



NORTH WEST **cambridge**

Section 73 Application
Landscape and Visual Assessment
September 2013

North West Cambridge

S73 Landscape and Visual Assessment

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North West Cambridge: S73 Landscape and Visual Assessment

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1 Landscape and Visual Assessment

1.1 Introduction

- 1.1.1 In September 2011 an outline planning application was submitted for the North West Cambridge Scheme, with an accompanying Landscape and Visual Impact Assessment, which was revised and resubmitted in March 2012. Outline Planning Permission (11/1114/OUT and S/1886/11) was granted in February 2013. As a result of subsequent amendments to the building heights in the Local Centre and revised positioning of the Community Centre through detailed design, a Section 73 application is being submitted.
- 1.1.2 This revised Landscape and Visual Impact Assessment (S73 LVIA) has been prepared to accompany the S73 Application in order that the revised building height Parameter Plans can be assessed and the resulting effects on the landscape and visual resource understood.
- 1.1.3 The LVIA of the Consented Scheme has been reviewed in light of the proposed changes to the maximum building parameters of the S73 Amended Scheme and considers whether the changes in building parameter will result in a change to the significance of effects on the landscape and visual resource as well as the associated mitigation measures and consequently whether the conclusions of the 2012 LVIA that was accepted at the time of granting planning permission in 2013 will be affected.

1.2 Parameter Plan Changes

- 1.2.1 The Parameter Plans of the Consented Scheme are illustrated in Figure 1.1. The changes to the consented Parameter Plans respond to the development within the Local Centre and are represented on Figure 1.2. It should be noted that for the purposes of the LVIA submitted in 2012, the Consented Scheme identified Phase 1 as being complete in 2014. As the full build out of Phase 1 is now considered to be completed by 2017 this is the year which has been used in this updated LVIA as being the Phase 1 assessment year. It is not considered that this will affect the conclusions previously made with regard to landscape and visual effects of the construction phase of works.
- 1.2.2 The proposed changes to the Consented Parameter Plans are set out below and illustrated in Figures 1.2 – 1.4.

NWC/OPA/PAR/04/B (Land Use (Built Development and Ancillary Space) Parameter Plan: Zone B) Date stamped 3rd April 2012.

- 1.2.3 Design development for the community centre for North West Cambridge requires that the community centre building extends into a small area of primary open land immediately to the south of Lot 7. Therefore it is proposed to amend the parameter plan to reflect this.

NWC/OPA/PAR/05/B Building Zones Parameter Plan: Zone

- 1.2.4 It is proposed that Zone K will need to extend westwards to take account of an increase in height of 2m to accommodate a proposed residential building immediately to the west of Zone K that otherwise crossed the zone boundary. Zone K is also increased to allow for the community centre.

NWC/OPA/PAR/06/B Building Heights Parameter Plan

- 1.2.5 There are 5 areas where it is proposed that the AOD heights are increased, by between 2 and 4 metres to accommodate buildings that due to design development and technical requirements are required to be taller than originally envisaged during the development of the outline parameter plans.

- 1.2.6 In addition, due to the detailed design of the Community Centre (Lot 7), its location now extends into the Primary open land set out in the open land and landscape areas parameter plan (NWC/OPA/PAR/3). The building heights parameter plan therefore includes a new discrete area of development with a maximum building height of 38.5m.
- 1.2.7 Due to technical requirements the energy centre flue size is required to be larger than previously anticipated. It is therefore proposed that the height for the energy centre flue on the parameter plan is increased by 2m, with an increased dimension of 5.0 x 5.8m, which reflects a square chimney rather than a circular chimney.
- NWC/OPA/PAR/07/B (Topography Parameter Plan: Zone B) Date stamped 3rd April 2012.*
- 1.2.8 Design development for the community centre for North West Cambridge requires that the community centre building extends into a small area of primary open land immediately to the south of Lot 7. Therefore it is proposed to amend this parameter plan to reflect an extended development area around Lot 7 to include the Community Centre building in its entirety.
- NWC/OPA/PAR/03/B Open Land and Landscape Areas Parameter Plan: Zone B*
- 1.2.9 Design development for the community centre for North West Cambridge requires that the community centre building extends into a small area of primary open land immediately to the south of Lot 7. Therefore it is proposed to amend the parameter plan to reflect this. The extension of this building also requires a building height parameter that will be updated on the heights and zone parameter plans as described above.
- 1.2.10 There are no changes to the overall quantum of development through additional floorspace or number of units therefore the overall density of development approved through the outline consent remains unaltered.
- Landscape Strategy*
- 1.2.11 The Landscape Principles outlined in Section 6.2 of the 2012 LVIA remain unchanged and are outlined below.
- Landscape Principles**
- 1.2.12 Consideration of the range of likely landscape and visual effects was taken into account throughout the design development of the Proposed Development. Therefore, mitigation has been addressed to as great an extent as possible and integrated into the proposals in order to avoid or minimise potential adverse effects. This assessment assumes that these landscape principles have been incorporated to the Proposed Development and describes how these measures provide mitigation.
- 1.2.13 The intention of the landscape principles is to create a scheme that is functional and that builds on the existing richness and diversity of Cambridge. The landscape principles help mitigate the effect of the Proposed Development by creating a setting that is in keeping with the character of Cambridge and its surrounding undulating topography and farmed landscape.
- 1.2.14 The Applicant's intent is to retain the University farm or agricultural character for as long as practicable into the development programme, allowing for a progressive change as the new character emerges.
- 1.2.15 The landscape strategy for the Proposed Development proposes four typical local character areas which are defined for the purpose of this assessment as follows:
- Western Edge
 - Parkland (the area of the Western Edge adjacent to the built form)
 - Landscape fingers

- Girton Gap, Central Open Space and Ridge & Furrow

Western Edge

- 1.2.16 The Western Edge comprises the western boundary of the Application Site directly adjacent to the motorway. Landforms that seek to balance the cut and fill from across the site will modify the existing topography and in some locations the topography will tilt upwards from the M11 towards the Parkland and the built edge. The intention is to restore the use of the Western Edge to uses compatible with the landscape character, including drainage, formal and informal recreation and allotments, thus contributing to the existing open arable character of other adjacent areas along the motorway.

Parkland

- 1.2.17 The Parkland is a valley that runs north to south as a narrow band adjacent to the Western Edge. At a lower level to the Western Edge, the Parkland is sheltered and has the function of collecting and distributing the water run-off from the landscape fingers and other immediately adjacent areas. The character of this area is comparable to the 'Fens' in Cambridge, with its extensive grasslands and isolated willows and poplars sitting next to the waterways. A stretch of land towards the eastern boundary of the Parkland will be dedicated to allotment gardens.

Landscape fingers

- 1.2.18 The landscape fingers run from Huntingdon Road towards the M11, perpendicular to the Parkland, and through the Proposed Development. These 'fingers' connect the development to the Parkland through a series of footpaths and public spaces. Their character is diverse and is directly associated with the building typologies, ranging from neighbourhood pocket parks, to local play areas, and will also include drainage functions.

Girton Gap, Central Open Space and Ridge & Furrow

- 1.2.19 The Girton Gap, Central Open Space and Ridge & Furrow area comprises a series of existing features including the SSSI, and the distinctive open area to the south of the site. Proposals for this area include the sports fields adjacent to Huntingdon Road and immediately east of the local centre, the SSSI, which will become publicly accessible open space, and the ridge and furrow fields.

- 1.2.20 In all of the areas of Primary Open Land, buildings and structures consistent with the use of the land as open space, including plant and equipment storage, bridges, pavilions, cafes, changing rooms, public toilets and information centres and buildings for housing utility undertakers' apparatus are permitted..

- 1.2.21 Possible adverse effects upon landscape features, landscape character and views have been addressed and incorporated to the Proposed Development through the following measures (with the loss of agricultural land the only effect upon the landscape resource that cannot be partially or fully mitigated against):

- A central 'green focus' and green corridor which links surrounding development areas and provides sufficient space to act as a wildlife corridor;
- A green corridor running alongside the M11 to provide an appropriate landscape setting to the North Western edge of Cambridge and provide the opportunity for extensive habitat restoration and enhancement;
- A destination and an area for the whole community to enjoy with a range of facilities, high-quality green spaces and good pedestrian and cycle links;
- Retention of existing planting (where practicable) and extensive planting of new woodland, trees and hedgerows;

- Ensuring that the new landform and development platforms are not overly engineered in appearance and tie in smoothly with the adjacent land;
- Retaining/ replacing existing footpaths and providing new connections;
- Relating the heights and densities of the proposals to both the existing housing that currently forms the urban edge to Cambridge and the surrounding landscape;
- Creating a new, well-screened and integrated urban/ rural edge to Cambridge;
- Forming a new network of open spaces that contributes to the new landscape and visual resource and provides recreational opportunities;
- Phasing the implementation of the landscape framework in advance of, or concurrently with, the development as far as practicable; and
- Careful consideration of building layout and orientation to minimise landscape and visual effects.

1.3 Assessment Methodology

1.3.1 The 2012 LVIA presented an assessment of the likely significant effects of the North West Cambridge Scheme on landscape character and visual amenity and the likely significant effects of night time artificial lighting.

- Effects on Landscape Character associated with the development relate to changes to the fabric, character and quality of the landscape resource and how it is experienced. There are changes to the landscape from the physical form of the proposed development and its construction, including built phases and the final finished form.
- Effects on Visual Amenity concern changes in views and people's response to changes in visual amenity.
- Effects of Artificial Lighting relate to the effects on residential properties adjacent to the site, wildlife/habitat on and around the site and two local observatories.

1.3.2 In order to provide an updated and comparative LVIA the approach and methodologies used are the same as those presented in the 2012 LVIA, Section 6.3. This updated LVIA has been carried out in accordance with the following best practice guidance documents:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition, edited by The Landscape Institute and Institute of Environmental Management and Assessment (2013);
- Landscape Character Assessment Guidance (2002) Countryside Agency in conjunction with Scottish Natural Heritage; and
- The Landscape Institute (2011) Photography and photomontage in landscape and visual impact assessment. Advice note 01/11.

1.3.3 In order to update the LVIA, the baseline study of the Application Site and the wider study area, as previously identified in the 2012 LVIA was reviewed both through a desk based review and site survey to understand whether the baseline landscape and visual resource had changed or whether the main characteristics and components that define it had remained largely unchanged. To inform this, a site survey was undertaken when winter photography from the viewpoints used in the block model photomontages was also captured.

Zones of Theoretical Visibility

1.3.4 The Zones of Theoretical Visibility (ZTV) have been re-generated based on the S73 revised parameter plans at both 2017 (completion of Phase 1) and 2026 (upon completion). The purpose of identifying the ZTV is to define the effective boundaries within which the proposed development could potentially affect

people's views of the landscape within the wider area surrounding the development and is based on the information provided by Parameter Plan NWC-OPA-PAR-06-B1.

- 1.3.5 As previously outlined in the 2012 LVIA (para 6.3.21 – 6.3.26) the overall visibility of the Application Site at 2017 (completion of Phase 1) and 2026 (full build out) was identified with the production of ZTVs (refer to Figure 2.1 and 2.2). The ZTVs take into account the relative screening that existing buildings and features such as trees and vegetation currently provide to the Application Site.
- 1.3.6 The overall visibility of the development from each of the viewpoints was also appraised through the preparation of ZTV for each viewpoint (refer to Figures 2.3-2.26). These ZTVs show the theoretical building block visibility from each of the viewpoints as well as the number of the building blocks that will be visible both at the completion of Phase 1 (2017) and upon completion (2026). The parameter blocks (in their maximum dimensions) have been merged into the digital surface model. The resulting zones of theoretical visibility graphics take into account the relative screening that existing buildings and features such as trees and vegetation may provide to the development. When illustrating ZTVs at particular points in time, where a façade of a proposed building halts visibility of the remainder of the building from a particular viewpoint, only the façade is shown coloured to denote visibility. This colouring appears as a thin line.
- 1.3.7 Since preparing the ZTVs, further discrete refinements have been made the parameter plans (from Revision B1 to Revision B), namely the frontage to the southern boundary of Lot 8 to 38.5m AOD with solely the hotel frontage being increased to 40.5m AOD and the frontage to the supermarket in Lot 1 being retained at the 37.5m AOD. Given it has been demonstrated that the changes to the parameter plans are barely perceptible, these further refinements are seen as positive and will have no discernible effect on the assessment carried out.

Visualisations

- 1.3.8 In consultation with both planning authorities, the 2012 LVIA provided block model photomontages from 8 of the 12 viewpoints, namely viewpoints 1,2,3,6,7,8,10 and 11. These visualisations have been updated to reflect the S73 Amended Scheme (Figures 3.1 – 3.7). Photographs were taken in clear weather conditions in April 2013. They were captured on a Full Frame Canon EOS 5D MKII Digital SLR with 50mm lens. All photography was taken using a tripod fitted with a levelled panoramic head calibrated for the nodal point of the camera/lens combination. The lens was set at a viewing height of approximately 1.5m above ground level and locational data recorded with a hand-held GPS.
- 1.3.9 Whilst the updated photography captured in April 2013 reflects the viewpoint locations previously captured in March 2010 for the Consented Scheme, the updated photography does not exactly match the previous photography in every instance. This is due to the fact that despite every effort having been made to relocate the camera in the same positions as before, some slight variation when relocating the camera is unavoidable.
- 1.3.10 The photographs are taken in landscape format at 20 degree intervals giving a 50% overlap between frames. The images are then individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using PTGUI software. The individual images are not cropped in any way during the process.
- 1.3.11 The purpose of the block model photomontages is to illustrate the potential extents of the built development areas. They are not intended to show what the development will be like but the area within which it may occur.
- 1.3.12 A layout of the proposed development area has been modelled using coloured 'development envelopes' related to the parameter plots within the area. The envelopes are modelled at the maximum heights of

the buildings and maximum extent of the building envelopes. Actual heights and extent of the built form is limited by the Description of Development and Development Parameters. These envelopes have been used as the basis for visual modelling in the photomontages and the assessment of effects. Colours are used to illustrate the development envelope heights and are not indicative of the colour of the buildings.

1.3.13 These visualisations are presented in Figures 3.1 – 3.7 and in combination with the ZTV maps and site visit assessment have informed this updated S73 landscape and visual assessment.

1.3.14 It should be noted that the block model photomontages presented with the Consented Scheme included one produced from Viewpoint 10 (Figure 6.54 of the 2012 LVIA). This viewpoint has not been updated as the Consented Scheme fully obscured the view from this viewpoint and as the S73 scheme has not changed in this location, the view will remain unchanged from that considered and assessed in the 2012 LVIA.

1.4 Baseline Conditions

1.4.1 The desk and site based reviews have indicated that the baseline conditions of both the landscape and visual resource within the study area remain largely unchanged. Whilst there may be some elements of the landscape and townscape which have slightly altered, for example; the hedge which fringed the section of the Application Site on Huntingdon Road, adjacent to Viewpoint 11, has been removed and replaced with a heras fence to safeguard access during the construction period; the overall landscape and visual setting of the Scheme as described in the 2012 LVIA (Section 6.7) remains valid.

1.4.2 The Application Site, however, at the time of the site walkover was undergoing extensive archaeological excavations. Whilst some of the Site remained under agricultural use, substantial parts of the site were being excavated with large areas of earth mounding visible.

1.5 Assessment of Landscape and Visual Effects

1.5.1 The nature of the effects relating to the landscape and visual resource resulting from the North West Cambridge Scheme identified in the 2012 LVIA were:

- The effect on the landscape character of the Bedfordshire & Cambridgeshire Claylands Landscape Character Area;
- The effect on the local landscape character of the Application Site and immediate surrounding area including setting of Cambridge;
- The effect on designated landscapes; and
- The effect on views from within the study area.

Comparative Landscape Effects

1.5.2 The updated theoretical building block visibility at 2017 and 2026 for the S73 Scheme (Figures 2.1 and 2.2) reflect a very similar extent of theoretical visibility compared with those presented in the 2012 LVIA. The increased height parameters associated with the Local Centre, Energy Centre flue and adjacent areas (Figure 1.2) would have a barely perceptible change in the extent of visibility experienced across both the wider landscape resource as well as in the immediate landscape surrounding the Application Site.

1.5.3 This is further verified when considering the block model photomontages (Figures 3.1 – 3.7) which demonstrate that the changes between the Consented Scheme and the S73 Scheme are not discernible from any of the viewpoints set within the wider landscape. The only viewpoints where the changes between the two schemes becomes perceptible is from within the Application Site boundary (Viewpoint 7). However, even at this viewpoint (Figure 3.5) the increase in height reflected in the S73 Scheme is very small and is not considered to change the effects previously assessed in the 2012 LVIA.

1.5.4 Consequently the S73 Scheme is not considered to change the effects previously assessed on any of the following landscape character areas or designated landscapes:

- Regional Landscape Character – Area 3: Western Claylands
- Local Landscape Character - LCA 5A – Western Claylands and TCA 2 – West Cambridge
- Green Belt;
- Historic Gardens and Designed Landscapes - Madingley Park and American Cemetery; and
- Cotton Countryside Reserve.

Effects upon Regional Landscape Character Area

Area 3 – Western Claylands (Cambridgeshire Guidelines (1991))

1.5.5 The Western Claylands LCA is a gently undulating landscape extending across a large section of south-west Cambridgeshire, subdivided by the shallow Ouse Valley LCA. The Application Site lies to the south-eastern periphery of this LCA and as such the Proposed Development would not be considered to materially affect the overall integrity of this regional character area. This is further supported by the proximity of the Application Site to the north-western urban edge of Cambridge. Whilst the sensitivity to change is considered to be medium the magnitude of change would be low both in 2017 and upon completion of the Proposed Development (2026).

1.5.6 Along the periphery of this LCA there will be a loss of farmland and open space to built development with the urban edge of Cambridge appearing to extend outwards into the edge of this LCA. The landscape principles for the Proposed Development will, however, assist the integration of the built form and urban/rural edge, redefining the north-west urban edge of Cambridge. Resulting effects are considered to be likely to be Minor Adverse and not significant for this regional character area both in 2017 and upon completion in 2026.

Effects upon Local Landscape Character

1.5.7 The local character areas (LCA) and local character types (LCT) identified in the Cambridge Green Belt Study (Landscape Design Associates, 2002) that would be directly affected by the Proposed Development are the following:

- LCA 5A – Western Claylands, part of the wider Claylands LCT
- TCA 2 – West Cambridge, part of the wider Bespoke houses and Colleges type

LCA 5A – Western Claylands

1.5.8 The Application Site lies almost entirely within this LCA which is considered to be of medium sensitivity to change. The Proposed Development up to 2017 would result in a medium magnitude of change becoming high once the scheme has been completed (2026). Resulting effects as at 2017 would be Moderate Adverse becoming Major Adverse once completed and Moderate Adverse once the landscape has established and matured (summer 15 years after completion). Effects are likely to be limited to the more eastern urban/rural interface of this character area.

1.5.9 The development of this area of land in effect re-defines the north western urban edge of Cambridge. The open, farmland will be lost in phases and replaced with built development set within a landscape framework where watercourses, trees, hedgerows are retained and enhanced with new planting, ponds and a network of paths. The Proposed Development retains an open farmland character towards the Western Edge, providing a buffer and functional transition between the Proposed Development and the M11. Whilst it is considered that the Proposed Development will have a significant adverse effect on this existing character area it could also be viewed that this character area will need to be re-defined with the new urban edge providing the new edge to the character area, thereby extending the townscape

character area north-westwards with the Western Claylands LCA eastern boundary becoming defined by the boundary of the M11.

TCA 2 – West Cambridge (part of the wider Bespoke Houses and Colleges Townscape Type)

- 1.5.10 The Application Site boundary extends into a very small peripheral section of this TCA. Whilst the sensitivity to change is considered to be high for the TCA in 2017, there will be no direct effects on this TCA and the magnitude of change would result in a Negligible effect on a peripheral section of this TCA. Upon completion in 2026 the Proposed Development would involve the loss of some farm buildings and a small section of arable farmland contained within the periphery of this TCA which would be replaced with development. The loss of the farmland and buildings are features which are not typical characteristics of this townscape, where bespoke properties and college buildings predominate.
- 1.5.11 Direct effects would be restricted to a small, contained and peripheral section of the TCA and due to the more inward facing nature of much of this townscape area, the existing mature planting contained within it combined with the proposed boundary reinforcement planting, it is considered that the magnitude of change during summer 15 years after scheme completion would be low. This would result in a localised Minor Adverse effect to this townscape character area.

Effects upon Designated Landscapes

Green Belt

- 1.5.12 Approximately 50 ha within the Application Site will be retained as Green Belt. The Green Belt will provide a setting for the Proposed Development as well as redefine the new urban edge of Cambridge. The Green Belt will also provide a functional buffer between the Proposed Development and the motorway, while preserving an open and agricultural landscape character.
- 1.5.13 The Proposed Development has allocated a series of uses within the Green Belt, all of which are permitted and aligned with the purposes of this designation. These uses include community farmland, sports pitches, pavilions, and allotments. As the Proposed Development enhances the functions and features of the Green Belt there will be no direct adverse effects on the Green Belt, and this would result in Negligible effect.

Historic Gardens and Designed Landscapes – Madingley Park

- 1.5.14 The site assessment suggests that there will be potential views of the Proposed Development from Madingley Park, particularly from Madingley Hall which is located at a high point and has open views towards the south-east. The effects of the Proposed Development on this designated landscape would be similar to those on Viewpoint 12. However, the views will be distant and the Proposed Development will be seen as part of and in context with Cambridge City edge, resulting in no direct effects on the amenity uses of this designated landscape and the magnitude of change would be negligible. This would result in a Negligible effect on Madingley Park.

Historic Gardens and Designed Landscapes – American Cemetery

- 1.5.15 The site assessment suggests that there will be potential views of the Proposed Development from the American Cemetery. These outward views, however, do not form part of the designed experience of visiting this designated landscape, as its character is more inward looking and contained. The effects of the development on this designated landscape would be similar to those on Viewpoint 1. The views will be distant and the development will be seen in context with Cambridge City edge, resulting in no direct effects on this designated landscape as the magnitude of change would be negligible. This would result in a Negligible effect on the American Cemetery.

Coton Countryside Reserve

- 1.5.16 The site assessment suggests that there will be potential views of the Proposed Development from some of the high points within Coton Countryside Reserve. Upon visiting the reserve, it was concluded that these views would be distant, in some cases partially screened by existing vegetation and perceived as part of the Cambridge City edge. The character and amenity attributes of this reserve will not be directly affected and the magnitude of change would be negligible. This would result in a Negligible effect on the Coton Countryside Reserve.

Summary of Landscape Effects

- 1.5.17 Table 1.1 below provides a summary of the Landscape Effects.

Table 1.1: Summary of Landscape Effects

Landscape Resource	Sensitivity to Change	Magnitude of Change			Significance of Effects			Change in Effect between 2012 LVIA and S73 LVIA
		2017	Winter year of Completion (2026)	Summer 15 years after completion	2017	Winter year of Completion (2026)	Summer 15 years after completion	
Regional Landscape Character Area Area 3 – Western Claylands	Medium	Low	Low	Low	Minor-Adverse	Minor- Adverse	Minor- Adverse	No Change in Effect
LCA 5A Western Claylands	Medium	Medium	High	Medium	Moderate-Adverse*	Major-Adverse*	Moderate-Adverse*	No Change in Effect
TCA 2 West Cambridge	High		Low	Low	Negligible	Minor- Adverse	Minor- Adverse	No Change in Effect
Green Belt	Medium	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	No Change in Effect
Madingley Park	High	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	No Change in Effect
American Cemetery	Medium	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	No Change in Effect
Coton Countryside Reserve	Medium	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	No Change in Effect

* It should be noted that these effects are limited to the more eastern urban/rural interface of this character area and do not affect the wider integrity of the Western Claylands LCA

Visual Effects

- 1.5.18 The 2012 LVIA considered the change in view experienced by people from twelve representative viewpoints. Theoretical building block visibility of the S73 Scheme from each of the twelve viewpoints is presented in Figures 2.1 to 2.26 and demonstrates that the extent of theoretical visibility of the S73 Scheme remains largely the same as that shown in the ZTV in the 2012 LVIA. This further affirms that the twelve viewpoints used in the 2012 LVIA remain valid as representative viewpoints and as a basis for assessing the effects of the S73 on visual amenity.
- 1.5.19 The updated ZTV and block model photomontages have been analysed for each of the twelve viewpoints to establish whether the S73 Scheme would affect the conclusions of the 2012 visual assessment.

Viewpoint 1 – Cambridge Road

Grid Reference: TL 40270/59929

Direction of View: North-east

Sensitivity: High

Magnitude of Change

2017: Negligible-Low

Winter year of completion (2026): Low

Summer year 15 after completion (2041): Low

- 1.5.20 Although the Proposed Development would be visible in the central portion of the view, the Proposed Development would fit into the woodland pattern of the middle ground and follow the existing characteristics of built form being glimpsed through tree planting. The south-eastern portions of the Proposed Development may rise above rather than have a backdrop of existing woodland. The magnitude of change arising from the Proposed Development is considered to be low-negligible as at 2017 and low upon completion (2026). Following the establishment of the landform and planting along the western boundary of the Application Site this magnitude would be reduced in the longer term (2041) to Low-Negligible.

Significance of Effect

2017: Negligible

Winter year of completion (2026): Minor-Adverse

Summer year 15 after completion (2041): Minor-Adverse

- 1.5.21 At 2017, a very small section of the Proposed Development would be visible from this viewpoint resulting in a Negligible effect.
- 1.5.22 Upon completion of the Proposed Development (2026) the built development would be glimpsed through the existing woodland in mid-ground views. In the distance, there will be a disruption of the skyline with new vertical elements (Energy Centre Flues) rising above the development and existing planting. The partial disruption of the skyline to the south-east in conjunction with the enhancement of existing planting on the western boundary and the retention of agricultural land in the foreground of the view would result in a Minor Adverse effect both upon completion and in summer 15 years after completion (2041).
- 1.5.23 *Figure 3.1 demonstrates that the change in building heights reflected in the S73 Scheme would not be discernible from this viewpoint and consequently the visual effect assessed in the 2012 LVIA would remain unchanged.*

Viewpoint 2 – Madingley Road approaching Cambridge

Grid Reference: TL 41427/ 59447

Direction of View: North-east

Sensitivity: Low

Magnitude of Change

2017: Negligible-low

Winter year of completion (2026): low-medium

Summer year 15 after completion (2041): low

- 1.5.24 The Proposed Development will be partially screened by the existing hedge, with only glimpses of the Proposed Development exposed during the winter. The magnitude of change arising from the Proposed Development is considered to be negligible-low as at 2017. At Development Completion (2026) when this view is revealed, the development would extend across the majority of the extent of the view in the middle ground. The farmland and wooded foreground, woodland backdrop, and the prominent line of the M11 and moving traffic will remain as notable components of the view. The magnitude of change arising from the Proposed Development as at 2026 is considered to be low-medium. The retention and enhancement of existing vegetation along the south-western boundary of the Application Site, and the proposed topography to the north-west will further reduce the magnitude of change to low in the long-term (2041).

Significance of Effect

2017: Negligible

Winter year of completion (2026): Minor- Moderate Adverse

Summer year 15 after completion (2041): Minor-Adverse

- 1.5.25 At 2017, the Proposed Development would be partially visible where there are gaps within the hedge or during winter time, resulting in a Negligible effect.
- 1.5.26 As the vegetation continues to mature upon completion of the Proposed Development (2026), glimpses of the built development would be revealed through the existing hedge during winter. The enhancement of vegetation along the western boundary of the development, in addition to the retention of agricultural land in the foreground of the view, would result in a Minor-Moderate Adverse effect upon completion and a Minor-Adverse effect in summer 15 years after completion (2041).
- 1.5.27 *Figure 3.2 shows a very small increase in height around the Local Centre, however, this barely discernible change would not be perceptible from this viewpoint and is not considered to change the visual effects previously assessed in the 2012 LVIA.*

Viewpoint 3 – Public footpath at Wrangling Corner

Grid Reference: TL 41356/ 60300

Direction of View: North-east

Sensitivity: High

Magnitude of Change

2017: Low

Winter year of completion (2026): Medium-low

Summer year 15 after completion (2041): Medium-low

- 1.5.28 The magnitude of change arising from the Proposed Development is considered to be low during 2017. The Proposed Development will only affect one direction of the view (north-west) and the enhancement of existing vegetation along the western boundary of the Application Site will result in a medium-low magnitude of change at development completion (2026) and in the long term (2041).

Significance of Effect

2017: Minor-Adverse

Winter year of completion (2026): Minor-Moderate Adverse

Summer year 15 after completion (2041): Minor-Moderate Adverse

- 1.5.29 At 2017, the Proposed Development would be partially visible towards one end of the view resulting in Minor Adverse effect.
- 1.5.30 Upon completion of the development (2026) the built development would be visible through the existing woodland, but without major disruption to the existing skyline or the agricultural land in the foreground. The high sensitivity of this viewpoint would result in a Minor-Moderate Adverse effect upon completion and a Minor-Moderate Adverse effect in summer 15 years after completion.
- 1.5.31 *Figure 3.3 shows a nominal increase in height in the south west of the site around the Local Centre. The increase in building height is barely discernible from this viewpoint and is not considered to change the visual effects previously assessed in the 2012 LVIA.*

Viewpoint 4 – Madingley Road bridge over the M11 motorway

Grid Reference: TL 42079/ 59395

Direction of View: North-east

Sensitivity: Medium-Low

Magnitude of Change

2017: No view

Winter year of completion (2026): Low

Summer year 15 after completion (2041): Low

- 1.5.32 Up to 2017 there will be no view of the Proposed Development. At development completion (2026), both motorway users and pedestrians on the bridge will have a direct view of the site; however it would form a small and relatively distant component. Closer views of the eastern part of the site would be peripheral to the view and predominantly screened by dense banks of trees. The Proposed Development would only be glimpsed behind the trees to the east, and although forming a new horizon line in the centre of the view, it would essentially replace the existing line of buildings and retain the foreground as open space. Therefore, the magnitude of change at completion (2026) and in the long term (2041) is considered to be low.

Significance of Effect

2017: Negligible

Winter year of completion (2026): Minor-Adverse

Summer year 15 after completion (2041): Minor-Adverse

- 1.5.33 At 2017, none of the Proposed Development would be visible from this viewpoint, resulting in no effect.
- 1.5.34 Upon completion of the development (2026) the built development would replace the existing line of buildings in the foreground, this change being more apparent to pedestrians than vehicular passengers who will only experience fleeting views of the development. The enhancement of the existing vegetation would result in a Minor Adverse effect both upon completion and in summer 15 years after completion.
- 1.5.35 *The theoretical building block visibility suggests that there will be no change in the view from this viewpoint and that the changes apparent in the S73 Scheme will not be visible.*

Viewpoint 5 – M11 motorway looking east**Grid Reference:** TL 42129/ 59734**Direction of View:** East**Sensitivity:** Low**Magnitude of Change**

2017: Low-negligible

Winter year of completion (2026): medium

Summer year 15 after completion (2041): Low

- 1.5.36 At 2017, the magnitude of change arising from the Proposed Development will be low-negligible. At development completion (2026), the Proposed Development would retain the strong hedgerow and wooded elements for the width of the view, including the prominent vertical elements of the hedgerow trees. Glimpses of Proposed Development would be revealed through the hedge during winter time, resulting in a medium magnitude of change at development completion (2026) and low in the longer term (2041).

Significance of Effect

2017: Minor-Adverse

Winter year of completion (2026): Minor-Moderate Adverse

Summer year 15 after completion (2041): Minor-Adverse

- 1.5.37 At 2017, the Proposed Development would be partially visible through gaps in the hedge during winter time, but the open agricultural foreground retained, resulting in Minor-Adverse effect.

- 1.5.38 At completion of the Proposed Development (2026) elements related to the proposed sports areas in the foreground, including any associated pavilion, may be visible through the hedge. In addition, new areas of planting and the enhancement of the existing hedge would result in a Minor-Moderate Adverse effect. The low sensitivity on this viewpoint, combined with the fleeting nature of the view, and the maturation of planting in summer 15 years after completion, is likely to result in Minor-Adverse effects on this view.

- 1.5.39 *The closest building blocks visible from this viewpoint are those in the Local Centre with the resulting increase in height associated with the S73 Scheme visible from this viewpoint. However, the increase in height is not considered to be sufficient to increase the magnitude of change previously assessed and would not change the conclusions of the visual effects identified for this viewpoint in the 2012 LVIA. Figure 3.5, whilst not illustrating the view from this viewpoint does reflect a similar viewing distance between the Local Centre and the viewpoint and reflects the small increase in height which would be visible from viewpoint 5.*

Viewpoint 6 – M11 motorway looking north/north-east**Grid Reference:** TL 42123/ 59924**Direction of View:** East**Sensitivity:** Low**Magnitude of Change**

2017: Low

Winter year of completion (2026): Medium-high

Summer year 15 after completion (2041): Medium-low

- 1.5.40 At 2017, the magnitude of change arising from the Proposed Development is considered to be low. At development completion (2026), the Proposed Development will extend almost the entire breadth of the view in the middle ground. The existing fields of the mid-ground would be replaced by built development, and would rise above and occlude views of the wooded skyline to the east. To the north east, the buildings and parkland trees along Huntingdon Road would be partially screened by the Proposed Development. The building heights are retained below the skyline, allowing the wooded backdrop to remain as a notable feature. The proposed topography and landform set out as part of the landscape principles, tilting upwards towards the Proposed Development will help reduce the magnitude by screening the lower levels of the Proposed Development, while maintaining the focus of the view on the fields in the foreground. The resulting magnitude of change arising from the development at development completion (2026) is considered to be medium-high. In the longer term, summer 15 years after completion (2041), the magnitude of change is considered to be medium-low as a result of continued maturation of planting.

Significance of Effect

2017: Minor-Adverse

Winter year of completion (2026): Minor-Moderate Adverse

Summer year 15 after completion (2041): Minor-Moderate Adverse

- 1.5.41 At 2017, the Proposed Development would be partially visible in mid ground views resulting in Minor Adverse effect. The proposals suggest that the University Farm will be kept in operation and phased out as the development comes forward. This progressive change over a long period of time can reduce the effects on this viewpoint in the long term.
- 1.5.42 Upon completion of the Proposed Development (2026) the built development would be the main component of the view in the mid ground, resulting in a Minor-Moderate Adverse effect. The establishment of the landscape proposals and new setting in summer 15 years after completion would reduce the magnitude of change, although the effect would remain Minor-Moderate Adverse effect.
- 1.5.43 *Figure 3.4 demonstrates that the change in building heights reflected in the S73 Scheme would not be visible from this viewpoint and consequently the visual effect assessed in the 2012 LVIA would remain unchanged.*

Viewpoint 7 – M11 motorway looking south-east

Grid Reference: TL 42123/ 59924

Direction of View: East/North-east

Sensitivity: Low

Magnitude of Change

2017: Low

Winter year of completion (2026): Medium

Summer year 15 after completion (2041): Medium-Low

- 1.5.44 At 2017, the magnitude of change arising from the proposed development is considered to be low. At development completion (2026), the Proposed Development would extend across the entire breadth of the view in the middle ground. The existing fields of the mid-ground would be replaced by built development, and would rise above and occlude views of the wooded horizon-line to the south. The proposed building heights remain in a continuous line falling away to the south-east and away from the motorway. The wooded backdrop is occluded by the built form, while in the foreground the existing vegetation and brook will be retained.

- 1.5.45 The proposed topography, tilting upwards towards the development would help reduce the magnitude of change by screening much of the lower levels of the Proposed Development with some sections screened to full building height. The focus of the view on the fields in the foreground would be maintained as a result of this screening effect and the proposed maturing landscape would further reduce the magnitude over time. The magnitude of change arising from the Proposed Development is considered to be medium at development completion (2026) and medium-low in the longer term (2041) as a result of continued maturation of planting.

Significance of Effect

2017: Minor-Adverse

Winter year of completion (2026): Minor-Moderate-Adverse

Summer year 15 after completion (2041): Minor-Moderate Adverse

- 1.5.46 At 2017, the Proposed Development would be partially visible in mid ground views resulting in Minor Adverse effect. The proposals suggest that the University Farm will be kept in operation and phased out as the development comes forward. This progressive change over a long period of time can help reduce the effects on this viewpoint in the long term.

- 1.5.47 Upon completion of the Proposed Development (2026) the built development would be a notable component of the view in the mid ground, resulting in a Minor-Moderate Adverse effect. The establishment of the landscape proposals and new setting in summer 15 years after completion would reduce the magnitude of change, although the effect would remain Minor-Moderate Adverse effect.

- 1.5.48 *Figure 3.5 shows a small increase in height at the Local Centre with the S73 Scheme. The difference in view between the Consented Scheme and the S73 Scheme, however, is nominal and would not constitute a change in effect. The 2012 assessment at this viewpoint remains valid.*

Viewpoint 8 – M11 motorway looking east/south-east

Grid Reference: TL 41820/ 60791

Direction of View: East/South-east

Sensitivity: Low

Magnitude of Change

2017: Low-negligible

Winter year of completion (2026): Medium-high

Summer year 15 after completion (2041): Medium

- 1.5.49 At 2017, the magnitude of change arising from the proposed development is considered to be low-negligible. At development completion (2026), the proposed Development will extend for the complete breadth of this view in the middle ground. The rising fields of the mid-ground would be replaced by built development and would rise above and occlude much of the wooded skyline. The proposed topography that intervenes and obscures the Proposed Development, screens the majority of sections within this view to full building height. The retention of the tree-lined watercourse allows this to remain as an important feature providing an additional screening element and the foreground of farmland, brook and scattered trees remains free of built development. The resulting magnitude of change arising from the Proposed Development is considered to be Medium-high at development completion (2026) and medium in the longer term (2041).

Significance of Effect

2017: Negligible

Winter year of completion (2026): Moderate-Major Adverse

Summer year 15 after completion (2041): Moderate Adverse

- 1.5.50 At 2017, the Proposed Development would only be visible in the background resulting in a Negligible effect. The University Farm will be kept in operation and phased out as the development comes forward. This progressive change over a long period of time can help reduce the effects on this viewpoint in the long term.
- 1.5.51 Upon completion of the Proposed Development (2026) the built development would be visible in mid ground. There will be a disruption of the skyline, but given the fleeting nature of this view and the progressive change, the result is a Moderate-major adverse effect. In summer 15 years after completion, the landscape proposals including the proposed topography, will have matured and defined a new setting for the development, resulting in Moderate adverse effect.
- 1.5.52 *Figure 3.6 demonstrates that the change in building heights reflected in the S73 Scheme would not be visible from this viewpoint and consequently the visual effect assessed in the 2012 LVIA would remain unchanged.*

Viewpoint 9 – Howe Farm from Washpit Brook

Grid Reference: TL 41927/ 60886

Direction of View: North-east

Sensitivity: High

Magnitude of Change

2017: Low-Negligible

Winter year of completion (2026): High

Summer year 15 after completion (2041): High

- 1.5.53 At 2017, the magnitude of change arising from the proposed development is considered to be low-negligible. Once completed (2026), the Proposed Development will extend for the complete breadth of this view in the middle ground, and occlude and rise above the tree-lined horizon of Huntingdon Road. The immediate foreground of farmland and hedgerows would remain free of built development and would have new planting and landscape features incorporated, reducing this change in the longer term. Although the proposals retain the foreground and the framing trees on each side, they also completely occlude the background and occupy most of the width of the view close to the receptors. The magnitude of change arising from the Proposed Development is therefore considered to be high at development completion (2026) and in the longer term (2041)

Significance of Effect

2017: Negligible

Winter year of completion (2026): Major Adverse

Summer year 15 after completion (2041): Major Adverse

- 1.5.54 At 2017, the Proposed Development would only be visible in the background resulting in a negligible effect. The University Farm will be kept in operation and phased out as the development comes forward. This progressive change over a long period of time can help mitigate the effects on this viewpoint in the long term.
- 1.5.55 Upon completion of the Proposed Development (2026) the built development would be immediately visible in the foreground, resulting in a Major adverse effect both upon completion and in summer 15 years after completion.

- 1.5.56 *The Local Centre and associated changes reflected in the S73 Scheme are not visible from this viewpoint due to the intervening building blocks. The theoretical building block visibility confirms that there will be no change in the view from this viewpoint and that the changes apparent in the S73 Scheme will not be visible.*

Viewpoint 10 – Howe Farm from footpath at Huntingdon Road

Grid Reference: TL 42105/ 61090

Direction of View: South-west

Sensitivity: High

Magnitude of Change

2017: No View

Winter year of completion (2026): High

Summer year 15 after completion (2041): High

- 1.5.57 At 2017, there will be no view of the Proposed Development. At Development Completion (2026) the Proposed Development would extend across the majority of the view in the foreground completely occluding above and beyond the horizon to the south and southeast. The development stops short of the public footpath maintaining a route and view corridor in a south-westerly direction. The wooded horizon remains visible in the far distance, retaining a connection beyond. The magnitude of change to the view that would arise would be high at development completion (2026) and in the long term (2041).

Significance of Effect

2017: Negligible

Winter year of completion (2026): Major Adverse

Summer year 15 after completion (2041): Major Adverse

- 1.5.58 At 2017, the Proposed Development would not be visible in mid ground views. The University Farm will be kept in operation and phased out as the development comes forward. This progressive change over a long period of time can help reduce the effects on this viewpoint in the long term.

- 1.5.59 Upon completion of the Proposed Development (2026) the built development would be immediately visible in the foreground, resulting in a Major adverse effect both upon completion and in summer 15 years after completion

- 1.5.60 *The Local Centre and associated changes reflected in the S73 Scheme are not visible from this viewpoint due to the immediate building blocks present in the immediate foreground view. The theoretical building block visibility confirms that there will be no change in the view from this viewpoint and that the changes apparent in the S73 Scheme will not be visible.*

Viewpoint 11 – Huntingdon Road looking over Trinity Farm

Grid Reference: TL 43019/ 60392

Direction of View: South-west

Sensitivity: Low

Magnitude of Change

2017: Low

Winter year of completion (2026): Low

Summer year 15 after completion (2041): Low

- 1.5.61 At 2017, the magnitude of change arising from the proposed development is considered to be low. At development completion (2026), the Proposed Development will occupy the central portion of the mid- to background of this view. The enclosing elements of hedgerow, research buildings and tree lines in gardens that define this open space remain intact, and the open space in the foreground will remain free from development. The backdrop of woodland in the centre of the view will, however, be entirely occluded by built development in both proposals. The magnitude of change arising from the Proposed Development as at Development Completion (2026) and in the long term (2041) is considered to be low as most of the view at eye level is blocked by an existing hedge and the experience along this road is strongly framed by planting and focused. The establishment of a new series of open spaces along the northern entrance into the Application Site will reinforce the open space corridor while filtering views of the proposals in the longer term.

Significance of Effect

2017: Minor-Adverse

Winter year of completion (2026): Minor-Adverse

Summer year 15 after completion (2041): Minor-Adverse

- 1.5.62 At 2017, the Proposed Development including the sports areas and associated infrastructure including flood lights would have been completed. These elements may be partially visible above the hedge and could result in a Minor Adverse effect.
- 1.5.63 The built development would be glimpsed through the existing hedge during winter in mid-ground views resulting in a Minor Adverse effect both upon completion in 2026 and in summer 15 years after completion.
- 1.5.64 *Figure 3.7 demonstrates that the change in building heights reflected in the S73 Scheme would not be visible from this viewpoint and consequently the visual effect assessed in the 2012 LVIA would remain unchanged.*

Viewpoint 12 – Beck Brook Farm, The Avenue

Grid Reference: TL 40178/ 61418

Direction of View: South-east

Sensitivity: Medium-Low

Magnitude of Change

2017: Negligible

Winter year of completion (2026): Low

Summer year 15 after completion (2041): Negligible

- 1.5.65 The Proposed Development occupies a small central part of the backdrop to the view, with much being screened by the strong belts of woodland. The magnitude of change would be negligible in 2017, at 2026 it would be low at most and negligible in the long term (2041).

Significance of Effect

2017: Negligible

Winter year of completion (2026): Minor-Adverse

Summer year 15 after completion (2041): Negligible

- 1.5.66 At 2017, the Proposed Development would only be partially visible in background views resulting in a Negligible effect.

1.5.67 Upon completion of the Proposed Development (2026) the built development would be glimpsed through the existing woodland and shelterbelts. Partial disruption of the skyline would result in a Minor Adverse effect upon completion. Once the landscape proposals begin to mature and provide a new setting for the Proposed Development, the effect would be negligible.

1.5.68 *The theoretical building block visibility suggests that there will be no change in the view from this viewpoint and that the changes apparent in the S73 Scheme will not be visible.*

Summary of Visual Effects

1.5.69 Table 1.2 below provides a summary of the Visual Effects.

Table 1.2: Summary of Visual Effects

Viewpoint	Sensitivity to Change	Magnitude of Change			Significance of Impacts			Change in Effect between 2012 LVIA and S73 LVIA
		2017	Winter year of completion (2026)	Summer 15 years of completion	2017	Winter year of completion (2026)	Summer 15 years of completion	
1	High	Negligible-Low	Low	Low	Negligible	Minor Adverse	Minor Adverse	No Change in Effect
2	Low	Negligible-Low	Low-Medium	Low	Negligible	Minor-Moderate Adverse	Minor Adverse	No Change in Effect
3	High	Low	Medium-Low	Medium-Low	Minor adverse	Minor-Moderate Adverse	Minor-Moderate Adverse	No Change in Effect
4	Medium-Low	No View	Low	Low	Negligible	Minor Adverse	Minor Adverse	No Change in Effect
5	Low	Low- Negligible	Medium	Low	Minor Adverse	Minor-Moderate Adverse	Minor Adverse	No Change in Effect
6	Low	Low	Medium	Medium-Low	Minor Adverse	Moderate Adverse	Minor-Moderate Adverse	No Change in Effect
7	Low	Low	Medium	Medium-Low	Minor Adverse	Moderate Adverse	Minor-Moderate Adverse	No Change in Effect
8	Low	Low- Negligible	Medium-High	Medium	Negligible			No Change in Effect
9	High	Negligible	High	High	Negligible	Major Adverse	Major Adverse	No Change in Effect
10	High	No View	High	High	Negligible	Major Adverse	Major Adverse	No Change in Effect
11	Low	Low	Low	Low	Minor Adverse	Minor Adverse	Minor Adverse	No Change in Effect
12	Medium-Low	Negligible	Low	Negligible	Negligible	Minor Adverse	Negligible	No Change in Effect

1.6 Cumulative Effects

- 1.6.1 The 2012 LVIA considered the cumulative effects of the North West Cambridge Scheme in combination with three other developments; NIAB1, NIAB2 and West Cambridge.
- 1.6.2 NIAB1 lies to the north-east of the Application Site located on land between Huntingdon Road and Histon Road and comprises a mixed use development of up to 1593 dwellings, primary school, community facilities, retail units and associated infrastructure including vehicular, pedestrian and cycleway accesses, open space and drainage works. The application is resolved to be approved with the S106 under negotiation.
- 1.6.3 NIAB2 also lies to the north-east of the Application Site, located on land between Huntingdon Road and Histon Road, within the South Cambridgeshire District administrative area. The site has been allocated in the South Cambridgeshire Site Specific Policies DPD for residential development as well as for provision of a secondary school to serve the North West Quadrant. No application has been submitted.
- 1.6.4 West Cambridge lies to the south of the Application Site. The development is an edge of town University Campus based around research facilities. The first buildings were completed in the 1950s with later additions in the 1970s and recently in the last ten years. The central and northern areas of West Cambridge have been delivered and are currently in operation. The character of this development is of large buildings set in an open landscape framed by wide streetscapes. Other associated uses include car parking and several residential blocks.
- 1.6.5 Given that the landscape and visual effects assessment of the S73 Amended Scheme is not considered to change the 2012 LVIA assessment findings it is considered that the assessment of cumulative effects will similarly remain unchanged. The assessment of cumulative effects as presented in the 2012 LVIA is presented below.

Cumulative Effects - Construction

- 1.6.6 Given the scale and duration of construction activity related to the Application Site, it is predicted that the combination of further construction activity as a result of the NIAB1, NIAB2 and West Cambridge sites would result in a slight increase in magnitude during the construction period. However, cumulative construction activity is not likely to intensify the effects to such a degree that would be considered materially more significant than would be the case for the Proposed Development in isolation.

Cumulative Effects - Landscape Character

- 1.6.7 NIAB1 and NIAB2 lie within Landscape Character Area 2A Western Fen Edge which is a different LCA to the development site (Western Claylands). It is therefore considered that there will be no direct effect on the landscape character of the Western Claylands LCA as a result of the NIAB1 or NIAB2 development and that consequently no cumulative effects would result.
- 1.6.8 West Cambridge development lies within Townscape Area 2, West Cambridge (part of the wider Bespoke Houses and Colleges Townscape Type). The Proposed Development is considered to result in a Minor Adverse effect to a small, localised and peripheral part of this TCA and not affect the integrity of it or the principal features and characteristics which define it. When considering the West Cambridge site which is under construction in combination with the proposed site it is not considered likely to result in significant cumulative effects greater than the effects of either of the individual developments.

Cumulative Effects - Visual Amenity

- 1.6.9 Figures 2.1 and 2.2 represent the theoretical modelled maximum extent to which any part of the Application Site would be visible from within the wider landscape. These figures indicate that there is no theoretical intervisibility between the Application Site and NIAB1, NIAB2 or West Cambridge. These

developments would theoretically experience views of parts of the Application Site although they would not be viewed in combination. It is also unlikely that the three developments would be seen in combination due to the intervening urban form.

- 1.6.10 From reviewing the specific viewpoint ZTVs (Figures 2.3-2.26) none of NIAB1, NIAB2 or the West Cambridge development would be visible in combination with the site from any of the 12 viewpoints assessed. It is therefore considered that no significant cumulative effects would be likely.

1.7 Summary and Conclusion

- 1.7.1 The combination of desk and site based assessment combined with analysis of the updated ZTV and block model photomontages, demonstrates that the increase in development parameters presented in the S73 Scheme (primarily associated with the Local Centre, Energy Centre flue) are barely perceptible within the landscape. Consequently, the assessment of effects on the landscape and visual resource as presented in Tables 1.1 and 1.2 above and in the 2012 LVIA, which was accepted at the time of granting planning permission in 2013, will remain valid.
- 1.7.2 The Landscape Principles remain unchanged with the S73 application and as there is no change in landscape and visual effects, the mitigation measures will similarly remain unaffected. Consequently there will be no requirement to vary Condition 6 in relation to the Environmental Statement of the Outline Planning Consent.

2 Night-Time Lighting Assessment

2.1 Introduction

- 2.1.1 This section of the S73 LVIA presents an assessment of the likely significant night-time artificial lighting effects of the Proposed Development on residential properties adjacent to the site, wildlife / habitat on and around the site and two local observatories.
- 2.1.2 The Application Site boundary is illustrated in Figures 1.1. The LVIA process requires that a baseline study of the Application Site and a wider Study Area is undertaken in order to identify the surrounding landscape character and principal visual receptors. This involved desktop research and site work to record both the landscape character of the site and its surroundings, and the visual character of the area including the extent of visibility of the site. This resulted in the Study Area being drawn at a 2.5 km radius as the receptors that would be likely to experience potentially significant effects arising from the development are contained within this radius.
- 2.1.3 The effects of artificial lighting are addressed in the same way, by identifying a baseline lighting condition, identifying and assessing the sensitivity of receptors, identifying required lighting provisions for the Proposed Development and assessing and benchmarking the baseline to cumulative lighting condition variance, of the Construction phase and at 2017 and 2026.
- 2.1.4 This report addresses relevant lighting legislation, national good practice planning guidance, identify a baseline lighting condition, assess the sensitivity of receptors, and identify required lighting provisions for the Proposed Development and then assess the potential lighting effects, including the magnitude of change and assumptions and limitations.
- 2.1.5 The effects of artificial lighting section also focuses on potential night-time exterior lighting effects, including light spill and management, sky glow, Luminaire conspicuity and glare and management, Light levels and illuminances and management Light colour and spectral composition and management. This is followed by significance criteria and interpreting the assessment, baseline conditions and proposed lighting typologies design characteristics and the mitigation that may be required through lighting performance characteristics.
- 2.1.6 Lastly, the effects of artificial lighting section covers the overall effects of the Proposed Development and a summary and conclusions section.
- 2.1.7 The assessment addresses the following components:
- baseline lighting conditions;
 - sensitivity of receptors;
 - Identify required lighting provisions for the Proposed Development:
 - 2017
 - 2026
 - cumulative lighting condition variance of:
 - Construction phase
 - 2017
 - 2026
 - Summary and conclusions.

2.2 Planning Policy Context

2.2.1 This section indicates relevant lighting legislation and good practice guidance.

Legislation :Relevant lighting legislation

2.2.2 Clean Neighbourhoods and Environment Act 2005, Section 102.

2.2.3 Standards informing building regulations

- BS 5489-1:2003 – Code of practice for the design of road lighting – Part 1: Lighting of roads and public amenity areas.
- BS EN 13201-2:2003 – Code of practice for the design of road lighting – Part 2: Performance requirements.
- BS EN 12193:2007 – Code of practice for the design of sports lighting – Light + Lighting – Sport Lighting

National good practice planning guidance : Relevant lighting good practice

2.2.4 Lighting in the Countryside: Towards Good Practice, July 1997. Reference document on exterior lighting and classification as it applies to the British countryside. Includes guidance and recommendations for development limitations based on context.

2.2.5 CIE – Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations. Document referenced by the Clean Neighbourhoods and Environment Act 2005 to inform consideration of artificial lighting.

2.2.6 CIE – Guide to the Lighting of Urban Areas. Document referenced by codes of practice for the design of road lighting Parts 1 and 2.

2.2.7 Guidance Notes for the Reduction of Obtrusive Light, 2005. Reference document published by the Institute of Lighting Engineers covering how to control and reduce light pollution. It includes guidance on suggested controls for exterior lighting dependant on context.

2.2.8 CIBSIE: Code for Lighting 2006. Reference document published by the Chartered Institute of Building Services Engineers covering good practice interior and exterior lighting.

Transportation guidance

2.2.9 The following points indicate relevant transportation lighting good practice requirements

- Design Manual for Roads and Bridges, Volume 8, Section 3 TD 34/07 (DMRB) – Design of road lighting for the strategic motorway and all purpose trunk road network.

2.3 Assessment Approach

2.3.1 This section indicates the methodology used in undertaking the study and guidance on interpreting its findings.

Identify a baseline lighting condition

2.3.2 This assessment considers the baseline lighting condition to be that which is experienced by local residents and ecology, and effects to local observatories, with the existing lighting provision in place. The baseline lighting condition has been confirmed by review of current site record photography and site survey information.

2.3.3 The lighting provisions, or sources, of the baseline lighting condition considered in this chapter include:

- Madingley Road Park & Ride
- Motorway / access roads
- Landscape, functional and aesthetic

- Building, perimeter for safe access and egress, aesthetic
- Private Residential, ad hoc for access, security and personalisation
- Existing developments: Cambridge, West Cambridge, Girton, Coton

Identify and assess the sensitivity of receptors

2.3.4 The sensitivity of receptors to the lighting effects has been assessed and given a rating, or benchmarked, using consistent terminology. The receptors considered in this chapter include:

- Residents in housing around the Application Site
- Wildlife and habitat on and around the Application Site
- Local observatories

Identify required lighting provisions for the Proposed Development

2.3.5 The lighting provisions, or sources, of new lighting effects that are considered in this chapter include:

- Exterior car parks / access roads
- Pedestrian and cycle routes
- Landscape, functional
- Landscape, aesthetic (optional)
- Building, perimeter for safe access and egress
- Building, aesthetic (optional)
- Sports Pitch (optional for non-grass pitch areas)
- Private Residential, ad hoc for access, security and personalisation

2.3.6 The lighting design for the Proposed Development will reflect:

- Environmental requirements and good practice guidance
- Technical requirements and good practice guidance
- Appropriate selection of lighting typologies
- Local requirements, which will be secured by planning condition.

2.3.7 The lighting performance characteristics required new lighting typologies that are considered include:

- Technical performance characteristics, required by health and safety legislation, for necessary permanent functional lighting installations.
- Environmental performance characteristics, referred to in clean neighbourhoods and environment legislation, for permanent lighting installations to manage their environmental effect.

Assessment of the lighting effects

2.3.8 This assessment considers the 2017 condition, or partial cumulative lighting condition, to be that which would be experienced with the elements of the baseline lighting provision that are to be retained and the new lighting provisions for the first phase of the Proposed Development in place. This condition is based on the identified lighting provision components listed above.

2.3.9 This assessment considers the post-construction condition, or cumulative lighting condition, to be that which would be experienced with the elements of the baseline lighting provision that are to be retained and all required new lighting provisions for the Proposed Development in place. This condition is based on the identified lighting provision components listed above.

Magnitude of change

- 2.3.10 The magnitude of change for lighting effects has been assessed and given a rating, or benchmarked, using consistent terminology. The ratings for the magnitude of change for the new lighting provision were made in the context of, and informed by, the district lighting conditions, site specific building and environmental factors, legislation, planning policy, current relevant standards and good practice guidance.

Summary and conclusions

- 2.3.11 A desk-top based comparison of the baseline to cumulative lighting condition has been undertaken, by independent lighting design specialists, to assess the magnitude of change and likely significant effects of the required lighting condition.
- 2.3.12 A commentary on the likely significant night-time lighting effects of the Proposed Development has been made and conclusions presented in the context of, and informed by, the district lighting conditions, site specific building and environmental factors, legislation, planning policy, current relevant standards and good practice guidance.

Assumptions and Limitations

- 2.3.13 Assessment of the wildlife / habitat baseline condition assumes the relocation of wildlife and / or habitat to non-constructed zones.
- 2.3.14 Assessment is made with the assumption that the University of Cambridge design guidelines will include technical / environmental performance requirements and lighting typologies that adhere to the performance characteristics described within this chapter.

2.4 Potential night-time exterior lighting effects

Light spill

- 2.4.1 Light spill is considered to be ‘the spilling of light beyond the boundary of the site on which a light source is located’, such that it causes a noticeably adverse effect. More simply, light spill is often termed as the intrusion of light into homes. It can also have a negative effect on wildlife and ecological systems local to an installation.

Light spill management

- 2.4.2 Recommended light spill criteria for a new installation can be formulated dependant on context factors. A recommended environmental performance specification can be expressed in the form of lux(max) on a notional working plane.
- 2.4.3 The appropriate selection of luminaires based on light distribution characteristics and optimal placement can manage light spill.

Sky glow

- 2.4.4 Sky glow is considered to be ‘the brightening of the night sky’ above illuminated areas. The brightness created is constantly varying as a function of many parameters such as direct upward-lighting, ground surface reflectance, overhead cloud cover, and the degree of water droplets in the atmosphere - rain, fog/mist, and snow, for example, exacerbate the effect. An acceptable Upward Light Ratio (ULR) for an installation can be formulated dependant on its environmental context.

Sky glow management

- 2.4.5 Recommended sky glow criteria for a new installation can be formulated dependant on context factors. A recommended environmental performance specification can be expressed in the form of ULR %(max) (upward light ratio).

- 2.4.6 The appropriate selection of luminaires based on light distribution characteristics and optimal placement can manage upward light spill.

Luminaire conspicuity and glare

- 2.4.7 The placement of luminaires, their photometric characteristics, and the viewing context contribute to how conspicuous and glaring luminaires appear

Luminaire conspicuity and glare management

- 2.4.8 Recommended luminaire conspicuity and glare for a new installation can be formulated dependant on context factors. A recommended environmental performance specification can be expressed in the form of I Kcd (max) for source intensity characteristics viewed from beyond the site boundary.

- 2.4.9 Luminaire conspicuity and glare can be managed through optimal luminaire placement and the specification of luminaires that have appropriate light control characteristics.

Light levels and illuminances

- 2.4.10 New developments often require or warrant lighting installations for functional safety or aesthetic purposes.

Light levels and illuminances management

- 2.4.11 Acceptable working plane light levels and surface illuminances for a new installation can be formulated dependant on context factors. An acceptable environmental performance specification can be expressed in the form of lux(max) and lux U(min) for working planes and cd(max) and lux U(min) for conspicuous surfaces.

Light colour and spectral composition

- 2.4.12 Light colour has the potential to alter an individual's perception of their environment with respect to colour and clarity, as the human eye responds best to whiter light with higher quantities of ultraviolet wavelengths. Various wildlife species may respond differently to spectral composition depending on how reliant they are on darkness; many nocturnal animals continue their social habits and feeding behaviours with increased activity in the area while others may decrease their activity and possibly desert their habitat.

Light colour and spectral composition management

- 2.4.13 The appropriate selection of lamps based on light colour and spectral composition can ensure a safe environment and reduce the scope for negative effects on neighbouring dwellings and nocturnal wildlife activity.

- 2.4.14 Areas close to optical astronomical telescopes (approximately 30 – 40 miles for sensitive equipment), the use of low pressure sodium lamp (SOX) are typically recommended and desired for their narrow spectral composition that is more easily screened out of received images.

Significance criteria and interpreting the assessment

- 2.4.15 Assessment of the sensitivity of identified receptors, magnitude of change experienced by those receptors and their significance has been made in the context of, and informed by, the district lighting conditions, site specific building and environmental factors, legislation, planning policy, current relevant standards and good practice guidance.

- 2.4.16 Ratings represent a range of conditions, some of which are a combination of two conditions (i.e. medium – low). These combined conditions are intended to mark change at the higher or lower end of a particular threshold.

- 2.4.17 Tables 2.1 – 2.4 set out the assessment methodology, tools and terminology for effects.

2.4.18 The sensitivity of a receptor is a measure of how responsive it is to a given lighting condition.

Table 2.1 – Sensitivity terminology and example criteria

Sensitivity	Example Receptor Criteria
Negligible	Industrial buildings
Low	Agricultural buildings and habitats with minimal wildlife
Medium	Residential buildings with baseline exposure to moderate lighting and habitats with moderate light sensitive ecology
High	Residential buildings without baseline exposure to lighting and habitats with high light sensitive ecology

2.4.19 The magnitude of change is a measure of the degree of change for a new lighting condition.

Table 1.2 – Matrix tool for identifying magnitude of change

Magnitude of Change	Example Criteria
Negligible	No perceptible change, barely noticeable
Low	Small change to an existing lighting condition, or new lighting condition creates only a low level of change or new effects to identified receptors
Medium	Noticeable, distinct, but not always intrusive, change to a lighting condition affecting the appearance, characteristics and effects of an installation to identified receptors
High	Extensive, unmistakable, noticeable intrusive change to a lighting condition affecting the appearance, characteristics and effects of an installation to identified receptors

Significance of effects ratings are used to evaluate the likely effects of a lighting condition for identified receptors given their sensitivity to particular lighting conditions and the level of change experienced by them when that condition is altered.

Table 1.3 – Matrix tool for identifying likely significance of effects

Magnitude of Change	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor to Moderate	Negligible
Low	Moderate	Minor to Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Table 1.4 – Definitions for significance of effects ratings

Magnitude of Effect	Example Criteria
Major beneficial	Lighting conditions that present a highly positive effect. Example: Major noticeable improvements in area safety, appearance or lighting effects resulting from new artificial lighting.
Moderate beneficial	Lighting conditions that present a moderately positive effect. Artificial lighting example: Moderate perceptible improvements in area safety, appearance or lighting effects resulting from new artificial lighting.
Minor beneficial	Lighting conditions that present a small positive effect. Example: Minor improvements in area safety, appearance or lighting effects resulting from new artificial lighting.
Negligible	Lighting conditions that present no significant effect
Minor adverse	Lighting conditions that present a negligible negative effect. Example: Minor deterioration in area safety, appearance or lighting effects resulting from new artificial lighting.
Moderate adverse	Lighting conditions that present a moderately negative effect. Example: Moderate perceptible deterioration in area safety, appearance or lighting effects resulting from new artificial lighting.
Major adverse	Lighting conditions that present a highly negative effect. Example: highly noticeable deterioration in area safety, appearance or lighting effects resulting from new artificial lighting.

2.5 Baseline Conditions

Description of the Application Site pertinent to the lighting assessment

- 2.5.1 The Application Site is at the urban / rural edge of Cambridge, bound by Huntingdon Road, Madingley Road, the A14 and the M11, and is mainly used for agriculture and agricultural research.
- 2.5.2 The majority of the Application Site is not developed; land is typically arable and improved grassland with instances of hedgerows, scattered vegetation and areas of historic landscape. The Application Site, however, at the time of the LVIA site walkover was undergoing extensive archaeological excavations. Whilst some of the Site remained under agricultural use, substantial parts of the site were being excavated with large areas of earth mounding visible.
- 2.5.3 There are seven small building groups within the Application Site: two building groups with potential suitability for bat roosting, Howe Farm, Agronomy Centre Building, Old Field Station, Office buildings and the Genetics Building to the North; former Gravel Hill Farm to the South-east.
- 2.5.4 Generally, there are no lighting installations within the Application Site.
- 2.5.5 Some ad hoc safety and perimeter lighting is in use for existing office, academic and farm buildings within the Application Site.
- 2.5.6 Base condition horizontal and vertical light levels were taken at 10m intervals along the residential boundary of the Application Site, where accessible. At 100m intervals, horizontal and vertical light levels

were measured in the North, South, East and West directions. Light levels consistently read 0 lux at this boundary line. Table 6.15 of the 2012 LVIA records these findings.

- 2.5.7 Figures 6.57 – 6.62 of the 2012 LVIA show images indicating light visible from Viewpoints 1 – 6 used by the landscape Winter Montages.
- 2.5.8 The Application Site contains three historic landscape features: the Travellers Rest Pit (SSSI – as part of the World Conservation Monitoring Centre; not included for development) to the centre of the Application Site, historic ridge and furrow field patterns to the East and an avenue of oak trees running North / South along Huntingdon Road.
- 2.5.9 Areas of ecological value within the Application Site are limited to spaces with any mature hedgerows, wooded areas, ponds and channels of water, mature trees, farm building groups and an assortment of badger setts around the Application Site.

Description of the Application Site context and assessment of existing lighting provisions.

- 2.5.10 The topography of the Application Site and surrounding land is reasonably flat, with minor sloping toward Wash Pit Brook.
- 2.5.11 Figures 6.57 – 6.74 of the 2012 LVIA are images indicating visible light from locations within the Application Site for views shown in Figure 6.56 of the 2012 LVIA. Sources of light are the M11, Madingley Road and the Park and Ride.
- 2.5.12 Lighting installed along Huntingdon Road is not measureable, or visible, at the residential boundary between the Application Site and existing properties along Huntingdon Road, indicating that there is effective obstruction from existing structures and established plantings along Huntingdon Road and existing landscape to the rear of residential properties themselves, see Figures 6.63 -6.65 of the 2012 LVIA.
- 2.5.13 The M11 / A14 junction is lit to motorway standards utilising 10 – 12m columns and is a noticeable, visible feature within the night-time visual envelope.
- 2.5.14 The Application Site boundary roads, Huntingdon Road and Madingley Road, are illuminated by standard column mounted streetlight style luminaires, typically on 6 – 8m columns. These luminaires are not in high conflict with the surrounding receptors; they present low – mid power output and incorporate reasonable optical control, creating a small negative effect.
- 2.5.15 Figures 6.64 – 6.66 and 6.68 - 6.71 of the 2012 LVIA are images indicating light contribution to views at locations along the residential boundary line for views shown in Figure 6.56 of the 2012 LVIA.
- 2.5.16 Access to the Application Site is restricted both entering and navigating the Application Site. Huntingdon Road leads to Howe Farm, the World Conservation Monitoring Centre (to include SSSI) and the former Gravel Hill Farm. Madingley Road leads to Madingley Rise, local residential developments and Madingley Park & Ride.
- 2.5.17 Application Site access roads are not lit.
- 2.5.18 Adjacent developed areas have a combination of academic and residential components, such as West Cambridge, Girton College and the residential areas between them.
- 2.5.19 Existing residential properties are generally lit by ad hoc lighting installations which may include security and decorative lighting. Figure 6.74 of the 2012 LVIA illustrates this type of lighting.
- 2.5.20 Directly to the North of the Application Site are existing residential properties and at a further 4km distance, the village of Girton.
- 2.5.21 To the North is a parcel of land used by the National Institute of Agricultural Botany (NIAB); this parcel is designated for future residential development.

- 2.5.22 To the South is a Park & Ride facility, and South-east land split for University and residential use.
- 2.5.23 The Park & Ride facility is illuminated by column mounted streetlight style luminaires, typically on 6 - 8m columns, interspersed with existing plantings and vegetation. These luminaires are not in high conflict with the surrounding receptors; they present a low – mid-power output and incorporate reasonable optical control, creating a small negative effect.
- 2.5.24 Lighting does contribute to views for some residential properties near the Park and Ride, Figures 6.66, 6.70 and 6.71 of the 2012 LVIA, but this does not contribute to any light spill at the residential boundary.
- 2.5.25 South-west of the Application Site, to the North of Madingley Road between the area designated for the Girton Gap and Churchill College is Cambridge Observatory. All telescopes maintained by this facility are optical and used for on-site observation.
- 2.5.26 Approximately 4.5 miles to the South of the Application Site is Mullard Radio Astronomical Observatory. The majority of telescopes maintained by this facility read radio signal, but one low level brightness telescope has been noted as being in operation.
- 2.5.27 Areas to the West and far South contain predominantly rural lowland landscape.
- 2.5.28 Ponds, scattered woodland and plantation on- and off-site create small pockets where some sensitive ecological receptors have been identified, i.e. badger setts, bat commuter paths and vole habitat.
- 2.5.29 The following sensitive receptors have been identified around the Application Site:
- Residents in housing around the Application Site
 - Identified wildlife / habitat areas around the Application Site
 - Cambridge Observatory to the South-east of the Application Site
 - Mullard Radio Astronomical Observatory to the South of the Application Site
- 2.5.30 The following sensitive receptors have been identified on the Application Site:
- Identified wildlife / habitat within the Application Site

Description of residential receptors around the Application Site and assessment of their sensitivity

- 2.5.31 Residential properties bound the North and South-east. These receptors are subject to existing lighting effects indicated above.

Sensitivity of Residential Receptors	Medium - High
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Residents and sensitivity factors

- 2.5.32 The sensitivity of light source conspicuity on views is very subjective, dependant on context location and individual perception. Acceptable performance characteristics, derived from empirical research, regarding lighting metrics related to personal disturbance and nuisance caused by lighting installations is available, but this does not cover the more subjective and personal issue of the sensitivity of individuals to effects on views.

Description of the ecology around the Application Site and assessment of its sensitivity

- 2.5.33 Chapter 7 of the 2012 ES was reviewed at the time of completing this chapter. Several protected and / or rare species were identified in the area, with a balance between those species residing within the Application Site and others local to the Application Site. Not every species identified is known to be sensitive to a permanent static lighting condition.

Sensitivity of Wildlife Receptors on the Application Site

Wildlife Type	Sensitivity	Qualifying Note:
Badger	Medium - High	Throughout Application Site: setts and foraging habitat
Bat	Medium - High	Commuting and foraging across the site, primarily associated with linear features, including the Washpit Brook, hedgerows, woodland edges and the avenue of horse chestnut trees. Most species present are relatively tolerant of lighting, being associated with urban and suburban areas. Small roost sites also present.
Water Vole	Negligible - Low	Present on the Washpit Brook. Water voles are diurnal animals, most active around dawn and dusk, and not considered to be particularly sensitive to lighting effects
Otter	Low	Otters will tend to avoid well-lit areas, but are known to use watercourses in most cities in the UK. No otters recorded using the site, but are likely to commute along the Washpit Brook at some stage in the future
Amphibian	Medium	Great crested newts breeding in off-site ponds, but likely to forage/hibernate within the southern parts of the site; large population of common toads present within the pond at the World Conservation Monitoring Centre and likely to forage/hibernate in the surrounding areas
Bird	Low	Barn owls present but no evidence of nesting on site. Other species present unlikely to be particularly sensitive to lighting effects
Brown hare	Low	Present across much of the Application Site. This species is active during daylight hours as well as at night, and are therefore not considered to be particularly sensitive to lighting effects
Invertebrates	Low	Present across the Application Site with many of the species of nature conservation concern being associated with mature trees and hedgerows. None of the species of conservation concern recorded on site are considered to be particularly sensitive to lighting effects

Ecology and sensitivity factors

2.5.34 Appropriately specified and installed exterior lighting can be categorised as a permanent static lighting condition. It has been observed that continuous, low intensity disturbances are able to be integrated into a variety of moderate - low sensitivity habitat without significant detriment and can be acclimated to by other nocturnal wildlife.

Description of non-residential receptors around the Application Site and assessment of their sensitivity

2.5.35 There are two non-residential receptors of note within 5 miles of the Application Site: the Cambridge Observatory and Mullard Radio Astronomical Observatory.

2.5.36 The Cambridge Observatory maintains 4 optical telescopes, used for on-site observation by the University Astronomical Society and on public observation nights

2.5.37 The Mullard Radio Astronomical Observatory maintains 6 telescopes, 1 is a low brightness optical telescope while the rest receive radio signal.

2.5.38 Existing lighting conditions created by the city of Cambridge and the surrounding area have removed the capability for these optical telescopes to be used for ‘front rank’ research on faint objects.

Observatory	Sensitivity	Qualifying Note
Cambridge	Medium	Optical telescopes currently affected by existing area lighting conditions; reduced viewing functionality
Mullard Radio Astronomical	Low - Medium	Radio telescopes unaffected by area lighting conditions; low brightness telescope currently affected by existing area lighting conditions

Non-Residential receptors and sensitivity factors

2.5.39 Observatories which read radio signal are not adversely affected by exterior lighting installation. Appropriately specified and installed exterior lighting can be categorised as a permanent static lighting condition. Optical observatories require more carefully shielded lighting and are best served when limiting the colour spectrum emitted in order to filter out erroneous lighting data. It has been observed that continuous, low intensity, narrow-spectrum disturbances are able to be integrated into a variety of moderate – low sensitivity envelopes without significant detriment.

District Classification

District context brightness

2.5.40 The degree to which an artificial lighting installation is likely to impact on an environment is in part dependent on visual context. Lighting installations in areas of low district brightness are likely to have a greater effect on their environment than those in areas of high district brightness. External lighting should be specified with consideration for the environmental context apparent to an installation.

2.5.41 Based on the lighting environmental context, which can be expressed in terms of district brightness, recommended light nuisance characteristics for new external lighting installations can be formulated. These acceptable light nuisance characteristics have been determined by independent imperial research. The research has been ratified and incorporated into good practice guidance and some local planning strategies. Table 2.5 indicates classification categories according to district brightness

characteristics. Table 2.6 indicates classification categories for areas around astronomical observatories cross-referenced to environmental zones of district brightness.

Table 2.5 – Classification of district brightness

Classification ref	Environmental Context	Example Areas
E1	Intrinsically Dark Areas	National Parks/Areas of Outstanding Natural Beauty
E2	Low District Brightness	Rural or small village location
E3	Medium District Brightness	Small town centres or urban locations
E4	High District Brightness	Town/City centres with high levels of night activity

Table 2.6 – Classification of astronomical activities and light pollution

Group ref	E Zone	Environmental Context	Example Areas
5	Total Exclusion zone	Low-resolution spectroscopy, wide-field imaging	Very remote rural location where an observatory of national or international standing is used by professional astronomers.
4	E1	Narrow-band imaging, low-resolution spectroscopy, continuum imaging	Remote rural location where an observatory of national or international standing is used by professional astronomers.
3	E2	Intermediate resolution spectroscopy / photometry	Near-rural or rural locations with telescopes in the 50-cm class for amateurs or 1-m for academic work.
2	E3	Infrared spectroscopy, imaging, photometry; high-resolution optical spectroscopy of brighter stars	Urban, suburban and town locations with telescopes in the 50-cm class for amateurs or 1-m for academic work.
1	E3	Casual viewing, eye inspection	Suburban and town residential and recreational environments
0	E4	No astronomical activity	Central urban, recreational, motorway or industrial zone

- 2.5.42 The suburban areas of Cambridge adjacent to the Application Site are assessed as areas of medium district brightness, lighting environmental zone E3.
- 2.5.43 The areas through which motorway and roadways bounding the Application Site cut through to the North and West / South-west to be areas are of low district brightness, lighting environmental zone E2.
- 2.5.44 The Green Belt provision outside the Application Site extending south of the M11 is assessed as intrinsically dark, lighting environmental zone E1. The Green Belt outside the Application Site does not influence the district brightness within the Application Site.
- 2.5.45 The M11 / A14 roundabout at the Western boundary is assessed as an area of low district brightness, lighting environmental zone E2. Note that the existing column height and nature of lighting for this type of junction increases noticeable effects to residential and non-residential receptors including conspicuity and glare.
- 2.5.46 The Green Belt provision within the Application Site boundary is assessed as an area of low district brightness, lighting environmental zone E2
- 2.5.47 Boundary lighting conditions between the motorways and city of Cambridge, lighting environmental zones E2 and E3, respectively, form the local area lighting condition extents.
- 2.5.48 The neighbouring villages and towns (Girton, Coton, Madingley) are assessed as areas of low district brightness, lighting environmental zone E2.
- 2.5.49 The Cambridge Observatory is assessed as generally of Group 3 (Table 6.9); current existing lighting conditions and proximity to the city of Cambridge may consider an overlapping inclusion into Group 2. This implies that the observatory and environs to be an area of low district brightness, lighting environmental zone E2.
- 2.5.50 The Mullard Radio Astronomical Observatory is generally assessed as Group 2 (Table 6.9), but within the classification of Group 3 in relation to its optical telescope for low brightness observations. This implies that the observatory and environs to be an area of low district brightness, lighting environmental zone E2.
- 2.5.51 Guidance documentation recommends that in cases where an area lies between two boundaries, the more rigorous zone is to be employed.
- 2.5.52 The Application Site is classified as environmental zone E2. The following criteria are applied to the Environmental requirements and recommended / good practice lighting performance section.

Proposed Development

Description of the post-construction Proposed Development

- 2.5.53 The development assessed as the Proposed Development as outlined within Chapter 2.
- 2.5.54 The topography of the Application Site and surrounding land will remain reasonably flat, with minor sloping toward Wash Pit Brook.
- 2.5.55 Existing historic landscape features will be retained.
- 2.5.56 A North – South portion of the Application Site will be set aside to remain undeveloped Green Belt. This area has been observed to contain badger setts and evidence of commuting by bats, otters and water voles.
- 2.5.57 The Western edge of the Application Site bordering the M11 is also retained as Green Belt and will remain as open land, creating an additional buffer between the Green Belt to the West of the M11 and more heavily populated areas such as Cambridge or Girton, with portions designated for habitat, arable farm land and recreational use.

- 2.5.58 Proposed residential buildings will abut existing residential buildings, back garden to back garden. The Proposed Development will create long back gardens at a distance of 20m minimum to create an additional buffering zone.
- 2.5.59 The majority of new buildings that will be introduced range from maximum building heights of 10-15m. A limited number of buildings in specific areas may have heights up to 18-25m.
- 2.5.60 Tree plantings generally line all boundaries of the Application Site.
- 2.5.61 Ponds, scattered woodland and plantation on-and off-site create small pockets where some sensitive ecological receptors have been identified, i.e. badger setts, bat commuter paths and vole habitat.
- 2.5.62 Grass sport pitch areas will not be lit.

2017 Lighting Condition

- 2.5.63 New lighting installation is required as part of the Local Centre and residential development for safe access / egress and space use during the hours of darkness.
- 2.5.64 Sport provisions will not be developed until after the first phase completion.

2026 Post-Construction Lighting Condition

- 2.5.65 New lighting installation is required along open roads within development areas and the local centre for safe access / egress and space use during the hours of darkness.
- 2.5.66 Lighting of non-grass sport pitch areas within the Application Site to the South, West of the Park & Ride, may be included.

Proposed Lighting Typologies Design Characteristics

- 2.5.67 The following lighting typologies are capable of satisfying the lighting performance requirements and are anticipated across the Proposed Development.

Car park / Access roads lighting

- 2.5.68 The use of streetlight style full horizontal cut-off luminaires installed at 0° tilt with flat glass lenses, back reflectors and internal baffles designed to limit views of the lamp and glare and direct light in a controlled pattern. This will help to reduce potential glare, sky glow, light spill and minimise visual intrusion to sensitive receptors. Column height will be kept within the range of 4m to 6m maximum in most cases.

Pedestrian and cycle route lighting

- 2.5.69 The use of streetlight style or decorative post top luminaires with full horizontal cut-off luminaires installed at 0° tilt with flat glass lenses, back reflectors and internal baffles designed to limit views of the lamp and glare and direct light in a controlled pattern. Where columns are likely to be visible to adjacent sensitive receptors, the use of shielding may be appropriate. This will help to reduce potential glare, sky glow, light spill and minimise visual intrusion to sensitive receptors. Column height will be kept within the range of 4m to 6m maximum in most cases. Alternatively, or in combination with the above, full horizontal cut-off luminaires, light poles and/or bollards may be utilised providing they are appropriately aimed and shielded.

Landscape lighting, functional

- 2.5.70 The use of streetlight style or decorative post top luminaires with full horizontal cut-off luminaires installed at 0° tilt with flat glass lenses, back reflectors and internal baffles designed to limit views of the lamp and glare and direct light in a controlled pattern. Where columns are likely to be visible to adjacent sensitive receptors, the use of shielding may be appropriate. This will help to reduce potential glare, sky glow, light spill and minimise visual intrusion to sensitive receptors. Column height will be kept within the range of 4m to 6m maximum in most cases. Alternatively, or in combination with the above, full horizontal cut-off

light poles, bollards and low level lighting in the form of LED strips and light scoops may be utilised providing they are appropriately aimed and shielded.

Landscape lighting, aesthetic

- 2.5.71 Specific aesthetic / decorative landscape lighting strategies / typologies designed cohesively with the architecture and landscape architecture of buildings and their context. Aesthetic landscape lighting is intended to ensure only immediate landscape feature elements are illuminated, avoiding adverse lighting effects.

Building lighting, aesthetic

- 2.5.72 Specific aesthetic / decorative building lighting strategies / typologies designed cohesively with the architecture and landscape architecture of buildings and their context. Aesthetic building lighting is intended to ensure only immediate feature building elements are illuminated, avoiding adverse lighting effects.

Building lighting, perimeter

- 2.5.73 The use of decorative wall mounted luminaires with full horizontal cut-off luminaires installed at 0° tilt with back reflectors and internal baffles designed to limit views of the lamp and glare and direct light in a controlled pattern. This will help to reduce potential glare, sky glow, light spill and minimise visual intrusion to sensitive receptors. Mounting height should be kept to a minimum. Alternatively, or in combination with the above, full horizontal cut-off light poles, bollards and low level lighting in the form of LED strips and light scoops may be utilised providing they are appropriately aimed and shielded.

Sports pitch flood lighting

- 2.5.74 The use of specialised sports floodlighting projects with full horizontal cut-off sports lighting luminaires installed at as near to 0° tilt as is practicable, with flat glass lenses, back reflectors and internal baffles designed to limit glare, house the lamp within the luminaire and direct the beam into a controlled pattern. Where columns are likely to be visible to adjacent sensitive receptors, the use of shielding may be appropriate. This will help to reduce potential glare, sky glow, light spill and minimise visual intrusion to sensitive receptors. Column height will be kept within a comparable range to other column mounted lighting of 6m to 8m maximum.

Private residential lighting, ad hoc

- 2.5.75 Functional and decorative lighting on private residential properties, post sale or lease, is not under the direct authority of the University and will be difficult to control unless restrictions are specified within lease contracts and property deeds. It is recommended that lighting on private residential properties is required to adhere to requirements made within the exterior Design Guidelines expected to be conditioned as part of this application and recommendations listed in the Clean Neighbourhoods and Environment Act, 2005.

Proposed Lamps

- 2.5.76 New generation LED, metal halide (MH) or hybrid (CosmoPolis) lamps, or lamps with similar characteristics, will be used for new external lighting. Lamp wattages will achieve required light levels without over-lighting.

Avoiding, reducing and managing any effects through required lighting performance characteristics

General measures

- 2.5.77 Adopt a daylight only construction schedule to minimise adverse lighting effects as different phases are complete. It is unavoidable that construction phase may require work during the hours of darkness in consideration of shorter daylight availability during winter months.
- 2.5.78 Mitigation techniques will be employed during the construction period through the Construction and Environmental Management Plan which will limit night time working, stipulate working hours, and ensure the careful siting of construction compounds away from the most sensitive visual receptors.
- 2.5.79 Obtrusive lighting at the residential boundary should be avoided where lighting is not required for the purposes of function and safety. Should obtrusive light contribution from public realm lighting be unavoidable, an appropriate selection of lighting equipment is required to minimise potential effects.
- 2.5.80 Residential lighting has potential to contribute visible lighting to views from existing residential properties. Existing distances between the existing properties and Application Site boundary line, in combination with a minimum 20m back garden design for proposed residential properties and the requirement for new installations to adhere to Exterior Design Guidelines and best practice by deed reduces potential contribution to obtrusive light. A 0 lux light level requirement at the residential boundary resulting from a proposed residential lighting installation is beneficial to control installations which may be desired in close proximity to the property line.
- 2.5.81 Lighting applications are not required throughout all hours of darkness. Lighting equipment with the capability of dimming is to be used, or lighting is to be switched off, in accordance with good practice guidance.
- 2.5.82 In areas where lighting is required throughout the night, utilise equipment with the capability of dimming for times when the Cambridge Observatory is participating in public observation nights or there is planned observation by the University Astronomical Society.
- 2.5.83 Leave the sport pitch areas that fall within areas of open land identified as 1, 2 and 3 on Parameter Plan 02, and, where practicable for sport pitch areas throughout the Application Site, free of lighting to reduce or remove potential contributions to glare, sky glow, light spill and visual intrusion.

Environmental requirements and good practice lighting performance

- 2.5.84 This assessment derives the following environmental lighting performance criteria from the available development information and good practice guidance for new lighting installed as part of the Proposed Development.

Light spill limit

- 2.5.85 Relevant guidance document - CIE 150:2003 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations
- 2.5.86 Light spill beyond the Application Site to surrounding windows and land should not exceed 5 lux prior to 23.00 and 1 lux after.

Sky glow limit

- 2.5.87 Relevant guidance document - CIE 150:2003 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations
- 2.5.88 The maximum percentage of direct upward light from a new installation should not exceed 2.5%

Luminaire Conspicuity and Glare

- 2.5.89 Relevant guidance document - CIE 150:2003 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations

- 2.5.90 A new installation should have no light sources mounted in a potentially intrusive direction that exceed 7.5 kcd prior to 23.00 and 0.5 kcd after, as viewed from the potentially intrusive direction, during the hours of darkness.

Light Colour and Spectral Composition

- 2.5.91 It is desirable for light quality, safety and wildlife effect limitation purposes to use new generation high pressure discharge lamps. New generation metal halide and metal halide / high pressure sodium hybrid lamps, such as the CosmoPolis, present good working efficacy, a smaller light emitting area which is good for light control and spectral compositions which are less disturbing to nocturnal wildlife than UV rich sources such as high pressure mercury discharge lamps.

- 2.5.92 In areas that are close to astronomical optical telescopes, the use of low pressure sodium lamp (SOX) are typically recommended and desired for screening. The proximity of the Cambridge Observatory and Mullard Radio Astronomical Observatory to the city of Cambridge as well as Mullard's primary use of radio telescope equipment allow the flexibility of other lamp types.

Technical requirements and good practice lighting conditions

- 2.5.93 This assessment derives the following technical lighting performance criteria, from the available development information and good practice guidance, for the following lighting application areas:

Maximum light level requirements for car parks with heavy traffic

- 2.5.94 Relevant guidance document - BS EN 13201-2:2003, BS 5489-1:2003 – School car parks. If traffic volume is confirmed as low, maximum light level requirements for car parks with medium traffic may be applied.

BS EN 13201-2:2003, BS 5489-1:2003 School Car Park Lighting Performance Requirements

Average horizontal illuminance of the principal area (E)	20 lux
Average uniformity (Uo min)	0.25 minimum

Maximum light level requirements for car parks with medium traffic

- 2.5.95 Relevant guidance document - BS EN 13201-2:2003, BS 5489-1:2003 – Office and commercial car parks

BS EN 13201-2:2003, BS 5489-1:2003 Car Park Lighting Performance Requirements

Average horizontal illuminance of the principal area (E)	10 lux
Average uniformity (Uo min)	0.25 minimum

Lighting level requirements for residential streets for

- 2.5.96 Relevant guidance document - BS EN 13201-2:2003, BS 5489-1:2003 Residential Street Lighting Performance Requirements.

CIBSE Lighting Guide 1 Lighting Performance Requirements

Average horizontal illuminance of the principal area (E)	7.5 lux
Average uniformity (Uo min)	0.20 minimum, 0.4 target

General lighting level requirements for traffic areas for vehicles (maximum 30 - 40mph)

- 2.5.97 Relevant guidance document - BS EN 13201-2:2003, BS 5489-1:2003 – Rural and Urban roadways
BS EN 13201-2:2003, BS 5489-1:2003 ME3 / ME4 Roadway Lighting Performance Requirements

Average horizontal illuminance of the principal area (E)	10 lux
Average uniformity (Uo min)	0.40

Maximum light level requirements for pedestrian and cycle routes sharing roads serving vehicles

- 2.5.98 Relevant guidance document - BS EN 13201-2:2003, BS 5489-1:2003 – Zone E2 combined surface
BS EN 13201-2:2003, BS 5489-1:2003 Pedestrian and Cycle Route Lighting Performance Requirements

Average horizontal illuminance of the principal area (E)	10 lux
Average uniformity (Uo min)	0.30 minimum

Maximum light level requirements for pedestrian and cycle routes

- 2.5.99 Relevant guidance document - BS EN 13201-2:2003, BS 5489-1:2003 – Separate Path Pedestrian and
Cycle Routes
BS EN 13201-2:2003, BS 5489-1:2003 Pedestrian and Cycle Route Lighting Performance Requirements

Average horizontal illuminance of the principal area (E)	5 lux
Average uniformity (Uo min)	0.30 minimum

Lighting level requirements for sports pitches

- 2.5.100 Relevant guidance document; CIBSE Lighting Guide 4 Sports Lighting, 2006 - Section, Football; BS EN
12193:1999
CIBSE Lighting Guide 4 Lighting Performance Requirements

Average horizontal illuminance of the principal area (E)	75 lux
Average uniformity (Uo min)	0.50

Lighting level requirements for gateways

- 2.5.101 Relevant guidance document, CIE Guide to the Lighting of Urban Areas – Section, Lighting Levels for
Urban Areas

- 2.5.102 Main entrances, or those that serve as designated gateways into the proposed North West Cambridge,
may have different lighting requirements to draw focus to these transition points. Maximum
recommended below.

Average horizontal illuminance of the principal area (E)	20 lux
Average uniformity (Uo min)	0.40

Likely Significant Construction Effects

- 2.5.103 The Proposed Development will, where practicable, include a daylight only construction schedule to minimise adverse lighting effects as different phases are complete. It is unavoidable that construction phase may require work during the hours of darkness in consideration of shorter daylight availability during winter months. Construction effects are transient, therefore limiting nighttime lighting impacts and lowering the effect rating.
- 2.5.104 Table 2.7 indicates the assessment of the cumulative effects that are likely to result from construction phase lighting provisions.
- Note that the non-permanent / temporary nature of this type of effect lowers the significance of effects by one level as derived from matrix tools.

Table 2.7 – Construction effects of the Proposed Development

Receptor	Sensitivity to Change	Magnitude of Change	Significance of Effect
Residential	High	Low - Medium	Moderate – Minor Adverse
Wildlife / Habitat	High	Low - Medium	Moderate – Minor Adverse
Observatories	High	Low - Medium	Moderate – Minor Adverse

Likely Significant Cumulative Effects

- 2.5.105 Tables 2.8 – 2.10 indicate the assessment of the cumulative effects that are likely to result from the required lighting provisions on the identified sensitive receptors, based on an understanding of the general lighting typologies, strategy and approach as set out above.

Table 2.8– Likely significant effects on identified existing residential receptors

Receptor	Lighting Typology	Effect Type	Sensitivity to Change	2017			2026			Change in Effect between 2012 Lighting Assessment and S73 Lighting Assessment
				Magnitude of Change	In line with good practice guidance (yes/no)	Significance of Effects	Magnitude of Change	In line with good practice guidance (yes/no)	Significance of Effects	
Residential properties around the Application Site	Above Ground Car Parks	Light spill	High	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Access Roads	Sky glow	Medium	Low	Yes	Moderate -Minor Adverse	Low	Yes	Moderate -Minor Adverse	No Change in Effect
	Pedestrian and Cycle Routes	Luminaire conspicuity and glare mitigation	Medium - High	Low	Yes	Moderate -Minor Adverse	Low	Yes	Moderate -Minor Adverse	No Change in Effect
	Building, perimeter	Light levels and illuminances	Medium-High	Low	Yes	Moderate -Minor Adverse	Low	Yes	Moderate -Minor Adverse	No Change in Effect
	Landscape, functional	Light colour and spectral composition	Medium	Low	Yes	Moderate - Minor Adverse	Low	Yes	Moderate - Minor Adverse	No Change in Effect
	Building, aesthetic	Light spill	Subjective receptive response and requires further design developme	Low	Possible	Moderate – Minor Adverse	Low	Possible	Moderate – Minor Adverse	No Change in Effect
				Low	Possible	Minor Adverse	Low	Possible	Minor Adverse	No Change in Effect
		Landscape, aesthetic	Luminaire conspicuity and		Low	Possible	Moderate – Minor Adverse	Low	Possible	Moderate – Minor Adverse

	glare mitigation	nt to quantify							
	Light levels and illuminances		Low	Possible	Minor Adverse	Low	Possible	Minor Adverse	No Change in Effect
	Light colour and spectral composition		Low	Possible	Minor Adverse	Low	Possible	Minor Adverse	No Change in Effect
Sports Pitch (non-grass)	Light spill	High	Negligible	Yes	Negligible	Negligible	Yes	Negligible	No Change in Effect
	Sky glow	Medium	Negligible	Yes	Negligible	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Luminaire conspicuity and glare mitigation	Medium - High	Negligible	Yes	Negligible	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Light levels and illuminances	Medium - High	Negligible	Yes	Negligible	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Light colour and spectral composition	Medium	Negligible	Yes	Negligible	Low	Yes	Moderate – Minor Adverse	No Change in Effect
Private Residential	Light spill	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Sky glow	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Luminaire conspicuity and glare mitigation	Medium-High	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Light levels and illuminances	Medium-High	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect

		Light colour and spectral composition	Medium	Low	Yes	Moderate – Minor Adverse	Low h	Yes	Moderate – Minor Adverse	No Change in Effect

Table 2.9 –Likely significant effects identified wildlife and habitat receptors

Receptor	Lighting Typology	Effect Type	Sensitivity to Change	2017			2026			Change in Effect between 2012 Lighting Assessment and S73 Lighting Assessment
				Magnitude of Change	In line with good practice guidance (yes/no)	Significance of Effects	Magnitude of Change	In line with good practice guidance (yes/no)	Significance of Effects	
Wildlife and Habitat Receptors	Above Ground Car Parks	Light spill	High	Low	Yes	Moderate Adverse	Medium - Low	Yes	Major - Moderate Adverse	No Change in Effect
	Access Roads	Sky glow	Medium-High	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Pedestrian and Cycle Routes	Luminaire conspicuity and glare mitigation	Medium-High	Low	Yes	Moderate – Minor Adverse	Medium – Low	Yes	Moderate Adverse	No Change in Effect
	Building, perimeter	Light levels and illuminances	High	Low	Yes	Moderate Adverse	Low	Yes	Moderate Adverse	No Change in Effect
	Landscape, functional	Light colour and spectral composition	Medium	Low	Yes	Moderate – Minor Adverse	Medium – Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Building, aesthetic	Light spill	High	Low	Yes	Moderate Adverse	Low	Yes	Moderate Adverse	No Change in Effect

	Landscape, aesthetic	Sky glow	Medium - High	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Luminaire conspicuity and glare mitigation	Medium-High	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Light levels and illuminances	High	Low	Yes	Moderate Adverse	Low	Yes	Moderate Adverse	No Change in Effect
		Light colour and spectral composition	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Sports Pitch (non-grass)	Light Spill	High	Negligible	Yes	Negligible	Low	Yes	Moderate Adverse	No Change in Effect
		Sky glow	Medium-High	Negligible	Yes	Negligible	Medium - Low	Yes	Moderate Adverse	No Change in Effect
		Luminaire conspicuity and glare mitigation	Medium-High	Negligible	Yes	Negligible	Medium – Low	Yes	Moderate Adverse	No Change in Effect
		Light levels and illuminances	High	Negligible	Yes	Negligible	Low	Yes	Moderate Adverse	No Change in Effect
		Light colour and spectral composition	Medium	Negligible	Yes	Negligible	Medium – Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Private Residential	Light spill	High	Low	Yes	Moderate Adverse	Medium - Low	Yes	Major - Moderate Adverse	No Change in Effect
		Sky glow	Medium - High	Low	Yes	Moderate – Minor Adverse	Medium - Low	Yes	Moderate Adverse	No Change in Effect
		Luminaire conspicuity and	Medium - High	Low	Yes	Moderate – Minor Adverse	Medium – Low	Yes	Moderate Adverse	No Change in Effect

	glare mitigation									
	Light levels and illuminances	High	Low	Yes	Moderate Adverse	Medium – Low	Yes	Major - Moderate Adverse	No Change in Effect	
	Light colour and spectral composition	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect	

Table 2.10 – Likely significant effects on non-residential receptors, Local Observatories

Receptor	Lighting Typology	Effect Type	Sensitivity to Change	2017			2026			Change in Effect between 2012 Lighting Assessment and S73 Lighting Assessment
				Magnitude of Change	In line with good practice guidance (yes/no)	Significance of Effects	Magnitude of Change	In line with good practice guidance (yes/no)	Significance of Effects	
Local Observatories: Mullard Radio Astronomical and Cambridge	Above Ground Car Parks	Light spill	Medium	Negligible	Yes	Negligible	Negligible	Yes	Negligible	No Change in Effect
	Access Roads	Sky glow	High	Low	Yes	Moderate Adverse	Low	Yes	Moderate Adverse	No Change in Effect
	Pedestrian and Cycle Route	Luminaire conspicuity and glare mitigation	Medium	Negligible	Yes	Negligible	Negligible	Yes	Negligible	No Change in Effect
	Building, perimeter	Light levels and illuminances	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
	Landscape, functional	Light colour and spectral composition	High	Low	Yes	Moderate Adverse	Low	Yes	Moderate Adverse	No Change in Effect

	Building, aesthetic	Light spill	Medium	Negligible	Yes	Negligible	Negligible	Yes	Negligible	No Change in Effect
		Sky glow	High	Low	Yes	Moderate Adverse	Medium – Low	Yes	Major - Moderate Adverse	No Change in Effect
	Landscape, aesthetic	Luminaire conspicuity and glare mitigation	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Light levels and illuminances	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Light colour and spectral composition	High	Low	Yes	Moderate Adverse	Medium - Low	Yes	Major - Moderate Adverse	No Change in Effect
	Sports Pitch (non-grass)	Light spill	Medium	Negligible	Yes	Negligible	Negligible	Yes	Negligible	No Change in Effect
		Sky glow	High	Negligible	Yes	Negligible	Low	Yes	Moderate Adverse	No Change in Effect
		Luminaire conspicuity and glare mitigation	Medium	Negligible	Yes	Negligible	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Light levels and illuminances	Medium	Negligible	Yes	Negligible	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Light colour and spectral composition	High	Negligible	Yes	Negligible	Low	Yes	Moderate Adverse	No Change in Effect
	Private Residential	Light spill	Medium	Negligible	Yes	Negligible	Negligible	Yes	Negligible	No Change in Effect
		Sky glow	High	Low	Yes	Moderate Adverse	Medium - Low	Yes	Major - Moderate Adverse	No Change in Effect

		Luminaire conspicuity and glare mitigation	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Light levels and illuminances	Medium	Low	Yes	Moderate – Minor Adverse	Low	Yes	Moderate – Minor Adverse	No Change in Effect
		Light colour and spectral composition	High	Low	Yes	Moderate Adverse	Medium – Low	Yes	Major - Moderate Adverse	No Change in Effect

2.6 Overall effects of lighting provision on receptors within the Proposed Development

2.6.1 Table 2.11 indicates the assessment of the cumulative effects that result from the required lighting provisions at local, regional and national levels.

Table 2.11– Overall effects of the Proposed Development

Scale	Sensitivity to Change	2017		2026	
		Magnitude of Change	Significance of Impacts	Magnitude of Change	Significance of Impacts
Local	Medium - Low	Low	Minor - Moderate Adverse	Medium	Minor - Moderate Adverse
Regional	Low	Negligible	Negligible	Negligible	Negligible
National	Negligible	Negligible	Negligible	Negligible	Negligible

2.6.2 Note that sensitivity to change at the local level is combined from the likely small scale effects to residential, wildlife and habitat, and non-residential receptors.

2.7 Summary and Conclusions

2.7.1 Legislation and good practice guidance indicates the Proposed Development requires new exterior lighting for purposes of vehicular and pedestrian safety and development function.

2.7.2 The Proposed Development design intent indicates and warrants additional new decorative exterior lighting for the purposes of enhancement and continuity of character areas.

2.7.3 The assessment of the likely significant effects from new lighting indicates effective management of required lighting provisions can be achieved in this context.

Construction Phase

2.7.4 Likely significant lighting effects from construction phase are non-permanent and temporary in nature.

2.7.5 Construction effects are considered generally moderate - minor adverse to all identified receptors.

2017

2.7.6 With regard to existing streetlighting along Huntingdon Road, Madingley Road the M11 and Storey's Way, no significant increase of effect as the result of new access roads is likely.

2.7.7 The analysis indicates the likely significant effects from new lighting for the first phase of the Proposed Development on the majority of sensitive residential receptors would be moderate to minor adverse.

2.7.8 The analysis indicates the likely significant effects from new lighting for the first phase of the Proposed Development on the majority of wildlife and habitat receptors would be moderate - minor adverse. This effect will generally be realised where habitat and commuting areas are located and would not apply to the full Application Site.

2.7.9 The analysis indicates the likely significant effects from new lighting for the first phase of the Proposed Development on the local observatories would be negligible.

2026

- 2.7.10 The analysis indicates the likely significant effects from new lighting for the post-construction phase for the Proposed Development on the majority of sensitive residential receptors would be moderate to minor adverse.
- 2.7.11 The analysis indicates the likely significant effects from new lighting for the Proposed Development on the majority of wildlife and habitat receptors would be moderate adverse. This effect will be realised where habitat and commuting areas are located and would not apply to the full Application Site. Relocation of habitat to non-constructed zones and avoidance of lighting along verified commuting paths may further reduce the relative effect of the Application Site to minor adverse.
- 2.7.12 The analysis indicates the likely significant effects from new lighting for the Proposed Development on the local observatories would be moderate to minor adverse. In the context of the potential effect to the optical telescopes used by the observatories, which could be affected by any lighting within a 30-40 mile radius and are currently affected by existing lighting conditions, the relative effect is expected to be negligible.
- 2.7.13 With regard to works along Huntingdon Road, Madingley Road the M11 and Storey's Way, allowing for existing street lighting, there would be no significant difference from the existing situation and no material night-time effects.
- 2.7.14 The analysis indicates the likely significant effects from new lighting for the Proposed Development on identified sensitive local receptors around the Application Site varies due to size and content.

Cumulative Effects

- 2.7.15 The analysis indicates the cumulative effect of the required lighting provisions for the Proposed Development is minor – moderate adverse and is local to the Application Site, having a negligible effect at regional and national levels.
- 2.7.16 Views from the residential boundary incorporate light from Madingley Road, the M11 and the Park and Ride which form part of the visual night-scape. Lighting from Huntingdon Road and Storey's Way is not directly visible from the residential boundary but does contribute to the area effect sky glow. New lighting is likely to increase the instances of light that may be seen but do not introduce new light into an intrinsically dark view.
- 2.7.17 The assessment of overall likely significant effects from new lighting for the Proposed Development in conjunction with existing and consented development, with consideration of site layout, indicates sky glow as having the most variable potential effect to identified receptors.
- 2.7.18 The assessment of the overall effects that would result from new lighting for the Proposed Development would satisfy technical and environmental good practice guidance and be considered minor – moderate adverse.

Summary

- 2.7.19 The effects of artificial lighting are addressed in the same way as the Landscape, Townscape and Visual Environment effects are assessed, by identifying a baseline lighting condition, identifying and assessing the sensitivity of receptors, identifying required lighting provisions for the Proposed Development and assessing and benchmarking the baseline to cumulative lighting condition variance, of the Construction phase and at 2017 and 2026.
- 2.7.20 The analysis indicates the likely significant effects from new lighting for the first phase of the Proposed Development (2017) (taking account of construction and operational effects associated with the Proposed Development and both of these effects cumulatively with the effects of the NIAB and West

- Cambridge developments so far as under construction and/or in operation) on the majority of sensitive residential receptors would be moderate to minor adverse.
- 2.7.21 The analysis indicates the likely significant effects from new lighting for the post-construction phase for the Proposed Development (taking account of the effects of the Proposed Development and those of the NIAB and West Cambridge developments) on the majority of sensitive residential receptors would be moderate to minor adverse.
- 2.7.22 The analysis indicates the likely significant effects from new lighting for the Proposed Development on the majority of wildlife and habitat receptors would be moderate adverse. This effect will be realised where habitat and commuting areas are located and would not apply to the full Application Site. Relocation of habitat to non-constructed zones and avoidance of lighting along verified commuting paths may further reduce the relative effect of the Application Site to minor adverse.
- 2.7.23 The analysis indicates the likely significant effects from new lighting for the Proposed Development on the local observatories would be moderate to minor adverse. In the context of the potential effect to the optical telescopes used by the observatories, which could be affected by any lighting within a 30-40 mile radius and are currently affected by existing lighting conditions, the relative effect is expected to be negligible.
- 2.7.24 The analysis indicates the cumulative effect of the required lighting provisions for the Proposed Development is minor – moderate adverse and is local to the Application Site, having a negligible effect at regional and national levels.
- 2.7.25 The assessment of overall likely significant effects from new lighting for the Proposed Development in conjunction with existing and consented development, with consideration of site layout, indicates sky glow as having the most variable potential effect to identified receptors.
- 2.7.26 The assessment of the overall effects that would result from new lighting for the Proposed Development would satisfy technical and environmental good practice guidance and be considered minor – moderate adverse.