by site workers; and good standards of hygiene adopted to prevent prolonged skin contact, inhalation and ingestion of soils during construction; • In addition, the methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site; • Ensure workers at risk of encountering potentially hazardous materials have had appropriate training • As part of the CEMP, a watching brief for the visual and olfactory assessment of the soil quality will be maintained with sampling and testing for verification and assessment purposes where necessary, together with treatment as required. 	Planning condition
	Methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site. These are detailed in Chapter 11 (refer to the submitted ES) and will be specified within the Soils Management Strategy which will form part of the CEMP.	Planning condition

Assessment chapter	Mitigation measure	Secured through:
	Implementation of standard environmental protection measures during construction set out in CIRIA C532 and the Environment Agency's former Pollution Prevention Guidance (PPG) series as further detailed in Chapter 13 water environment (refer to the submitted ES). Preparation of appropriate application documents and associated assessments and adherence to Environment Agency consent and licence requirements for any proposed engineering works (e.g. for possible open loop ground source heat pumps) penetrating the base of the Gault Clay and abstracting groundwater from the underlying strata and/or discharging into the same strata.	Planning condition
	Further to the results of future ground investigation, appropriate gas protection measures may be required in new buildings.	Planning condition
	The risk to Site workers during any subsequent maintenance works relates to the risk of skin contact, inhalation and ingestion of any residual as yet undetermined contaminated material on Site. In accordance with current health and safety legislation, the maintenance contractor will be required to adopt measures to mitigate the risk to Site workers.	Planning condition
	The placement of buildings / hardcover, as well as replacement of the existing surface water drainage system will mitigate against the risk of potential mobilisation / migration of any residual potential contaminants. The removal and / or remediation of any contamination sources discovered, together with any localised remedial action necessary, will reduce the risk of migration of contaminants impacting ground waters.	Planning condition
	Incorporation of measures to mitigate against potentially contaminated run-off e.g. bunding in areas of fuel and chemical storage, adoption of oil / silt interceptors in drainage design, control valves on outlet structures to ponds and drainage features etc.	Planning condition

