

Chapter 11: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare

Daylight, Sunlight, Overshadowing, Light Pollution & Solar Glare	
AUTHOR	EB7
SUPPORTING APPENDIX	ES Volume 3, Appendix: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare: Annex 1: Policy and Guidance Annex 2: Drawings of the Baseline Condition and Development Scenario; Annex 3: Detailed Results of the Daylight (VSC, NSC and ADF) and Sunlight (APSH) Analysis; Annex 4: Results of the Overshadowing (Sunlight Amenity) Analysis; Annex 5: Transient Overshadowing Images; Annex 6: Detailed Light Pollution Analysis; and Annex 7: Detailed Solar Glare Analysis.
KEY CONSIDERATIONS	This chapter outlines the methodologies applied to identify and assess the baseline conditions at the site and of its surrounds, the potential daylight, sunlight, overshadowing, solar glare and light pollution impacts and effects to sensitive receptors; and the likely residual daylight, sunlight, overshadowing, solar glare and light spillage impacts and effects associated with the Proposed Development. Mitigation is set out as necessary and the residual likely significant effects are identified. The potential daylight, sunlight, overshadowing, solar glare and light spillage impacts, and effects associated with the Proposed Development are as follows: <ul style="list-style-type: none"> • Changes to the daylight and sunlight amenity within surrounding residential properties identified which have a reasonable expectation to natural light throughout the demolition and construction works and once the Proposed Development is operational; • Changes to overshadowing of surrounding outdoor amenity spaces throughout the demolition and construction works and once the Proposed Development is operational; • The potential for solar glare effects to sensitive viewpoints surrounding the site, particularly road users once the Proposed Development is complete; and • The potential for light pollution effects to sensitive receptors.
CONSULTATION	The EIA Scoping Report and Scoping Opinion received from WBC is presented in ES Volume 3, Appendix: EIA Methodology . Woking Borough Council (WBC) had no comments regards daylight, sunlight, overshadowing, light pollution and solar glare.

ASSESSMENT METHODOLOGY

Defining the Baseline

Current Baseline Conditions

11.1 The baseline is currently occupied by a football stadium (Woking Football Club); a collection of large-footprint, low-rise buildings, including the Woking Snooker Centre; David Lloyd Leisure Centre (including tennis courts), Woking Gymnastics Club; car parking; and a small number of residential properties (81 Westfield Avenue, Hoe View, Park View and 1-6 Kingfield Road) situated in the north of the site. The baseline analysis is shown in **ES Volume 3, Appendix: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare (Annex 2)**.

11.2 The assessment has been undertaken via the creation of a digital three dimensional model of the site and surroundings, based on measured survey. This will be referred to in this chapter as the ‘baseline scenario’. Where survey data was not available, building dimensions and window locations have been determined using Ordnance Survey (OS) data and site photographs.

11.3 As set out in the EIA Scoping Report (presented in **ES Volume 3, Appendix: EIA Methodology (Annex 3)**), internal daylight and sunlight of the residential units within the Proposed Development is considered a design issue and is not considered within this ES. The internal daylight and sunlight is presented in a standalone report which accompanies the planning application.

Daylight and Sunlight

11.4 The assessment of daylight and sunlight considers the surrounding residential receptors in proximity to the Proposed Development that have windows facing the site (Figure 11.1). Professional judgment has been applied in order to take a sensible approach to distance within which surrounding receptors are included within the assessment. These receptors were agreed with WBC as part of EIA Scoping. The full list of properties included is as follows:

- Elm View, Kingfield Road;
- 53 Westfield Avenue;

- The Dell, Kingfield Road;
- Cotswolds, Kingfield Road;
- Chinthurst, Kingfield Road;
- 9-12 Kingfield Road;
- Pond House, Kingfield Green;
- Kingfield Cottage, Kingfield Green;
- The Cedars, Kingfield Green;
- Nut Cottage, Kingfield Green;
- Penlan, Kingfield Green;
- 67 Granville Road;
- 1 Westfield Grove;
- 2 Westfield Grove;
- 3 Westfield Grove;
- 4 Westfield Grove;
- 50 Westfield Avenue;
- 51 Westfield Avenue;
- 52 Westfield Avenue;
- 52A Westfield Avenue;
- 54 Westfield Avenue;
- 55 Westfield Avenue;
- 56 Westfield Avenue;
- 57 Westfield Avenue;
- 58 Westfield Avenue;
- 59 Westfield Avenue;
- 60 Westfield Avenue;
- 61 Westfield Avenue;
- 62 Westfield Avenue;
- 63 Westfield Avenue;
- 63A Westfield Avenue;
- 64 Westfield Avenue;
- 66 Westfield Avenue;
- Ash House, Acer Grove;
- Hornbeam House, Acer Grove;
- Beech House, Sycamore Avenue; and
- Hazel House, Sycamore Avenue.

11.5 It should be noted that the existing property named Penlan to the east of the site currently holds a planning consent to demolish the single dwelling bungalow and construct two separate houses. At the time of writing, this consent has not been implemented. However, there is the possibility that this scheme will be implemented in the future. Therefore, to understand the effects on both scenarios, an assessment has been undertaken on both the existing and consented scenario within the main assessment. As this study is based on the environmental impacts to the existing scenario, significance has only been applied to the existing scenario.

11.6 As described in the BRE Guidelines¹, commercial buildings are deemed less sensitive and as such are not considered relevant for assessment. This is because they are generally designed to rely on electric lighting to provide a consistent and reliable source of light by which to work, rather than natural daylight or sunlight which vary greatly.

¹ Building Research Establishment, 2011. Site Layout Planning for Daylight and Sunlight – A guide to good practice.

Figure 11.1 Location of the Existing Residential Receptors Assessed

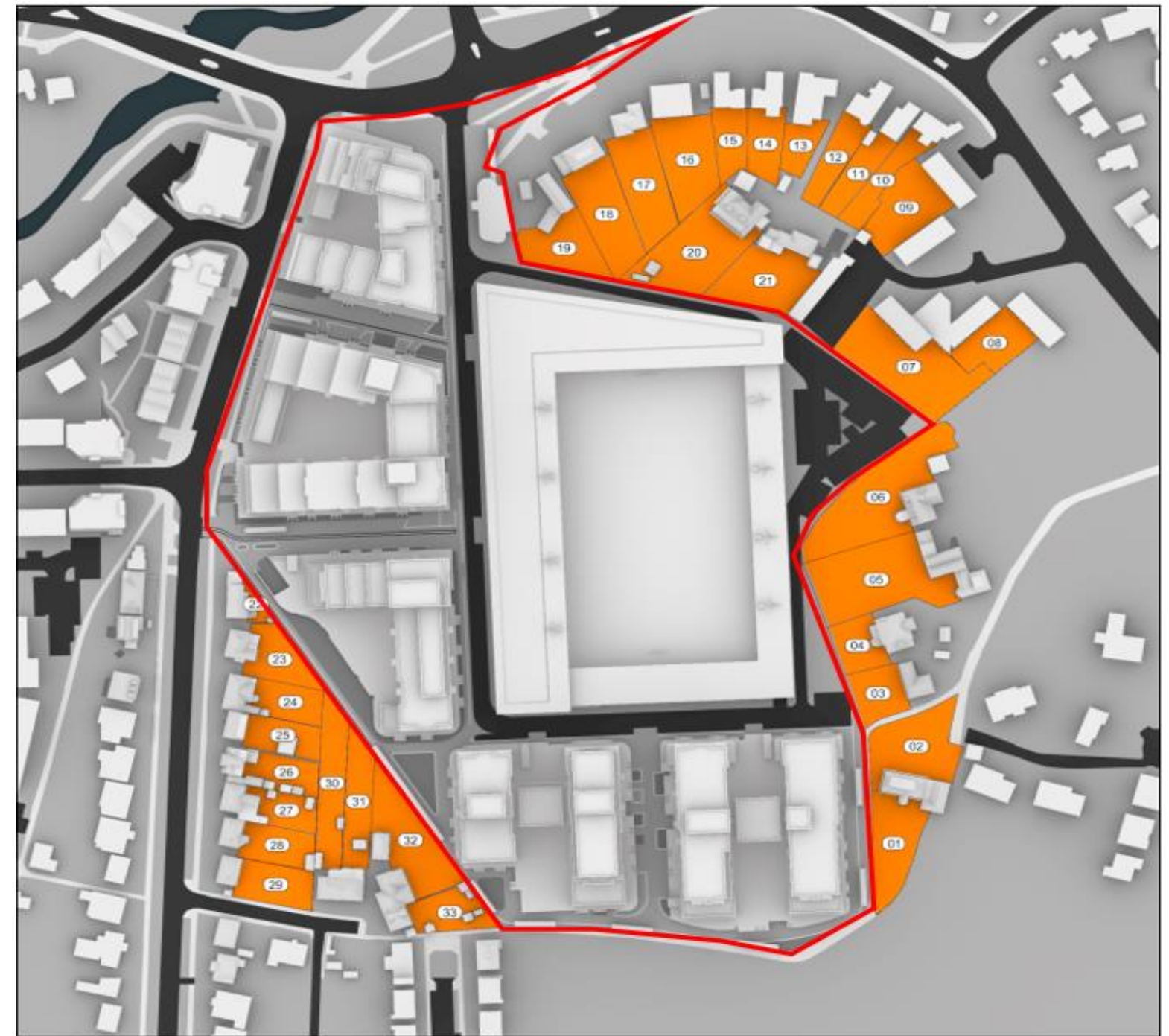


Overshadowing

11.7 Amenity spaces in proximity to south, east or west of the proposed massing (with the potential to be impacted) are listed below and shown in Figure 11.2.

- Relevant gardens serving properties on Westfield Avenue (labelled as 22-29 in Figure 11.2);
- Relevant gardens serving properties on Westfield Grove (labelled as 30-33 in Figure 11.2);
- Relevant gardens serving properties on Kingfield Green (labelled as 01-06 in Figure 11.2);
- Relevant gardens serving properties on Kingfield Drive (labelled as 07-08 & 20-21 in Figure 11.2); and
- Relevant gardens serving properties on Kingfield Road (labelled as 09-19 in Figure 11.2).

Figure 11.2 Location of the Proposed Scenario and Surrounding Amenity Spaces



Light Pollution

11.8 Existing residential properties in proximity to the proposed stadium will be relevant to the light pollution assessment. The assessment is likely to include the following sensitive receptors:

- Relevant neighbouring properties on Kingfield Road (running along the northern boundary of the site);
- Relevant neighbouring properties on Kingfield Drive (located to the east of the site); and
- Relevant neighbouring properties on Kingfield Close (located to the east of the site).

Solar Glare

11.9 The sensitive receptors considered with regard to reflected solar glare effects are drivers of vehicles and cyclists on roads surrounding the site. Viewpoints were selected as those where a driver faces the Proposed Development and may need to make a

decision; this being sensitive to an instance of distraction/disability glare. Generally, these viewpoints are at the affected traffic intersections or signal locations around the site.

11.10 Four key points have been selected and assessed shown in Figure 11.3. These viewpoints are as follows:

- V1 – Travelling east on A247, Kingfield Road;
- V2 – Travelling east on A247, Kingfield Road (multiple views due to signals);
- V3 – Travelling west on A247, Kingfield Road; and
- V4 – Travelling north on Westfield Avenue.

Figure 11.3 Location of Solar Glare Viewpoints



Likely Evolution of the Baseline Conditions

11.11 The evolution of the baseline will be considered using professional judgment informed by the results of the cumulative scenario. The cumulative scenario will provide information on the general changes, if any, in daylight, sunlight and overshadowing conditions around the site. This, in combination with knowledge of how the Proposed Development interacts with the surrounding area (by understanding the baseline conditions) and how the Proposed Development affects those conditions will be the basis of the assessment of this scenario.

Impact Assessment Methodology

Demolition and Construction

11.12 The level of effect in relation to daylight, sunlight and overshadowing for the identified sensitive receptors will vary throughout the demolition and construction phase, depending on the level of obstruction caused. The effect will almost certainly be less than that of the completed Proposed Development, given that the extent of permanent massing will decrease throughout the demolition phase and increase throughout the construction phase, until the buildings are complete. Therefore, a quantitative assessment of the demolition and construction phase is not required. A qualitative assessment of these effects has been provided.

11.13 Potential light pollution effects as a result of temporary lighting during the demolition and construction will vary throughout the process dependant on the task being undertaken. The contractors will follow the good practice guidance outlined in ILP guidelines and therefore a light pollution assessment during demolition and construction is not required as significant effects are unlikely.

11.14 Potential solar glare effects will not occur until the building's cladding is fixed and as such, the Proposed Development's solar glare effects will be reflective of the cladding whilst it is being constructed.

Completed Development

11.15 When comparing the size of existing massing against the Proposed Development, the effect in relation to daylight, sunlight and overshadowing for the identified sensitive receptors will cause reductions and as such the effects will be negligible or adverse.

11.16 At present, the existing buildings on site do not cause any noticeable solar glare and, as such, any solar glare effects will be negligible or adverse.

11.17 As there are currently floodlights serving the stadium, there is potential for beneficial, negligible and adverse effects in terms of light pollution.

Daylight Assessments

11.18 The BRE Guidelines provide three different methods for assessing daylight for existing residential accommodation: the Vertical Sky Component (VSC) method, No Sky Line Contour (NSC) method and the Average Daylight Factor (ADF) method. Each method is summarised in the following sections.

11.19 When reviewing the daylight results for each surrounding property in the first instance the VSC results are considered, looking at the daylight potential at the window face. This is the most basic daylight assessment and is considered in conjunction with the NSC to consider the daylight entering the rooms.

11.20 The levels of significance of effect to existing neighbouring properties is determined through VSC and NSC assessment. The ADF results have been provided as supplementary information only for existing neighbouring properties. These results have not been discussed or effect significance, but have been included to provide more information when this chapter is reviewed.

11.21 The ADF assessment may be used to assess the level of daylight within future receptors as a primary test for daylight, where enough information is known – for example the standalone internal daylight and sunlight assessment or a proposed unbuilt neighbour.

The Vertical Sky Component (VSC) Method

11.22 VSC is a quantified measurement of the amount of skylight falling on a vertical wall or window. This is the ratio of the direct sky luminance falling on a vertical wall at the reference point for the simultaneous horizontal illuminance under an unobstructed sky. The 'standard overcast sky' is used and the ratio is usually expressed as a percentage. The maximum value is almost 40% for a completely unobstructed vertical wall. The vertical sky component on a window can be related to the average daylight factor in a room.

No Sky Line Contour (NSC) Method

11.23 The NSC method is a measure of the distribution of daylight at the 'working plane' within a room. In residential properties, the 'working plane' means a horizontal 'desktop' plane 0.85 metres (m) in height. The NSC divides those areas of the working plane in a room which receive direct sky light through the windows from those areas of the working plane which cannot. If a significant area

of the working plane lies beyond the NSC (i.e. it receives no direct sky light), then the distribution of daylight in the room will be poor and supplementary electric lighting may be required.

11.24 The effect of daylight distribution in an existing building can be found by plotting the NSC in each of the main rooms. For residential properties, this will include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are considered less important due to their use.

The Average Daylight Factor (ADF) Method

11.25 The BRE Guidelines define ADF as:

“...a ratio of total daylight flux incident on a reference area to the total area of the reference area, expressed as a percentage of outdoor luminance on a horizontal plane, due to an unobstructed sky of assumed or known luminance distribution”.

11.26 The ADF method of assessment takes into account the diffuse visible transmittance of the glazing to the room in question (i.e. how much light gets through the window glass); the net glazed area of the window in question; the total area of the room surfaces (ceiling, walls, floor and windows); the proportion of window located above the working plane and the angle of visible sky reaching the window/windows in question. It also makes allowance for the average reflectance of the internal surfaces of the room and of external obstruction.

11.27 Due to the specific variables of the aforementioned, if these are unknown then the ADF test may not present an accurate representation of the situation. This data has been presented as supplementary information for existing surrounding receptors and may be used as a primary test when considering future receptors (where sufficient information is known).

11.28 It is only the visible sky angle element which is dependent upon external obstruction. It can be directly related both to the obstruction angle and to the VSC on the external window wall.

Sunlight Assessment

The Annual Probable Sunlight Hour (APSH) Method

11.29 With regard to sunlight, the same skylight indicator is used for the VSC test at the same reference point to calculate Annual Probable Sunlight Hours (APSH), which is expressed as a percentage.

11.30 The BRE Guidelines also note:

“Access to sunlight should be checked for the main window of each room which faces within 90 degrees (°) of due south”.

11.31 Therefore, any windows facing 90° of due north need not be analysed as they have no expectation of sunlight.

11.32 The properties with at least one window orientated towards 90° of due south include:

- Elm View, Kingfield Road;
- The Dell, Kingfield Road;
- Cotswolds, Kingfield Road;
- Chinthurst, Kingfield Road;
- 9-12 Kingfield Road;
- Pond House, Kingfield Green;
- Kingfield Cottage, Kingfield Green;
- The Cedars, Kingfield Green;
- Nut Cottage, Kingfield Green;
- Penlan, Kingfield Green;
- 1 Westfield Grove;
- 3 Westfield Grove;
- 4 Westfield Grove;
- 50 Westfield Avenue;
- 54 Westfield Avenue;
- 55 Westfield Avenue;
- 56 Westfield Avenue;
- 57 Westfield Avenue;
- 58 Westfield Avenue;
- 59 Westfield Avenue;
- 60 Westfield Avenue;
- 61 Westfield Avenue;
- 62 Westfield Avenue;
- 63 Westfield Avenue;
- 63A Westfield Avenue;
- 64 Westfield Avenue;
- 66 Westfield Avenue;
- Ash House, Acer Grove;

- 51 Westfield Avenue;
- 52 Westfield Avenue;
- 52A Westfield Avenue;
- 53 Westfield Avenue;
- Hornbeam House, Acer Grove;
- Beech House, Sycamore Avenue; and
- Hazel House, Sycamore Avenue.

Overshadowing Assessment

11.33 The BRE guidelines provide that the availability of sunlight should be checked for open spaces, such as gardens, public realm, play spaces etc. This test gauges the effect on the amenity for users of these spaces. This assessment considers the amount of the direct sunlight available, together with the effects of shading.

Sunlight Amenity Assessment

11.34 The sunlight amenity assessment calculates the proportion of an outside amenity area which receives at least 2 hours of direct sunlight. This is achieved by plotting a contour of the area which receives at least 2 hours of direct sunlight on the 21st March. An amenity space with at least 2 hours of sunlight across the majority of its area can be said to see acceptable levels of direct sun. Amenity areas surrounding the Proposed Development with the potential to see increased levels of shadow (those to the north) will be defined and assessed.

Transient Overshadowing

11.35 The BRE Guidelines suggest that where large buildings are proposed which may affect a number of gardens or open spaces, it is useful and illustrative to plot a shadow plan to show the location of shadows at different times of the day and year. This can be done by using the sun on the ground indicator in reverse. For the purpose of this assessment the overshadowing has been mapped for the following three key dates in the year:

- 21st March (Spring Equinox);
- 21st June (Summer Solstice); and
- 21st December (Winter Solstice).

11.36 For each of these dates, the overshadowing was calculated at hourly intervals throughout daylight hours. These images are presented within **ES Volume 3, Appendix: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare: Annex 5**. September 21st (Autumn Equinox) provides the similar overshadowing images as March 21st (Spring Equinox) as the sun follows a similar path at these corresponding times of year.

11.37 The indicators are calculated for different latitudes, Woking being 51.3° north. Clearly, southern orientation is critically important, as are the heights of the Proposed Development, existing buildings on the site and surrounding buildings.

Light Pollution

11.38 Light pollution or obtrusive light can be defined as any light emitting from artificial sources into spaces where this light would be unwanted, such as the needless spillage of light into the night sky or spillage of light into the windows of neighbouring residential properties, where this would cause disruption to the sleeping patterns of the occupants.

11.39 Light pollution is a general term which encompasses Sky Glow, Light Trespass, Glare and Building Luminance as described in the Institute of Lighting Professionals (ILP) Guidelines², as follows:

- Sky Glow is the brightening of the of the night sky over our towns, cities and countryside. This can be quantified by measuring the Upward Light Ratio (ULR). This is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky. The values suggested in Table 11.1 are the maximum allowable levels for their respective environmental zones;
- Light Trespass is the spilling of light beyond the site boundary. This is assessed using vertical illuminance in lux (EV) measured flat on the glazing at the centre of the window;
- Glare is the uncomfortable brightness of a light source when viewed against a dark background. This applies to each source in the obtrusive direction and is quantified as source intensity (I) (kcd). Table 11.1 provides the maximum allowable levels for their respective environmental zones (pre and post curfew); and

² Institution of Light Professionals, 2011. Guidance Notes for the Reduction of Obtrusive Light.

- Building Luminance can cause an increase in the brightness of the general area. This is measured in Cd/m² (L) as an average over the building façade. The values suggested in Table 11.1 are the maximum allowable pre curfew levels for their respective environmental zones caused only by externally lighting on the building façade.
- 11.40 The ILP Guidelines suggest that in many cases the target levels for each of the forms of light pollution are not obtainable. Specific cases will be dealt with on a case by case basis and maximum mitigation should be utilised to ensure that the effects are within acceptable limits.
- 11.41 The ILP Guidelines quantify the levels of sky glow, glare and light trespass seen as acceptable for varying environmental zones. This site sits within E3: which is defined as: Medium district brightness areas – Small town centres or urban locations. The Proposed Development sits within environmental zone E3.
- 11.42 Table 11.1 sets out light limitations for exterior lighting installations specified in the ILP Guidelines.

Table 11.1 Obtrusive Light Limitations for Exterior Lighting Installations

Environmental Zone	Sky Glow Upward Light Ratio [Max %]	Light Trespass (Into Windows) Vertical Illuminance (Lux)		Source Intensity [kcd]		Building Luminance Average L[cd/m ²]
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Pre-curfew
E1	0	2	1 ³	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1.0	10
E4	15.0	25	5	25	2.5	25

Curfew - The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by a LPA. As there is no curfew stated in local planning policy, 23.00hrs has been used as suggested in the ILP guidance.

Solar Glare

- 11.43 Viewpoints were selected at the potentially affected traffic intersections around the site and as defined in Methodology for Determining Baseline Conditions and Sensitive Receptors section of the chapter (Figure 11.3). In some cases, where a driver has multiple signals to consider, more than one assessment has been provided. These consider the drivers focal point looking straight ahead and at each signal. This occurs at Viewpoint 2, where the driver has three viewpoints, including straight ahead and two traffic signals. These are denoted V2A, B, C etc. The remaining viewpoints have no traffic signals to look at and so only a forward facing view has been analysed.
- 11.44 For each viewpoint two sets of angular images were generated:
- Images displaying the time of the year: The sunpath is divided in months, taking the 21st of each month as the limit for each section; and
 - Images displaying the time of the day: In this case the sunpath is divided by hours of the day. The hours represent mean solar time and not local time, and therefore they do not take daylight saving hours into account.

Assumptions

- 11.45 In some cases, drawings retrieved from the planning portal and / or historic sales particulars and typical layouts of similar local buildings have been used to determine room use.
- 11.46 Reasonable estimations of internal reflectance are used if not known. The reflectance is assumed to be 0.5 with the surrounding receptors.
- 11.47 Specular materials on the façade of the Proposed Development were assumed to be fully reflective for the purposes of the solar glare assessment to present a worst case.
- 11.48 The solar glare assessment assumes all specular materials on the Proposed Development are fully reflective. In addition, the assessment assumes full sun throughout the year and is not based on climatic data. For this reason, the assessment assumes a worst case scenario.

Limitations

- 11.49 The context model of the site has been built to measured survey data and site photographs. Where it was not possible to get a clear view of the surrounding properties, it has been necessary to assume worst case window locations.
- 11.50 Detailed floor plan information for all existing sensitive receptors with the potential to be affected by the Proposed Development were not available and so reasonable assumptions as to the internal configuration of the rooms behind the fenestration were made.

A standard 4.27m deep room was assumed unless the building form dictated otherwise. The use of the rooms behind the fenestration was also assumed from external observation. This is common accepted practice when access is unavailable.

- 11.51 The assessments do not include trees which may serve to interact with the real-world daylight and sunlight levels.
- 11.52 The assessment of solar glare does not consider intensity of reflections but merely states the time of the year and day when these occur.

Defining Significance

Receptor Sensitivity

- 11.53 In terms of sensitivity, all of the residential receptors with habitable rooms have been assessed are considered to be of high sensitivity.
- 11.54 Both public and private amenity spaces are considered to be of high sensitivity.
- 11.55 Drivers of cars and trains are both considered to be receptors of high sensitivity.

Magnitude of Impact

- 11.56 The BRE Guidelines state the following for use in Environmental Impact Assessments (EIA) within Appendix I, when considering the magnitude of impact on daylight, sunlight and overshadowing:

“The guidance in this book may be used as the basis for environmental impact assessment, where the skylight and sunlight impact of a new Development on its surroundings are taken into account.

Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space.

The assessment of impact would depend on a combination of factors and there is no simple rule of thumb that can be applied.

Where the loss of skylight or sunlight fully meets the guidelines in this book, the impact would be negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible is more appropriate. Where the loss of light is only just within the guidelines, and a larger number of windows or open space area are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight or sunlight in the affected building or open space.

Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards minor adverse effect would include:

- Only a small number of windows or limited area or open space are affected;
- The loss is only marginally outside the guidelines;
- The affected room has other sources of skylight or sunlight;
- The affected building or open space only has a low level requirement for skylight or sunlight; and
- There are particular reasons why an alternative, less stringent guidelines should be applied.

Factors tending towards a major adverse effect include:

- A large number of windows or large area of open space are affected;
- The loss of light is substantially outside the guidelines;
- All the windows in a particular property are affected; and
- The affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight.”

Effect Significance

- 11.57 Table 11.2 below has been used to determine the effect significance from the receptor sensitivity and magnitude of impact.

Table 11.2 Effect Significance Matrix

Magnitude of Impact	Receptor Sensitivity		
	High	Moderate	Low
Major	Major	Major or Moderate	Moderate or Minor

Magnitude of Impact	Receptor Sensitivity		
	High	Moderate	Low
Moderate	Major or Moderate	Moderate or Minor	Minor
Minor	Moderate or Minor	Minor	Minor or Negligible
Negligible	Negligible	Negligible	Negligible

11.58 The specific criteria targets are discussed below and can be used to apply significance to any effects. It should be noted that each property will be served by a number of windows/rooms showing a range of magnitudes of impact. In such cases the guidance from the BRE outlined in paragraph earlier in this section has been used to define the magnitude of impact and hence, significance of effect. Should the various assessment methodologies show varying significance levels for the same building, professional judgement should be applied to assign significance based on all evidence available. In some instances, technical breaches of the guidance may occur as a result of self-limiting light features. These include windows that are recessed into the building's facade or placed beneath overhanging balconies, which provide the occupants with private external amenity space but limit the amount of daylight that can reach the window surface from directly above. In such cases the BRE Guidelines suggest additional assessments with these obstructions removed to be run in order to identify these as technical numerical breaches of the guidance. Where this is done, professional judgment may then be used to assign the significance of the effects.

11.59 The nature of effects are defined as beneficial or adverse, with beneficial effects being where a noticeable improvement in daylight or sunlight levels occurs within a receptor, and adverse effects being where a noticeable loss of light occurs. Negligible effects are defined as where a loss occurs, but said loss is deemed so minor as not to be noticeable.

11.60 For the purposes of the assessment a significant effect in EIA terms is one which is moderate adverse or above. An effect which is negligible or minor adverse is considered to be not significant in EIA terms.

VSC Criteria

11.61 The BRE Guidelines recommend that a window serving a habitable room should be able to benefit from a minimum VSC value of 27%.

11.62 In order to be regarded as meeting the VSC criteria once the Proposed Development has been constructed, a window should either:

- Retain at least 27% VSC in absolute terms; or
- Retain at least 80% of its existing VSC value after the Proposed Development is constructed.

11.63 In certain circumstances it may be appropriate to use different target values. Appendix F within the BRE Guidance, states for example, in a historic city centre or in an area with modern high rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings.

11.64 Where the results show compliance with the BRE Guidelines criteria, the occupants are unlikely to experience any noticeable change to their daylight amenity levels. For the purposes of this assessment, such an effect would be considered to be **negligible**.

11.65 Where there will be a noticeable change, the results have been summarised dependant on how far beyond the suggested targets the reductions are from baseline levels. For VSC, the ranges of reduction have been set at:

- Up to 19.9% (**negligible**)
- 20-29.9% (**minor adverse**);
- 30-39.9% (**moderate adverse**); and
- >40% (**major adverse**) based on professional judgment.

NSC Criteria

11.66 In order to be regarded as meeting the NSC criteria an existing room should retain at least 80% of its existing NSC value after the Proposed Development is constructed.

11.67 Where the results show compliance with the NSC criteria, the effect is of negligible significance since the occupants are unlikely to experience any noticeable change to their daylight amenity levels. For the purposes of this assessment, such an effect would be considered negligible.

11.68 If, following construction of a new development, the NSC changes so that the area of the existing room which receives direct sky light is reduced to less than 0.8 times its former value, then this will be noticeable to the occupants and more of the room will appear poorly lit.

11.69 Where there will be a noticeable change, the results have been summarised dependant on how far beyond the suggested targets the reductions from baseline levels will occur. For NSC the ranges of reduction have been split into:

- Up to 19.9% (**negligible**)
- 20-29.9% (**minor adverse**);
- 30-39.9% (**moderate adverse**); and
- >40% (**major adverse**) based on professional judgment.

ADF Criteria

11.70 The recommended ADF value is dependent upon the use of the room in question. The ADF criteria suggest a bedroom should have an ADF of 1%, a living room 1.5% and a kitchen 2%. Circulation space and bathrooms do not have a requirement for daylight. Where room use is unknown an ADF target value of 1.5% (that of a living room) has been assumed. The ADF is not used to apply significance but simply provides the reader with additional information.

Sunlight Assessment

11.71 The BRE Guidelines for the APSH method state that if a window:

"...can receive more than one quarter of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21 September and 21 March, then the room should still receive enough sunlight".

11.72 Accordingly, in order to be regarded as meeting APSH criteria once the Proposed Development has been constructed, a window should either:

- Retain at least 25% total APSH and 5% APSH in the winter months in absolute terms;
- Retain at least 80% of its existing total and winter APSH values after the Proposed Development is constructed; or
- The loss of total absolute annual APSH should be no more than 4% lower than the existing level.

11.73 Where the results show compliance with the BRE Guidelines APSH criteria, the effect is of **negligible** significance since occupants are unlikely to experience any noticeable change to their sunlight amenity levels.

11.74 Where the assessment demonstrates that sunlight levels will not meet either of the requirements, the results have been assessed on the basis of how far beyond the suggested targets the reductions from baseline levels will occur. For total APSH the ranges of reduction have been split into:

- Up to 19.9% (**negligible**)
- 20-29.9% (**minor**);
- 30-39.9% (**moderate**); and
- >40% (**major**) based on professional judgment.

Overshadowing

11.75 It is suggested in the BRE Guidelines that for an area to appear adequately sunlit throughout the year, at least half (50%) of any assessment area should see direct sunlight for at least two hours on the 21st March. If, as a result of new development, an existing assessment area will not meet these guidelines and the area which can receive two hours of direct sunlight on the 21st March is reduced to less than 0.8 times its former area, then the loss of sunlight is likely to be noticeable.

11.76 Where the results show compliance with the BRE Guidelines criteria, the occupants are unlikely to experience any noticeable change to their sunlight amenity levels. For the purposes of this assessment, such an effect would be considered negligible. Should the relevant criteria not be achieved, a judgment has to be made as to the scale and nature of the effect and thus, the significance of the effect, based on the level of loss, retained sunlight levels and the relevant baseline condition.

11.77 The BRE Guidelines give no criteria for the significance of transitory overshadowing other than to suggest that by establishing the different times of day and year when shadow will be cast over surrounding areas an indication can be given as to the significance of the Proposed Development's effect.

11.78 For this reason, the results of the transient overshadowing assessment will be discussed in a qualitative sense in this chapter but the significance of the effect for overshadowing will be primarily based on the results of the quantitative sunlight amenity assessment as described above.

Light pollution

11.79 Where the results show compliance with the ILP Guidelines, the effect is considered to be **negligible**. Should the relevant criteria not be achieved, professional judgment was made on significance of the likely adverse effect based on the level of additional light trespass.

Solar Glare

11.80 As there is no set guidance for applying significance to solar glare effects, the following criteria for the scale of effect is based on professional opinion:

- **Negligible:** Glare angles greater than 30°, as reflections beyond this angle are normally not intense enough to cause glare (CIE), or between 10° and 30° for brief periods of time;
- **Minor adverse:** Glare angles between 10° and 30° for long periods of time or between 3° and 10° for a short period of time;
- **Moderate adverse:** Glare angles between 3° and 10° for a long period of time; and
- **Major adverse:** Solar reflections with glare angles smaller than 3°.

11.81 Glare angle refers to the angle between a reflection and the driver's line of sight. According to International Commission on Illumination (CIE), glare angles beyond 30° are normally of little significance unless the glare source is of unusual intensity (i.e. very reflective glass or tilted rooflights that could reflect intense sunlight from high solar altitudes).

11.82 A long period of time is considered as more than two hours per day during more than two months per year.

11.83 These are general criteria, which should be adapted to the specific situation in order to consider the complexity of solar glare. The probability of a glare episode occurring can be reduced e.g. a limited intensity. The severity of glare could also be reduced if the reflections were broken up by the façade, the intensity of the solar reflection is likely to be too weak or if the driver was able to use a car's visor for mitigation. Other parameters may apply in unusual situations.

BASELINE CONDITIONS

Current Baseline Conditions

Daylight and Sunlight

11.84 **Error! Reference source not found.** to Table 11.6 summarise the baseline daylight and sunlight results for the existing baseline situation.

Table 11.3 Baseline VSC Summary

Surrounding Properties	Total number of windows	Total number of windows that achieve VSC levels above those suggested in the BRE guidance	Total number of windows that achieve VSC levels below those suggested in the BRE guidance
Elm View, Kingfield Road	17	16	1
The Dell, Kingfield Road	9	9	0
Cotswolds, Kingfield Road	18	16	2
Chinthurst, Kingfield Road	8	8	0
9-12 Kingfield Road	14	14	0
Pond House, Kingfield Green	20	17	3
Kingfield Cottage, Kingfield Green	24	20	4
The Cedars, Kingfield Green	16	16	0
Nut Cottage, Kingfield Green	12	12	0
Penlan, Kingfield Green	27	27	0
67 Granville Road	7	7	0
1 Westfield Grove	6	6	0
2 Westfield Grove	3	3	0
3 Westfield Grove	6	5	1
4 Westfield Grove	9	9	0

Surrounding Properties	Total number of windows	Total number of windows that achieve VSC levels above those suggested in the BRE guidance	Total number of windows that achieve VSC levels below those suggested in the BRE guidance
50 Westfield Avenue	9	9	0
51 Westfield Avenue	5	5	0
52 Westfield Avenue	7	7	0
52A Westfield Avenue	11	10	1
53 Westfield Avenue	5	3	2
54 Westfield Avenue	2	1	1
55 Westfield Avenue	4	2	2
56 Westfield Avenue	2	1	1
57 Westfield Avenue	15	13	2
58 Westfield Avenue	3	3	0
59 Westfield Avenue	11	9	2
60 Westfield Avenue	3	3	0
61 Westfield Avenue	8	4	4
62 Westfield Avenue	3	0	3
63 Westfield Avenue	8	7	1
63A Westfield Avenue	13	6	7
64 Westfield Avenue	3	3	0
66 Westfield Avenue	3	3	0
Ash House, Acer Grove	17	12	5
Hornbeam House, Acer Grove	19	14	5
Beech House, Sycamore Avenue	30	19	11
Hazel House, Sycamore Avenue	54	39	15
Total	431	358	73

Table 11.4 Baseline NSC Summary

Surrounding Properties	Total number of rooms	Total number of rooms above 80% well-lit	Total number of rooms below 80% well-lit
Elm View, Kingfield Road	9	8	1
The Dell, Kingfield Road	6	6	0
Cotswolds, Kingfield Road	7	7	0
Chinthurst, Kingfield Road	5	5	0
9-12 Kingfield Road	12	12	0
Pond House, Kingfield Green	9	9	0
Kingfield Cottage, Kingfield Green	8	8	0
The Cedars, Kingfield Green	6	6	0
Nut Cottage, Kingfield Green	6	4	2
Penlan, Kingfield Green	9	9	0
67 Granville Road	4	4	0
1 Westfield Grove	4	3	1
2 Westfield Grove	2	2	0
3 Westfield Grove	4	4	0
4 Westfield Grove	3	3	0

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Surrounding Properties	Total number of rooms	Total number of rooms above 80% well-lit	Total number of rooms below 80% well-lit
50 Westfield Avenue	4	3	1
51 Westfield Avenue	2	2	0
52 Westfield Avenue	4	4	0
52A Westfield Avenue	5	5	0
53 Westfield Avenue	4	4	0
54 Westfield Avenue	2	2	0
55 Westfield Avenue	3	3	0
56 Westfield Avenue	2	2	0
57 Westfield Avenue	7	7	0
58 Westfield Avenue	2	2	0
59 Westfield Avenue	5	5	0
60 Westfield Avenue	2	2	0
61 Westfield Avenue	4	2	2
62 Westfield Avenue	2	2	0
63 Westfield Avenue	5	4	1
63A Westfield Avenue	4	4	0
64 Westfield Avenue	2	2	0
66 Westfield Avenue	2	2	0
Ash House, Acer Grove	7	7	0
Hornbeam House, Acer Grove	7	7	0
Beech House, Sycamore Avenue	17	17	0
Hazel House, Sycamore Avenue	29	29	0
Total	215	207	8

Table 11.5 Baseline ADF Summary

Surrounding Properties	Total number of rooms	Total number of rooms above BRE suggested targets	Total number of rooms below BRE suggested targets
Elm View, Kingfield Road	9	6	3
The Dell, Kingfield Road	6	6	0
Cotswolds, Kingfield Road	7	6	1
Chinthurst, Kingfield Road	5	5	0
9-12 Kingfield Road	12	11	1
Pond House, Kingfield Green	9	7	2
Kingfield Cottage, Kingfield Green	8	6	2
The Cedars, Kingfield Green	6	4	2
Nut Cottage, Kingfield Green	6	4	2
Penlan, Kingfield Green	9	8	1
67 Granville Road	4	1	3
1 Westfield Grove	4	3	1
2 Westfield Grove	2	1	1
3 Westfield Grove	4	3	1
4 Westfield Grove	3	3	0
50 Westfield Avenue	4	2	2

Surrounding Properties	Total number of rooms	Total number of rooms above BRE suggested targets	Total number of rooms below BRE suggested targets
51 Westfield Avenue	2	2	0
52 Westfield Avenue	4	4	0
52A Westfield Avenue	5	4	1
53 Westfield Avenue	4	0	4
54 Westfield Avenue	2	2	0
55 Westfield Avenue	3	2	1
56 Westfield Avenue	2	2	0
57 Westfield Avenue	7	5	2
58 Westfield Avenue	2	2	0
59 Westfield Avenue	5	5	0
60 Westfield Avenue	2	2	0
61 Westfield Avenue	4	1	3
62 Westfield Avenue	2	2	0
63 Westfield Avenue	5	4	1
63A Westfield Avenue	4	4	0
64 Westfield Avenue	2	2	0
66 Westfield Avenue	2	2	0
Ash House, Acer Grove	7	7	0
Hornbeam House, Acer Grove	7	7	0
Beech House, Sycamore Avenue	17	15	2
Hazel House, Sycamore Avenue	29	27	2
Total	215	177	38

Table 11.6 Baseline APSH Summary

Surrounding Properties	Total number of rooms with windows facing the Proposed Development and within 90° of due south	Total number of rooms above BRE suggested targets for total and winter APSH	Total number of rooms below BRE suggested targets for total and winter APSH
Elm View, Kingfield Road	9	9	0
The Dell, Kingfield Road	6	6	0
Cotswolds, Kingfield Road	7	7	0
Chinthurst, Kingfield Road	5	5	0
9-12 Kingfield Road	12	12	0
Pond House, Kingfield Green	6	4	2
Kingfield Cottage, Kingfield Green	8	8	0
The Cedars, Kingfield Green	5	5	0
Nut Cottage, Kingfield Green	6	6	0
Penlan, Kingfield Green	5	5	0
67 Granville Road	0	0	0
1 Westfield Grove	2	2	0
2 Westfield Grove	0	0	0
3 Westfield Grove	1	1	0
4 Westfield Grove	1	1	0
50 Westfield Avenue	4	4	0

Surrounding Properties	Total number of rooms with windows facing the Proposed Development and within 90° of due south	Total number of rooms above BRE suggested targets for total and winter APSH	Total number of rooms below BRE suggested targets for total and winter APSH
51 Westfield Avenue	2	2	0
52 Westfield Avenue	4	4	0
52A Westfield Avenue	5	5	0
53 Westfield Avenue	4	3	1
54 Westfield Avenue	2	2	0
55 Westfield Avenue	3	2	1
56 Westfield Avenue	2	2	0
57 Westfield Avenue	7	7	0
58 Westfield Avenue	2	2	0
59 Westfield Avenue	5	5	0
60 Westfield Avenue	2	2	0
61 Westfield Avenue	3	1	2
62 Westfield Avenue	2	2	0
63 Westfield Avenue	4	4	0
63A Westfield Avenue	4	4	0
64 Westfield Avenue	2	2	0
66 Westfield Avenue	2	2	0
Ash House, Acer Grove	3	3	0
Hornbeam House, Acer Grove	2	2	0
Beech House, Sycamore Avenue	17	17	0
Hazel House, Sycamore Avenue	29	25	4
Total	183	173	10

11.85 As would be expected in a suburban / medium density urban area, the baseline VSC assessment shows the vast majority of windows surrounding the Proposed Development exceed the BRE suggested VSC levels of 27%. The properties which show this full compliance include the The Dell, Chinthurst, 9-12 Kingfield Road, The Cedars, Nut Cottage, Penlan, 67 Granville Road, 1, 2 & 4 Westfield Grove, 50-52 Westfield Avenue, 58 Westfield Avenue, 60 Westfield Avenue, 64 Westfield Avenue and 66 Westfield Avenue. These properties enjoy an unusually clear outlook over the current site, enjoying the benefit from the low rise nature of the buildings on site. Properties such as Beech House and Hazel House include balconies above some windows and as such are self light limited.

11.86 The NSC results for the majority of properties show a high number of rooms would enjoy a view of the sky at the working plane across 80% or more of their area. There are however incidences where some rooms within a property have lower existing NSC levels. These properties include the Elm View, Nut Cottage, 1 Westfield Grove, 50 Westfield Avenue, 61 Westfield Avenue and 63 Westfield Avenue.

11.87 The baseline APSH assessment results indicate that there are windows within Pond House, 53-57 (odds) Westfield Avenue, 61 Westfield Avenue and Hazel House which show levels below the suggested BRE targets. The properties situated along Westfield Avenue are principally east facing and this orientation gives rise to lower sunlight potential.

Overshadowing

Sunlight Amenity

11.88 The results of the sunlight amenity assessment to the surrounding amenity areas show that all 33 areas enjoy at least 52.4% of each area would see at least 2 hours of direct sunlight. The direct sunlight levels to these spaces are therefore in line with the BRE targets.

Transient Overshadowing

11.89 In order to provide an illustrative view of the shadow path on the baseline scenario transient overshadowing studies have been undertaken throughout the day on the 21st of March, 21st of June and 21st of (transient overshadowing images can be found within **ES Volume 3, Appendix Daylight, Sunlight, Overshadowing and Solar Glare (Annex 5)**.

11.90 As the existing site consists of a number of low rise commercial buildings with the tallest element being the existing football stand, the baseline scenario shows little existing shading. The same can be said for the surrounding properties, which create little shading.

Light Pollution

11.91 It is not possible to measure the Sky Glow caused by the lighting on the site in the baseline condition as the light emitted from all sources is not known. However, a review of the fittings indicates the majority are downward facing and as such it is considered that sky glow would be within suggested levels. The exception to this is the flood lights on the existing Football Pitch.

11.92 In order to ascertain the vertical illuminance levels at neighbouring residential properties in the current condition, a night time site visit was undertaken and light levels measured with a light meter. This site visit was undertaken at 10pm on the 3rd September 2019. This is pre curfew (11pm) in the hours of darkness. This was undertaken a night when the football stadium flood lighting was on to present a worst case. It should be noted that best efforts were made to take readings that occurred as a result of fixed lighting on and surrounding the site. Notwithstanding this, due to the level of traffic on Westfield Avenue, car headlights may have caused increased readings. Readings were taken as close to surrounding residential properties as possible, although without gaining access it was not possible to obtain readings at the window face. The results can be found in **ES Volume 3, Appendix: Daylight, Sunlight, Overshadowing, Light Pollution & Solar Glare (Annex 6)**.

11.93 The light spill to the east of the site is generally minimal (<3Lux) due to the distance from the floodlighting. Levels to the south and west are higher (5-45Lux), generally driven the flood lighting and David Lloyd car park lighting in isolated locations. Light levels to the north are high (up to 25Lux) and again are driven by the flood lighting. These levels are significantly higher than the 10 Lux suggested in the ILP guidelines. It should be noted that in the majority of instances there is dense foliage between the site and the neighbours which will block much of this light spill. Also, the floodlighting is only used occasionally so this presents an absolute worst case.

11.94 It should be noted that the tennis courts on site are not artificially lit.

Solar Glare

11.95 As the solar glare assessment is an assessment of the impacts caused by the completed development, there is no baseline assessment.

Likely Evolution of the Baseline

11.96 An assessment with the baseline as is has been considered. Should there be no additional development in the area, the baseline levels of daylight, sunlight, overshadowing, light pollution and solar glare would remain as stated.

11.97 Should additional developments be built general levels of daylight and sunlight will reduce and additional light pollution effects are likely. Additional development is likely to result in an increase in reflections (i.e. solar glare) from other schemes. However, an overall increase in massing and density would likely reduce the amount of reflected solar glare occurring from any future development such as this.

POTENTIAL EFFECTS

Demolition and Construction

11.98 The level of effect in relation to the daylight, sunlight and overshadowing for the surrounding properties will vary throughout the demolition and construction phase, depending on the level of obstruction caused. The effect will almost certainly be less than that of the completed Proposed Development, given that the extent of permanent massing will increase throughout the construction phase, until the buildings are complete. As such the effect on daylight to surrounding properties will vary from short to medium term and would be of negligible to major adverse; the effect on sunlight to surrounding properties will be no worse than moderate adverse; and overshadowing effects will be negligible.

11.99 Solar glare would not present an adverse effect until the windows/cladding are built. The effect on solar glare will be no worse than those of the Proposed Development.

11.100 Construction works are not proposed at night. Any lighting required would comply with the suggestions of the ILP guidelines. The effect on light pollution will be negligible.

Completed Development

Daylight and Sunlight

11.101 Full details of the VSC, NSC, ADF and APSH analysis are provided within *ES Volume 3, Appendix: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare (Annex 3)*. Drawings of the Proposed Development in context and window maps are also provided within *ES Volume 3, Appendix: Daylight, Sunlight, Overshadowing and Solar Glare (Annex 2)*. A summary of these results are provided below in Table 11.7 to Table 11.9.

Table 11.7 Completed Development – VSC in relation to the BRE Guidelines

Surrounding Properties	Total number of windows	Total number of windows that achieve VSC levels in excess of 27% or a reduction of less than 20% from the baseline level	Total number of windows that achieve VSC levels below those suggested in the BRE guidance			
			20%-29.9% reduction	30%-39.9% reduction	>40% reduction	Total
Elm View, Kingfield Road	17	8	3	6	0	9
The Dell, Kingfield Road	9	9	0	0	0	0
Cotswolds, Kingfield Road	18	13	5	0	0	5
Chinthurst, Kingfield Road	8	8	0	0	0	0
9-12 Kingfield Road	14	14	0	0	0	0
Pond House, Kingfield Green	20	20	0	0	0	0
Kingfield Cottage, Kingfield Green	24	24	0	0	0	0
The Cedars, Kingfield Green	16	16	0	0	0	0
Nut Cottage, Kingfield Green	12	12	0	0	0	0
Penlan, Kingfield Green	27	24	0	1	2	3
67 Granville Road	7	4	2	1	0	3
1 Westfield Grove	6	4	2	0	0	2
2 Westfield Grove	3	1	0	2	0	2
3 Westfield Grove	6	6	0	0	0	0
4 Westfield Grove	9	9	0	0	0	0
50 Westfield Avenue	9	9	0	0	0	0
51 Westfield Avenue	5	5	0	0	0	0
52 Westfield Avenue	7	7	0	0	0	0
52A Westfield Avenue	11	11	0	0	0	0
53 Westfield Avenue	5	5	0	0	0	0
54 Westfield Avenue	2	1	1	0	0	1
55 Westfield Avenue	4	4	0	0	0	0
56 Westfield Avenue	2	1	1	0	0	1
57 Westfield Avenue	15	15	0	0	0	0
58 Westfield Avenue	3	2	1	0	0	1
59 Westfield Avenue	11	11	0	0	0	0
60 Westfield Avenue	3	2	1	0	0	1
61 Westfield Avenue	8	8	0	0	0	0

Surrounding Properties	Total number of windows	Total number of windows that achieve VSC levels in excess of 27% or a reduction of less than 20% from the baseline level	Total number of windows that achieve VSC levels below those suggested in the BRE guidance			
			20%-29.9% reduction	30%-39.9% reduction	>40% reduction	Total
62 Westfield Avenue	3	2	1	0	0	1
63 Westfield Avenue	8	8	0	0	0	0
63A Westfield Avenue	13	13	0	0	0	0
64 Westfield Avenue	3	2	1	0	0	1
66 Westfield Avenue	3	1	2	0	0	2
Ash House, Acer Grove	17	16	1	0	0	1
Hornbeam House, Acer Grove	19	19	0	0	0	0
Beech House, Sycamore Avenue	30	13	7	7	3	17
Hazel House, Sycamore Avenue	54	19	1	25	9	35
Total	431	346	29	42	14	85

Table 11.8 Completed Development – NSC in relation to the BRE Guidelines

Surrounding Properties	Total number of rooms	Total number of rooms that achieve less than a 20% reduction from the baseline level in NSC	Total number of rooms that achieve NSC reductions suggested to be noticeable in the BRE guidance			
			20%-29.9% reduction	30%-39.9% reduction	>40% reduction	Total
Elm View, Kingfield Road	9	7	0	0	2	2
The Dell, Kingfield Road	6	6	0	0	0	0
Cotswolds, Kingfield Road	7	7	0	0	0	0
Chinthurst, Kingfield Road	5	5	0	0	0	0
9-12 Kingfield Road	12	12	0	0	0	0
Pond House, Kingfield Green	9	9	0	0	0	0
Kingfield Cottage, Kingfield Green	8	8	0	0	0	0
The Cedars, Kingfield Green	6	6	0	0	0	0
Nut Cottage, Kingfield Green	6	6	0	0	0	0
Penlan, Kingfield Green	9	9	0	0	0	0
67 Granville Road	4	4	0	0	0	0
1 Westfield Grove	4	4	0	0	0	0
2 Westfield Grove	2	1	1	0	0	1
3 Westfield Grove	4	4	0	0	0	0
4 Westfield Grove	3	3	0	0	0	0

Surrounding Properties	Total number of rooms	Total number of rooms that achieve less than a 20% reduction from the baseline level in NSC	Total number of rooms that achieve NSC reductions suggested to be noticeable in the BRE guidance			
			20%-29.9% reduction	30%-39.9% reduction	>40% reduction	Total
50 Westfield Avenue	4	4	0	0	0	0
51 Westfield Avenue	2	2	0	0	0	0
52 Westfield Avenue	4	4	0	0	0	0
52A Westfield Avenue	5	5	0	0	0	0
53 Westfield Avenue	4	4	0	0	0	0
54 Westfield Avenue	2	2	0	0	0	0
55 Westfield Avenue	3	3	0	0	0	0
56 Westfield Avenue	2	2	0	0	0	0
57 Westfield Avenue	7	7	0	0	0	0
58 Westfield Avenue	2	2	0	0	0	0
59 Westfield Avenue	5	5	0	0	0	0
60 Westfield Avenue	2	2	0	0	0	0
61 Westfield Avenue	4	3	0	0	1	1
62 Westfield Avenue	2	2	0	0	0	0
63 Westfield Avenue	5	5	0	0	0	0
63A Westfield Avenue	4	4	0	0	0	0
64 Westfield Avenue	2	2	0	0	0	0
66 Westfield Avenue	2	2	0	0	0	0
Ash House, Acer Grove	7	7	0	0	0	0
Hornbeam House, Acer Grove	7	7	0	0	0	0
Beech House, Sycamore Avenue	17	17	0	0	0	0
Hazel House, Sycamore Avenue	29	13	1	2	13	16
Total	215	195	2	2	16	20

Surrounding Properties	Total number of windows facing the Proposed Development and within 90° of due south	Total number of windows above the BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Penlan, Kingfield Green	5	5	0
67 Granville Road	0	0	0
1 Westfield Grove	2	2	0
2 Westfield Grove	0	0	0
3 Westfield Grove	1	1	0
4 Westfield Grove	1	1	0
50 Westfield Avenue	4	4	0
51 Westfield Avenue	2	2	0
52 Westfield Avenue	4	4	0
52A Westfield Avenue	5	5	0
53 Westfield Avenue	4	4	0
54 Westfield Avenue	2	2	0
55 Westfield Avenue	3	3	0
56 Westfield Avenue	2	2	0
57 Westfield Avenue	7	7	0
58 Westfield Avenue	2	2	0
59 Westfield Avenue	5	5	0
60 Westfield Avenue	2	2	0
61 Westfield Avenue	3	3	0
62 Westfield Avenue	2	2	0
63 Westfield Avenue	4	4	0
63A Westfield Avenue	4	4	0
64 Westfield Avenue	2	2	0
66 Westfield Avenue	2	2	0
Ash House, Acer Grove	3	3	0
Hornbeam House, Acer Grove	2	2	0
Beech House, Sycamore Avenue	17	17	0
Hazel House, Sycamore Avenue	29	20	9
Total	183	174	9

Table 11.9 Completed Development – APSH in relation to the BRE Guidelines

Surrounding Properties	Total number of windows facing the Proposed Development and within 90° of due south	Total number of windows above the BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Elm View, Kingfield Road	9	9	0
The Dell, Kingfield Road	6	6	0
Cotswolds, Kingfield Road	7	7	0
Chinthurst, Kingfield Road	5	5	0
9-12 Kingfield Road	12	12	0
Pond House, Kingfield Green	6	6	0
Kingfield Cottage, Kingfield Green	8	8	0
The Cedars, Kingfield Green	5	5	0
Nut Cottage, Kingfield Green	6	6	0

Daylight

11.102 The VSC and NSC results indicate that there would be no noticeable change in the levels of daylight to the following properties:

- The Dell, Kingfield Road;
- Chinthurst, Kingfield Road;
- 9-12 Kingfield Road;
- Pond House, Kingfield Green;
- Kingfield Cottage, Kingfield Green;
- The Cedars, Kingfield Green;
- Nut Cottage, Kingfield Green;
- 51 Westfield Avenue;
- 52 Westfield Avenue;
- 52A Westfield Avenue;
- 53 Westfield Avenue;
- 55 Westfield Avenue;
- 57 Westfield Avenue;
- 59 Westfield Avenue;

- 3 Westfield Grove;
 - 4 Westfield Grove;
 - 50 Westfield Avenue;
 - 63 Westfield Avenue;
 - 63A Westfield Avenue; and
 - Hornbeam House, Acer Grove.
- 11.103 With no noticeable alterations in the VSC or NSC to these properties, the effect of the Proposed Development on their daylight is considered **negligible** and will not be discussed further. The remaining properties are discussed below.
- Elm View*
- 11.104 This property is situated immediately to the north of the Proposed Development, separated by the property's rear garden. As this property is located in a suburban periphery of Woking, the lack of existing massing in the surrounding area has resulted in this property having very high levels of daylight in the existing scenario. This is shown by the baseline data where 16 (94%) out of the 17 windows within the property exceed the BRE targets for the VSC assessment. With the Proposed Development in place, 8 (47%) windows will see no noticeable change in VSC and of those remaining windows, 3 would see minor adverse impacts and 6 would see moderate adverse impacts. Retained VSC levels are generally good, being in excess of 22.5%, just below the suggested target of 27%.
- 11.105 The results of the NSC assessment show that 7 (78%) of the 9 rooms within the property would see no noticeable change in NSC level. Both of the remaining two rooms would see major adverse impacts.
- 11.106 Overall, the effect of the Proposed Development would be considered to be **moderate adverse**.
- Cotswolds*
- 11.107 This property is situated to the north of the Proposed Development, separated by the property's large rear garden. With the Proposed Development in place, 13 (72%) of the 18 windows will see no noticeable effect to the VSC levels. Of those windows which do not meet the recommended targets, all 5 will see minor adverse impacts, showing reductions between 20.2% - 24.6%, marginally above the recommended target of 20%.
- 11.108 The results of the NSC assessment show that none of the 7 (100%) rooms within the property will see a noticeable change in NSC level.
- 11.109 Given the minor adverse VSC effects and the lack of impact to the NSC levels, the overall impact of the Proposed Development would be considered to be **minor adverse**.
- Penlan*
- 11.110 This property is located the south east of the Proposed Development, separated from the site by a footpath and hedgerow. For the purposes of this assessment, the existing property has been considered as the primary receptor, but analysis for the two consented properties has also been undertaken.
- 11.111 The results of the VSC assessment show that currently, 24 (89%) of the 27 windows would see no noticeable reduction in VSC levels. Of the remaining windows, 1 would see a moderate adverse reduction and 2 windows would see a major adverse impact. The two windows which see major adverse impacts are identified as W10 and W11 within drawing 3499-WM11 within **ES Volume 3, Appendix Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare (Annex 2)**, serve a conservatory and therefore are considered to be technical deviations as this room receives light from a number of other windows. To quantify this, an average of all VSC levels seen within the vertical windows has been taken, showing a mean average VSC of 27%, which is the suggested level of retained VSC. This does not consider the light that would enter through the glazed roof
- 11.112 The NSC assessment shows that all 9 (100%) rooms assessed within the property would see no noticeable impact.
- 11.113 Given the only impacts to this property that are deemed to be moderate, occur in a fully glazed conservatory, where the impact to two windows will not be noticeable, coupled with the full NSC compliance, the effect of the Proposed Development on the current property would be considered to be **minor adverse**.
- 11.114 As this property is subject to a planning consent, there is the potential for these to be built out before the completion of the Proposed Development. As these buildings have not yet been constructed, it is inappropriate to conduct a comparative study. Therefore, both consented properties have been assessed using the ADF assessment as recommended in section F8 (ii) of Appendix F of the BRE Guidance.
- 11.115 The northernmost consented property has been referred to as Penlan Consented House 1, and the southern building is referred to as Penlan Consented House 2.
- 11.116 The ADF assessment shows that all (100%) 7 rooms within Penlan Consented House 1 meet the recommended criteria set out by the BRE, whilst 4 (50%) out of the 8 rooms within Penlan Consented House 2 meet the recommended ADF targets. As previously noted, as these properties are only consented and, therefore, not built, it is not appropriate to apply significance to these potential receptors as it is not possible to compare existing and proposed.
- 67 Granville Road*
- 11.117 This property is located directly to the south of the Proposed Development across Granville Road. With the Proposed Development in place, this property will see 4 (57%) out of the 7 windows having no noticeable impact to the VSC levels.
- 11.118 Of the 3 remaining windows, 2 will see minor adverse impacts and 1 will see a moderate adverse impact. These windows are referred to as W2-W4 on the ground floor, within drawing 3499-WM13 in **ES Volume 3, Appendix Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare (Annex 2)**. These windows are located within the flank wall of the property and therefore likely to be secondary within to primary windows within rooms located on the front or rear of the property or serve non-habitable space (likely bathrooms or toilets). However, without accurate room layout information, these have still been included within the assessment.
- 11.119 The NSC assessment shows that all 4 (100%) rooms assessed within the property will see no noticeable reduction to the NSC levels.
- 11.120 Given the minor / moderate nature of the deviations from the recommended VSC targets to windows on a flank façade and the full compliance with the NSC assessment, the impact this property would be considered to be **minor adverse**.
- 1 Westfield Grove*
- 11.121 This property is also located to the south of the proposal separated from the Proposed Development by the properties rear garden.
- 11.122 The results of VSC assessment show that this property will see no noticeable impact within 4 (66%) of the 6 windows assessed. The remaining two windows will both see minor adverse reductions.
- 11.123 The NSC assessment shows that all 4 (100%) rooms within the property will see no noticeable reduction with the Proposed Development in place.
- 11.124 Therefore, the overall impact to this property should be considered as **minor adverse**.
- 2 Westfield Grove*
- 11.125 This property is located to the south of the Proposed Development, neighbouring 1 Westfield Grove to the north-east.
- 11.126 The VSC assessment shows that 1 out of the 3 windows assessed within this property will see no noticeable reduction with the Proposed Development in place. The remaining two windows will see moderate adverse impacts. These two windows are identified as W1 and W2 within drawing 3499-WM15 in **ES Volume 3, Appendix Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare (Annex 2)**. Both windows serve the same Living / Kitchen / Dining room (LKD), and retain between 22.9% - 23.1% VSC which is not significantly below the BRE suggested 27%. It should also be noted, that whilst VSC does not consider the area of glazing. The room affected is served by a significant amount of glazing with large glass bi-fold doors and separate windows. A such, in real terms the level of light retained within the rooms would be considered acceptable.
- 11.127 The NSC assessment shows that 1 of the 2 rooms assessed will see no noticeable impact with the Proposed Development in place. The remaining room will see a minor adverse impact.
- 11.128 Overall, the impact to this property should be considered as **minor - moderate adverse**.
- 54 Westfield Avenue*
- 11.129 This end terrace property is located to the west of the Proposed Development, across Westfield Avenue.
- 11.130 The VSC assessment shows that 1 of the 2 windows assessed within this property will see no noticeable impact as a result of the Proposed Development. The remaining window, serving the top floor bedroom, will see a minor adverse impact, likely to be driven by the deep overhanging eaves of the properties roof.
- 11.131 The NSC assessment shows that both rooms assessed within the property will see no noticeable impact as a result of the Proposed Development.
- 11.132 Therefore, considering the minor VSC reduction and the full NSC compliance, the overall impact to daylight within this property would be considered to be **minor adverse**.
- 56 Westfield Avenue*
- 11.133 This terraced property is located to the west of the Proposed Development, across Westfield Avenue, neighbouring 54 Westfield Avenue.

- 11.134 The VSC assessment shows that 1 of the 2 windows assessed within this property will see no noticeable impact as a result of the Proposed Development. The remaining window, serving the top floor bedroom, will see a minor adverse impact, again likely driven by the deep overhanging eaves of the roof, acting as cover for the properties balcony.
- 11.135 The NSC assessment shows that neither of rooms assessed within the property would see a noticeable impact as a result of the Proposed Development.
- 11.136 Therefore, considering the minor VSC reduction and the full NSC compliance, the overall impact to daylight within this property would be considered to be **minor adverse**.
58 Westfield Avenue
- 11.137 This terraced property is located to the west of the Proposed Development, across Westfield Avenue, neighbouring 56 Westfield Avenue.
- 11.138 The VSC assessment shows that 2 of the 3 windows assessed within this property will see no noticeable impact as a result of the Proposed Development. The remaining window, serving the top floor bedroom, will see a minor adverse impact, again likely driven by the deep overhanging eaves of the roof, acting as cover for the amenity space on the property's balcony.
- 11.139 The NSC assessment shows that both rooms assessed within the property will see no noticeable impact as a result of the Proposed Development.
- 11.140 Therefore, considering the minor VSC reduction and the full NSC compliance, the overall impact to daylight within this property would be considered to be **minor adverse**.
60 Westfield Avenue
- 11.141 This terraced property is located to the west of the Proposed Development, across Westfield Avenue, neighbouring 58 Westfield Avenue.
- 11.142 The VSC assessment shows that 2 of the 3 windows assessed within this property will see no noticeable impact as a result of the Proposed Development. The remaining window, serving the top floor bedroom, will see a minor adverse impact, retaining 26.6% VSC, marginally below the target of 27%. Again, this minor deviation is likely driven by the overhanging eaves feature of the roof, acting as cover for the amenity space on the property's balcony.
- 11.143 The NSC assessment shows that both rooms assessed within the property will see no noticeable impact as a result of the Proposed Development.
- 11.144 Therefore, considering the minor VSC reduction and the full NSC compliance, the overall impact to daylight within this property would be considered to be **minor adverse**.
61 Westfield Avenue
- 11.145 This property is located to the south-west of the Proposed Development, on the eastern side of Westfield Avenue.
- 11.146 The results of the VSC assessment show that all 8 windows assessed will see no noticeable impact as a result of the Proposed Development.
- 11.147 The NSC assessment shows that this property would experience no noticeable effect within 3 of the 4 rooms assessed. The remaining room will see a technical injury resulting in a moderate adverse impact as a result of the Proposed Development. This is a loft room used as a study and the effect is driven by the low windows and ceiling height. Whilst the results show a moderate impact to this room, it is likely that the real world implications would be negligible, which is represented by the acceptable VSC results for the window serving this room. This adverse impact is likely to be driven by the low ceilings and unconventional shape of the room.
- 11.148 Overall, the isolated technical impact to the NSC values within the property combined with the full compliance with the VSC assessment means that the effect of the Proposed Development would be considered as **minor adverse**.
62 Westfield Avenue
- 11.149 This terraced property is located to the west of the Proposed Development, across Westfield Avenue, neighbouring 60 Westfield Avenue.
- 11.150 The VSC assessment shows that 2 of the 3 windows assessed within this property will see no noticeable impact as a result of the Proposed Development. The remaining window, referred to as W2, serving the first floor bedroom, will see a minor adverse impact, retaining 26.6% VSC, marginally below the target of 27%. This small secondary window serves a bedroom which is also served by a much larger primary window, which exceeds the recommended targets for VSC.
- 11.151 The NSC assessment shows that both rooms assessed within the property will see no noticeable impact as a result of the Proposed Development.
- 11.152 Therefore, considering the minor VSC reduction and the full NSC compliance, the overall impact to daylight within this property would be considered to be **minor adverse**.
64 Westfield Avenue
- 11.153 This terraced property is located to the west of the Proposed Development, across Westfield Avenue, neighbouring 60 Westfield Avenue.
- 11.154 The VSC assessment shows that 2 of the 3 windows assessed within this property will see no noticeable impact as a result of the Proposed Development. The remaining window, referred to as W1 within the first floor bedroom, will see a minor adverse impact, retaining 26.4% VSC, marginally below the target of 27%. This small secondary window serves a bedroom which is also served by a much larger primary window, which exceeds the recommended targets for VSC.
- 11.155 The NSC assessment shows that both rooms assessed within the property will see no noticeable impact as a result of the Proposed Development.
- 11.156 Therefore, considering the minor VSC reduction and the full NSC compliance, the overall impact to daylight within this property would be considered to be **minor adverse**.
66 Westfield Avenue
- 11.157 This terraced property is located to the west of the Proposed Development, across Westfield Avenue, neighbouring 60 Westfield Avenue.
- 11.158 The VSC assessment shows that 1 of the 3 windows assessed within this property will see no noticeable impact as a result of the Proposed Development. The remaining windows, referred to as W1 on the first and second floors, will see a minor adverse impact, retaining 26.4% and 26.9% VSC respectively, both marginally below the target of 27%.
- 11.159 The NSC assessment shows that both rooms assessed within the property will see no noticeable impact as a result of the Proposed Development.
- 11.160 Therefore, considering the minor VSC reduction and the full NSC compliance, the overall impact to daylight within this property would be considered to be **minor adverse**.
Ash House
- 11.161 These residential flats sit to the west of the proposal across Westfield Avenue on the corner of Westfield Avenue and Acer Grove.
- 11.162 The VSC assessment shows that that 16 of the 17 windows assessed within this property will not see a noticeable impact as a result of the Proposed Development. The remaining window will see a minor adverse impact, with a 20.2% reduction, marginally above the target of 20%.
- 11.163 The NSC assessment shows that all rooms within this property will not see a noticeable impact with the Proposed Development in place.
- 11.164 Overall, considering the high compliance within the VSC assessment with the exception of one minor adverse impact, and full compliance with the NSC assessment, the impact of the Proposed Development would be considered to be **minor adverse**.
Beech House
- 11.165 These residential flats sit to the north-west of the proposal across Westfield Avenue on the corner of Westfield Avenue and Sycamore Avenue.
- 11.166 The VSC assessment shows that 13 (43%) of the 30 windows assessed within this property will not see a noticeable impact as a result of the Proposed Development. Of the remaining windows, 7 will see a minor adverse impact, 7 will see a moderate adverse impact and 3 windows would see a major adverse impact. The 3 major adverse impacts occur in two separate LKD's. One of the major impacts occurs in a dual aspect LKD which is mitigated by two other fully compliant windows. The two other major impacts occur in one LKD on the ground floor which is overhung by a balcony.
- 11.167 This property is self-limiting in design, with a number of overhanging balconies, which provide private amenity for the residents. These balconies and design features are a likely driver in the deviations from the BRE targets. 11 of the 17 windows which do not meet the BRE recommended levels for VSC are limited by a balcony or overhang. The BRE guidance states that features such as these are self-limiting in design and assessing the VSC levels within the window with the balcony removed is an acceptable method to demonstrate this argument.
- 11.168 The results of the 'balconies removed' assessment shows that 19 windows within the property will not see a noticeable impact as a result of the Proposed Development when removing balconies'. Of the remaining 11 windows, there a 5 minor adverse impacts, 6 show moderate adverse impacts and all major impacts have been removed.

11.169 The Proposed Development has been cut back significantly to respect the residential accommodation within Beech House. This has resulted in significant improvements in light levels to this neighbour as the design has evolved.

11.170 The NSC assessment shows that no rooms within this property will see a noticeable impact with the Proposed Development in place.

11.171 Overall, the impact of the Proposed Development, based on proportional change alone, would be considered to be **moderate adverse**. Where major effects occur, they are driven by the self-limiting nature of overhanging balconies, which is highlighted by balconies removed assessment.

Hazel House

11.172 These residential flats sit to the north-west of the Proposed Development, across Westfield Avenue.

11.173 The VSC assessment shows that 19 (35%) out of 54 windows will not see a noticeable impact as a result of the Proposed Development. Of the remaining windows, the property would experience 1 minor adverse impact, 25 moderate impacts and 9 major adverse impacts.

11.174 Of the 9 major adverse impacts, 3 occur in bedrooms, which are considered to have a lower reliance on daylight due to the room use. This is referenced by s.2.2.8 of the BRE Guidance where it states “bedrooms should be analysed, although they are less important”. The remaining 6 major impacts occur in dual aspect LKD’s, which are mitigated by other windows which retain high and compliant VSC levels.

11.175 Again, this property is also self-limiting in design, with a number of overhanging balconies and structural overhangs limiting the daylight potential of a number of windows. When removing these limiting designs, the results show 31 (57%) windows do not see a noticeable impact. Of the remaining 23 windows, the property would experience 2 minor adverse impacts, 17 moderate adverse and only 4 major adverse. Again, the 4 major adverse impacts are found within dual aspect LKD’s and are therefore mitigated by other windows serving the rooms which show compliant VSC results.

11.176 The results of the NSC assessment show that 13 out of the 29 rooms assessed will not see a noticeable impact as a result of the Proposed Development. Of the remaining 16 rooms, the property would experience 1 minor adverse impact, 2 moderate impacts and 13 major adverse impacts. Of the 13 major adverse impacts, 7 occur in bedrooms, which again, have a lower reliance on daylight. The remaining 6 major impacts occur in LKD’s, which are inherently deeper rooms than that of a standard living room due to the multipurpose use. The arrangement of the LKD has the main living space located in immediate proximity to the windows with dining spaces at the rear. As such, the areas with the highest light requirement are located in proximity to the windows where the natural light would be at its best.

11.177 The Proposed Development has been cut back significantly to respect the residential accommodation within Hazel House. This has resulted in a significant improvement in light levels throughout the design evolution.

11.178 Overall, the effect to daylight within this property would be considered to be **moderate adverse**.

Sunlight

11.179 The following properties either have no Proposed Development facing windows within 90° of due south or would have no noticeable alteration in APSH and as such would sustain no noticeable impacts with regard to sunlight:

- | | |
|---------------------------------------|---------------------------------|
| • Elm View, Kingfield Road; | • Nut Cottage, Kingfield Green; |
| • The Dell, Kingfield Road; | • Penlan, Kingfield Green; |
| • Cotswolds, Kingfield Road; | • 67 Granville Road; |
| • Chinthurst, Kingfield Road; | • 1 Westfield Grove; |
| • 9-12 Kingfield Road; | • 2 Westfield Grove; |
| • Pond House, Kingfield Green; | • 3 Westfield Grove; |
| • Kingfield Cottage, Kingfield Green; | • 4 Westfield Grove; |
| • The Cedars, Kingfield Green; | • 60 Westfield Avenue; |
| • 50 Westfield Avenue; | • 59 Westfield Avenue; |
| • 51 Westfield Avenue; | • 61 Westfield Avenue; |
| • 52 Westfield Avenue; | • 62 Westfield Avenue; |

- | | |
|-------------------------|-----------------------------------|
| • 52A Westfield Avenue; | • 63 Westfield Avenue; |
| • 53 Westfield Avenue; | • 63A Westfield Avenue; |
| • 54 Westfield Avenue; | • 64 Westfield Avenue; |
| • 55 Westfield Avenue; | • 66 Westfield Avenue; |
| • 56 Westfield Avenue; | • Ash House, Acer Grove; |
| • 57 Westfield Avenue; | • Hornbeam House, Acer Grove; and |
| • 58 Westfield Avenue; | • Beech House, Sycamore Avenue. |

11.180 With no noticeable alterations in the APSH to these properties the effect of the Proposed Development on their daylight is considered **negligible** and will not be discussed further.

Hazel House

11.181 The results of the APSH assessment show with the Proposed Development in place, 20 of the 29 rooms would see no noticeable impact as result of the Proposed Development. There are 9 rooms with windows orientated towards 90° of due south would experience a reduction below the BRE suggested targets. These are all bedrooms which have a lower requirement for sunlight. Of these 9 rooms, the retained values are still high, marginally below the recommended levels set out by the BRE. 4 of the 9 rooms would achieve either the APSH annual target of 25 APSH or the winter target of 5 APSH. All of the living rooms would continue to receive sunlight levels well in excess of the suggested targets.

11.182 Given the good levels retained by the rooms, coupled with the low requirement for sunlight of the rooms affected, the effect on sunlight with the Proposed Development in place is considered to be **minor adverse**.

Overshadowing

Sunlight Amenity (Sun on Ground)

11.183 The results of the Sun on Ground assessment shows that at least 50% of each assessment area would achieve 2 hours of direct sunlight on the 21st of March, therefore the Proposed Development is fully compliant with the BRE Guidance in terms of Sunlight Amenity. The significance of effect as a result of the Proposed Development is therefore considered **negligible**.

11.184 The full assessment of the Sunlight Amenity assessment can be found within ES Volume 3, Appendix Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare (Annex 4).

Transient Overshadowing

11.185 The transient shadow images for three key dates throughout the year are located within **ES Volume 3, Appendix Daylight, Sunlight, Overshadowing and Solar Glare (Annex 5)**.

11.186 As would be expected, the Proposed Development will cause additional levels of shadowing on 21st March and, where not confined to the site, the shadows will pass quickly across neighbouring amenity areas. Throughout the day the shadows cast generally last for no more than 2 hrs before transitioning on. The amenity areas set out in Figure 11.2 have been considered in this assessment.

11.187 The properties to the north, such as Elm View, The Dell and Cotswolds and Chinthurst will also experience some additional overshadowing to the rear gardens. These gardens are very large and the additional shadow generally occurs at the rear, away from the house. Whilst not simulated, it should be noted that at rear of these gardens is a large row of mature trees and hedges, which will cast a shadow on the gardens at present. However, for the purposes of this assessment, to create a worst case scenario, all trees and hedgerows have been removed. Therefore the ‘real world’ impact of the Proposed Development on these gardens would be less than that shown in this assessment.

11.188 This can also be said for the properties to the east and south east of the Proposed Development, which includes Pond House, Kingfield Cottage, The Cedars, Nut Cottage and Penlan. All of which have large gardens which will be partially overshadowed. However, these properties are also separated from the site by large mature trees which will already create shadow over these areas.

11.189 Additional assessments for 21st June (when the shadows cast would be at their shortest) has been undertaken. At this time of year, when gardens are likely to be used most the extent of the shadow is significantly reduced.

11.190 The shadows cast on the 21st of December are longer and as such effect a larger area. Again, should the mature trees on the boundary be considered, the real world change in shadow would be less.

Light Pollution

- 11.191 A full detailed lighting strategy has not been provided. However, as the scheme proposes floodlighting in a residential area, it has been deemed necessary to consider the effects of this. As such, DPA Lighting Consultants have provided an illustrative lighting strategy for the floodlighting and set out principals of lighting for the remainder of the Proposed Development. This document can be found at **ES Volume 3, Appendix Daylight, Sunlight, Overshadowing and Solar Glare (Annex 6)**. The commentary below sets out the potential light spill as a result of the flood lighting. It should be noted that the flood lighting would only be used occasionally during the evenings and never after curfew (11pm). The current estimate of use would be for 23 times a year for 3 hours a time.
- 11.192 The light spill on proposed dwellings has also been considered within this assessment. All facades will see average spill across their facades within the suggested levels. The assessments show that a small area of facades 11 and 12 are marginally beyond the 10 Lux level at 11 Lux. This is isolated, marginal and will only occur occasionally when the flood lighting is in use. As such, these effects are considered acceptable.
- 11.193 The suggested acceptable pre-curfew threshold for light spill in environmental zone E3 is 10 Lux. The lighting design has shown that it has been possible to light the pitch to the required level and keep light spill well within this threshold for all existing properties. The significance of effect as a result of the Proposed Development is therefore considered **negligible** to all existing neighbours and **minor adverse** to a small number of residential units within the scheme.

Solar Glare

- 11.194 The results of the solar glare assessment can be found in **ES Volume 3, Appendix Daylight, Sunlight, Overshadowing and Solar Glare: (Annex 6)**. The analysis identified 4 viewpoints around the Proposed Development where road traffic could potentially be affected (denoted by the 'V').

Viewpoint V1 - Travelling east on A247

- 11.195 Instances of reflection will occur briefly from individual windows between 3° to 10° from the drivers focal point during spring and autumn between 0500 and 0600 for less than an hour. In addition, there will reflectance between 10° and 30° degrees from the driver's focal point throughout the year, during the afternoon / evening, approximately between 1400 and 1700.
- 11.196 The reflective elements of the façade are broken up to a certain extent and as such, the intensity and frequency of the glare will be further limited.
- 11.197 Given the glare is limited to a short amount of time between 3° to 10°, the effects are considered to be **minor adverse**.

Viewpoint V2 – Travelling east on A247

- 11.198 Viewpoints V2B and V2C represent views to the two different sets of traffic lights, with Viewpoint V2A looking straight down the road.
- 11.199 The traffic light shown in V2C and the view straight ahead V2A indicate brief instances of glare between 10° and 30° degrees 2 hours a day, throughout the year.
- 11.200 Viewpoint V2B does show some brief instances of glare between 3° and 10° during the hours of 0500 and 0600 within the spring and autumn months.
- 11.201 As the instances of glare are brief and as there will always be a signal visible with no glare between 3° and 10° the reflections visible from viewpoint V2 will result in **minor adverse** instances of glare of drivers.

Viewpoint V3 – Travelling west on Kingfield Road / A247

- 11.202 Viewpoint V4 shows reflectance occurring within 10° and 30° degrees during the hours of 0600 – 0800 throughout the year.
- 11.203 The reflective elements of the façade are broken up to a certain extent and as such, the intensity and frequency of the glare will be further limited.
- 11.204 Given the glare is limited between 10° to 30°, the effects are considered to be **minor adverse**.

Viewpoint V4 – Travelling north on Westfield Avenue

- 11.205 Instances of reflection will occur for less than an hour during the morning beyond 10° from the drivers focal point during early and late summer.
- 11.206 As the glare is limited to a short period of time, it is considered that the glare will result in **minor adverse** effects.

MITIGATION AND RESIDUAL EFFECTS

Demolition and Construction

- 11.207 Worst case construction effects are considered to be directly comparable to the effects of the completed Proposed Development for daylight, sunlight, overshadowing and solar glare. As such, reference should be made to the section below.

Completed Development

Daylight and Sunlight

- 11.208 As would be expected with a scheme of this scale, there are some residual isolated significant effects to the neighbouring residential properties. These have been minimised through considered design with the proposal stepping down to the neighbouring properties.
- 11.209 Once the Proposed Development is completed, the likely effects on daylight for residential properties in the vicinity of the Proposed Development would range from being negligible to the vast majority of residential properties and of minor significance to Cotswolds, Penlan, 67 Granville Road, 1 Westfield Grove, 54-66 (evens) Westfield Avenue and Ash House.
- 11.210 The Proposed Development also presents moderate adverse effects to the daylight in regard to Elm View, 2 Westfield Grove, Beech House & Hazel House. These effects are isolated and the scheme has been designed in a way to limit the effects where possible.
- 11.211 In terms of sunlight, only Hazel House shows minor adverse effects.
- 11.212 Mitigation measures have been included through the design process of the Proposed Development, taking the surrounding properties into consideration to reduce the potential impact to these receptors. A number of cutbacks have been implemented in certain areas of the Proposed Development, significantly reducing the impact of neighbouring daylight and sunlight levels. Accordingly, no further mitigation measures have been suggested. The likely residual effects in relation to daylight and sunlight would be negligible to moderate adverse.

Overshadowing

- 11.213 Once the Proposed Development is completed, the likely residual effects on overshadowing to existing surrounding amenity areas would remain negligible and as such, no mitigation measures are considered necessary.

Light Pollution

- 11.214 Once the Proposed Development is completed, the likely residual effects on light pollution as a result of the floor lighting to existing surrounding amenity areas would remain negligible to existing neighbours and as such, no mitigation measures are considered necessary. As an illustrative scheme has been put forward for the flood lighting, the detailed scheme will be designed to cause the same or less of an effect than those stated in this chapter.

Solar Glare

- 11.215 Once the Proposed Development is completed, the likely residual effects on solar glare upon neighbouring transport routes would remain negligible to minor adverse. As the effect is not significant, mitigation is not required.

Summary

- 11.216 The residual effects resulting from the Proposed Development are summarised in Table 11.10.

Table 11.10 Summary of Residual Effects

Receptor	Receptor Sensitivity	Residual Effect (Nature and Scale)	Geo	D I	P T	R IR	St Mt Lt
Demolition and Construction							
Daylight	High	Moderate adverse	L	D	P	IR	Lt
Sunlight	High	Minor adverse	L	D	P	IR	Lt
Overshadowing	High	Negligible adverse	L	D	P	IR	Lt
Light Pollution	High	Negligible adverse	L	D	P	IR	Lt
Solar Glare	High	Minor adverse	L	D	P	IR	Lt
Completed Development							
Daylight							

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Receptor	Receptor Sensitivity	Residual Effect (Nature and Scale)	Geo	D I	P T	R IR	St Mt Lt
Elm View, Kingfield Road	High	Moderate adverse	L	D	P	IR	Lt
The Dell, Kingfield Road	High	Negligible	L	D	P	IR	Lt
Cotswolds, Kingfield Road	High	Minor adverse	L	D	P	IR	Lt
Chinthurst, Kingfield Road	High	Negligible	L	D	P	IR	Lt
9-12 Kingfield Road	High	Negligible	L	D	P	IR	Lt
Pond House, Kingfield Green	High	Negligible	L	D	P	IR	Lt
Kingfield Cottage, Kingfield Green	High	Negligible	L	D	P	IR	Lt
The Cedars, Kingfield Green	High	Negligible	L	D	P	IR	Lt
Nut Cottage, Kingfield Green	High	Negligible	L	D	P	IR	Lt
Penlan, Kingfield Green	High	Minor adverse	L	D	P	IR	Lt
67 Granville Road	High	Minor adverse	L	D	P	IR	Lt
1 Westfield Grove	High	Minor adverse	L	D	P	IR	Lt
2 Westfield Grove	High	Moderate adverse	L	D	P	IR	Lt
3 Westfield Grove	High	Negligible	L	D	P	IR	Lt
4 Westfield Grove	High	Negligible	L	D	P	IR	Lt
50 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
51 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
52 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
52A Westfield Avenue	High	Negligible	L	D	P	IR	Lt
53 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
54 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
55 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
56 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
57 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
58 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
59 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
60 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
61 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
62 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
63 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
63A Westfield Avenue	High	Negligible	L	D	P	IR	Lt
64 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
66 Westfield Avenue	High	Minor adverse	L	D	P	IR	Lt
Ash House, Acer Grove	High	Minor adverse	L	D	P	IR	Lt
Hornbeam House, Acer Grove	High	Negligible	L	D	P	IR	Lt

Receptor	Receptor Sensitivity	Residual Effect (Nature and Scale)	Geo	D I	P T	R IR	St Mt Lt
Beech House, Sycamore Avenue	High	Moderate adverse	L	D	P	IR	Lt
Hazel House, Sycamore Avenue	High	Moderate adverse	L	D	P	IR	Lt
Sunlight							
Elm View, Kingfield Road	High	Negligible	L	D	P	IR	Lt
The Dell, Kingfield Road	High	Negligible	L	D	P	IR	Lt
Cotswolds, Kingfield Road	High	Negligible	L	D	P	IR	Lt
Chinthurst, Kingfield Road	High	Negligible	L	D	P	IR	Lt
9-12 Kingfield Road	High	Negligible	L	D	P	IR	Lt
Pond House, Kingfield Green	High	Negligible	L	D	P	IR	Lt
Kingfield Cottage, Kingfield Green	High	Negligible	L	D	P	IR	Lt
The Cedars, Kingfield Green	High	Negligible	L	D	P	IR	Lt
Nut Cottage, Kingfield Green	High	Negligible	L	D	P	IR	Lt
Penlan, Kingfield Green	High	Negligible	L	D	P	IR	Lt
67 Granville Road	High	Negligible	L	D	P	IR	Lt
1 Westfield Grove	High	Negligible	L	D	P	IR	Lt
2 Westfield Grove	High	Negligible	L	D	P	IR	Lt
3 Westfield Grove	High	Negligible	L	D	P	IR	Lt
4 Westfield Grove	High	Negligible	L	D	P	IR	Lt
50 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
51 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
52 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
52A Westfield Avenue	High	Negligible	L	D	P	IR	Lt
53 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
54 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
55 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
56 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
57 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
58 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
59 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
60 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
61 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
62 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
63 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
63A Westfield Avenue	High	Negligible	L	D	P	IR	Lt
64 Westfield Avenue	High	Negligible	L	D	P	IR	Lt

Receptor	Receptor Sensitivity	Residual Effect (Nature and Scale)	Geo	D I	P T	R IR	St Mt Lt
66 Westfield Avenue	High	Negligible	L	D	P	IR	Lt
Ash House, Acer Grove	High	Negligible	L	D	P	IR	Lt
Hornbeam House, Acer Grove	High	Negligible	L	D	P	IR	Lt
Beech House, Sycamore Avenue	High	Negligible	L	D	P	IR	Lt
Hazel House, Sycamore Avenue	High	Minor adverse	L	D	P	IR	Lt
Overshadowing	High	Negligible	L	D	P	IR	Lt
Light Pollution	High	Negligible					
Solar Glare	High	Minor adverse	L	D	P	IR	Lt
<p>Notes:</p> <p>Residual Effect Scale = Negligible / Minor / Moderate / Major Nature = Beneficial or Adverse Geo (Geographic Extent) = Local (L), Borough (B), Regional (R), National (N) D = Direct / I = Indirect P = Permanent / T = Temporary R = Reversible / IR= Irreversible St = Short Term / Mt = Medium Term / Lt = Long Term N/A = not applicable / not assessed</p>							

LIKELY SIGNIFICANT EFFECTS

- 11.217 Mitigation has been applied throughout the design process in articulating the massing of the Proposed Development to minimise the effects as far as possible. The Proposed Development steps back from the most proximate neighbours to reduce any potential daylight and sunlight effects that may be seen within the neighbours.
- 11.218 Whilst this mitigation has been successful in the majority of cases, there are some remaining isolated effects. Overall, the rate of compliance is good, and no further mitigation is suggested. The effects therefore remain as assessed, with the following receptors being significantly affected:
- Elm View, Kingfield Road – moderate effect to daylight;
 - 2 Westfield Grove – moderate effect to daylight;
 - Beech House, Sycamore Avenue – moderate effect to daylight; and
 - Hazel House, Sycamore Avenue – moderate effect to daylight.
- 11.219 For a scheme of this size and scale, these effects are to be expected and are mainly driven by the currently low rise nature of the majority of the existing site. The BRE guidance states that the targets suggested should be interpreted flexibly. Therefore, the few isolated effects caused a result of the Proposed Development are considered to be acceptable.

CLIMATE CHANGE

Daylight

- 11.220 In line with the BRE Guidelines, the daylight assessments are carried out under an assumed overcast sky.

- 11.221 The UKCP18³ reports suggests that cloud amount will decrease, although there is no information as to who this will affect diffuse illuminance and irradiance levels. Whilst there is no information, it can be considered reasonable to assume that as cloud cover decreases, the overall amount of daylight increases. As such, it is unlikely to impact upon the conclusions of this chapter.

Sunlight

- 11.222 The APSH assessment is used to quantify the sunlight levels to a residential property. The BRE Guidelines provides a sunlight availability indicator with a set of 100 spots representing the position of the sun throughout the year.
- 11.223 A change in climate that might result in more annual sunlight hours would note result in more than 100 APSH test points since this is a fixed number.
- 11.224 The BRE Guidelines may be updated in the future to reflect a potentially sunnier climate. Whilst the locations of the points may shift, it is likely that the overall number of points is likely to stay the same.
- 11.225 Given the above, an APSH assessment using the current methodology will most likely produce comparable results.
- 11.226 In addition, the UKCP09 data suggests that the future climate is likely to be slightly sunnier. Notwithstanding this, unless the BRE Guidelines are updated, the change in climate will not affect an APSH assessment.

Overshadowing

- 11.227 This assessment assumes a day with no cloud cover and such, the maximum potential sunlight is considered. As mentioned above, the UKCP18 reports suggest a potentially sunnier climate. Notwithstanding this, unless the methodology is changed, this will not affect the assessment.

Solar Glare

- 11.228 As with overshadowing, the solar glare assessment assumes no cloud cover so the maximum potential sunlight is assessed. As such, whilst the UKCP09 reports potential to be sunnier, the conclusions of the assessments undertaken will remain the same unless the methodology is changed.

ASSESSMENT OF FUTURE ENVIRONMENT

Evolution of the Baseline Scenario

- 11.229 The evolution of the baseline scenario will revolve around the proposal of other schemes within the area. If the Proposed Development was not brought forward and the existing baseline scenario remained unchanged (i.e. no other schemes were built in the area), the surrounding neighbours would see no impact to daylight and sunlight levels.
- 11.230 Due to the underdeveloped nature of the site, any similar development to be proposed on the site would result in a similar impact to the surrounding receptors. Where these future proposed schemes would occur, there will likely be a similar reduction in daylight and sunlight levels seen within the relevant residential receptors considered within this assessment.

Cumulative Effects Assessment

- 11.231 As set out in *ES Volume 1, Chapter 2: EIA Methodology*, no cumulative schemes were identified within the surrounding area of the site; therefore, a cumulative effects assessment (i.e. an assessment of the effects of the Proposed Development in combination with the effects of other cumulative schemes within the surrounding area) has not been undertaken.

³ DEFRA, 2018. Adapting to climate change – UK Climate Projections.