READING BOROUGH COUNCIL

TOWN AND COUNTRY PLANNING ACT 1990
TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000
SECTION 78 APPEALS

PROOF OF EVIDENCE ON DAYLIGHT AND SUNLIGHT

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Appeal by: Aviva Life and Pensions UK Ltd

Appeal Site: Vastern Court, Reading

Appeal Against: The failure of Reading Borough Council to determine within the prescribed period a planning application

Planning Inspectorate Reference: APP/E0345/W/21/3289748

Reading Borough Council Reference: 200328

March 2022

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1 INTRODUCTION

1.1 My name is Paul Jeffrey Littlefair and I have been working on daylighting and related issues at the Building Research Establishment, Garston, Watford WD25 9XX, since 1979. BRE is the UK's foremost construction research organisation. It was formerly part of the Department of the Environment and is now owned by the BRE Trust, a registered charity. In 1984 I was awarded a PhD for work carried out at BRE. The title of my thesis was 'Daylighting design and energy conservation'. In 1988 I became a member of the Chartered Institution of Building Services Engineers (the professional institution responsible for interior lighting) and am a Chartered Engineer. I was a founder member (now a Fellow) of the Society of Light and Lighting. I am a member of the Institution of Lighting Professionals.

1.2 I have published over 100 papers on daylight and related issues and wrote part of the British Standard Code of Practice on daylight and the CIBSE Lighting Guide 'Daylighting and window design'. The effect of building layout on interior daylight, particularly in existing buildings, is one of my specialised subjects. In 1991 I wrote 'Site layout planning for daylight and sunlight: a guide to good practice', for the Department of the Environment, which is widely used by developers and planning authorities to help determine the loss of light to existing buildings. I revised this document in 2011.

1.3 I am BRE's specialist on Rights to Light issues, and have carried out over 400 studies of the loss of light to existing buildings.

Scope of Evidence

1.4 This proof deals with the daylight and sunlight issues arising from the proposed development. Section 2 describes the development and the reasons for refusal. Section 3 explains the relevant policies and guidance on daylight and sunlight. Section 4 deals with loss of light to existing dwellings. Section 5 deals with cumulative effects, including the effect of the Appeal Schemes on two proposed developments on nearby sites, and the joint effect of all three developments on existing dwellings. Section 6 reviews daylight and sunlight provision within the Appeal Scheme itself, and section 7 addresses sunlight provision within open spaces.

1.5 The developer has submitted an Environmental Statement, chapter 10 of which is entitled 'Daylight, Sunlight, Overshadowing and Solar Glare' (CD 1.9.10). They have also submitted a report by CHP Surveyors Ltd concerning daylight and sunlight provision within the proposed scheme itself, entitled 'Reading Station Park, Reading: Internal daylight and sunlight review' dated 6th October 2021 (CD 1.46).

1.6 BRE have been commissioned by Reading Borough Council to evaluate this chapter and report. The assessment was to cover the methodology and conclusions, but not verification of the calculations.

1.7 The assessment addresses the council's seventh reason for refusal:

> *'The proposed development would result in unacceptable loss of daylight to existing residents at 17-51 Vastern Road, and has not demonstrated whether acceptable living conditions (daylight and sunlight) could be achieved for occupants in the new development. In addition, it has not been adequately demonstrated how an acceptable level and quality of private and communal amenity space could be achieved for all future occupiers, whilst meeting appropriate levels of daylight and sunlight penetration. The proposal submission does not also include an assessment of the cumulative impact on the adjoining RMG site and the loss of daylight sunlight to the SSE site. Therefore, the development would be contrary to NPPF, The National Design Guide, National Model Design Code Parts 1 and 2, Reading Borough Local Plan Policies (2019) CC7, CC8, H10 and CR10.'*

1.8 The assessment is also relevant to the first and second reasons for refusal which cover the wider impact on the local area. The first reason states

> *'The Applicant has failed to demonstrate how proposed plot heights in excess of Local Plan and RSAF height and massing guidance will not result in unacceptable detrimental effects on the townscape, the surrounding area and the setting of public spaces, especially when considered in the context of cumulative effects with adjoining allocated, emerging and existing sites contrary to NPPF Section 12, the National Design Guide, National Model Design Code Parts 1 and 2, Reading Borough Local Plan Policies (2019) Policies CR2, CR3, CC7, H2, CR10 and CR10(a), CR11 and CR11e, the Reading Station Area Framework (2010).'* The second reason states *'The siting, height and likely massing of proposed Tall Buildings within Plots A, B, C and D are bulky, harmful to the setting and the character of the surrounding area and public spaces and fails to achieve the high standard of design expected of a Tall Building. This is contrary to contrary to NPPF Section 12, Reading Borough Local Plan Policies (2019) EN1, EN3, EN5, CR2, CC7, CR10, H2, CR11, The Reading Tall Buildings Strategy, The Reading Tall Buildings Strategy Update Note 2018, and the Reading Station Area Framework (2010).'*

1.9 The evidence in this proof is based principally on the data supplied in the Environmental Statement and CHP Surveyors' report, plus additional data supplied by CHP. It is also based on outline plans by Collado Collins contained in a document 'Reading Station Park redevelopment: Amended outline planning application booklet, amended description of development, application forms & certificates, amended development parameters (schedule and parameter plans)' dated October 2021 (CD 1.34). No site visit was specifically undertaken for this review, although I did visit the site on 9 May 2019 to assess a proposed neighbouring scheme.

1.10 I have not carried out any independent calculations of the loss of light, or daylight and sunlight in the proposed development, and the assessment has been based on the data provided by CHP Surveyors. I have assumed that these data have been calculated correctly, although I have concerns about the daylight data for the proposed scheme. These concerns are outlined in detail in section 6 below.

2 THE PROPOSED DEVELOPMENT

2.1 The proposed development is described in an outline planning application submitted to Reading Borough Council. The proposal is for a large mixed use development, in a series of blocks up to around 75 metres tall.

2.2 Figure 1 shows the development as modelled by CHP Surveyors. In assessing loss of light to neighbouring (existing and proposed) dwellings, CHP appear to have modelled the maximum parameter scheme. In principle, the loss of light for a scheme which lies within the maximum parameter envelope could be expected to be less than this. However in their design statement (CD 1.54) Collado Collins have proposed an illustrative scheme which appears to exceed the maximum parameters. The maximum parameter drawing for Block B shows the eastern half of the building with a maximum height of 55.1m AOD, which equates to 17m above ground. However the illustrative scheme Vastern Road elevation shows an element in this location of six storeys plus pitched roof. The Design Code (CD 1.47) recommends a minimum floor to floor height of 4m on the ground floor and 3.15m on upper floors, resulting in an overall height of 19.75m even before the pitched roof is taken into account. With even a modest pitched roof it would end up over 22m high (60.1m AOD). This could further increase the loss of light to dwellings on Vastern Road.

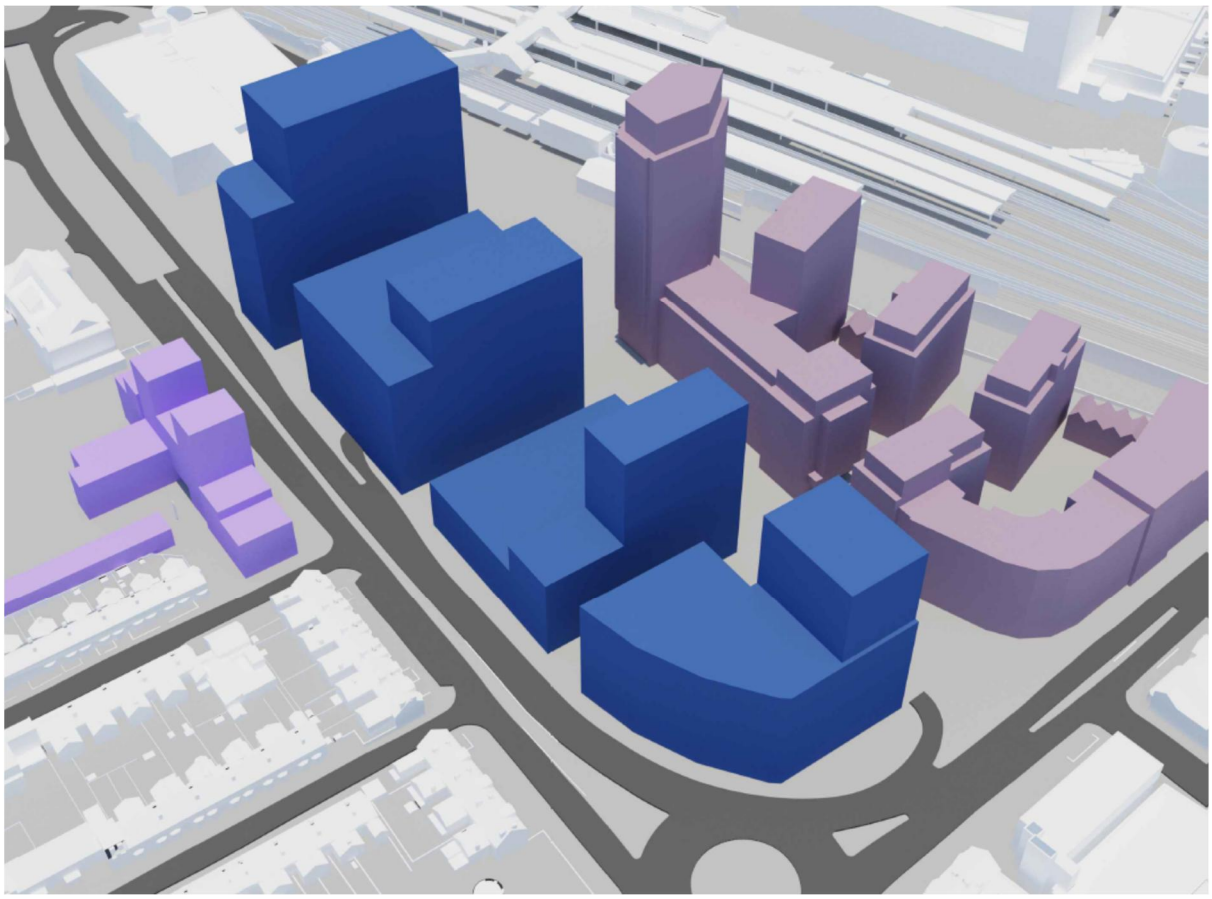

Figure 1. The proposed scheme in dark blue, as modelled by CHP Surveyors (CD 1.9.31). The proposed massing for the Reading Metropolitan/Hermes development is shown behind it in light purple. To the left is the site of the proposed River Gate/SSE development (in lilac).

2.3 Figure 2 shows the development site and its surroundings.

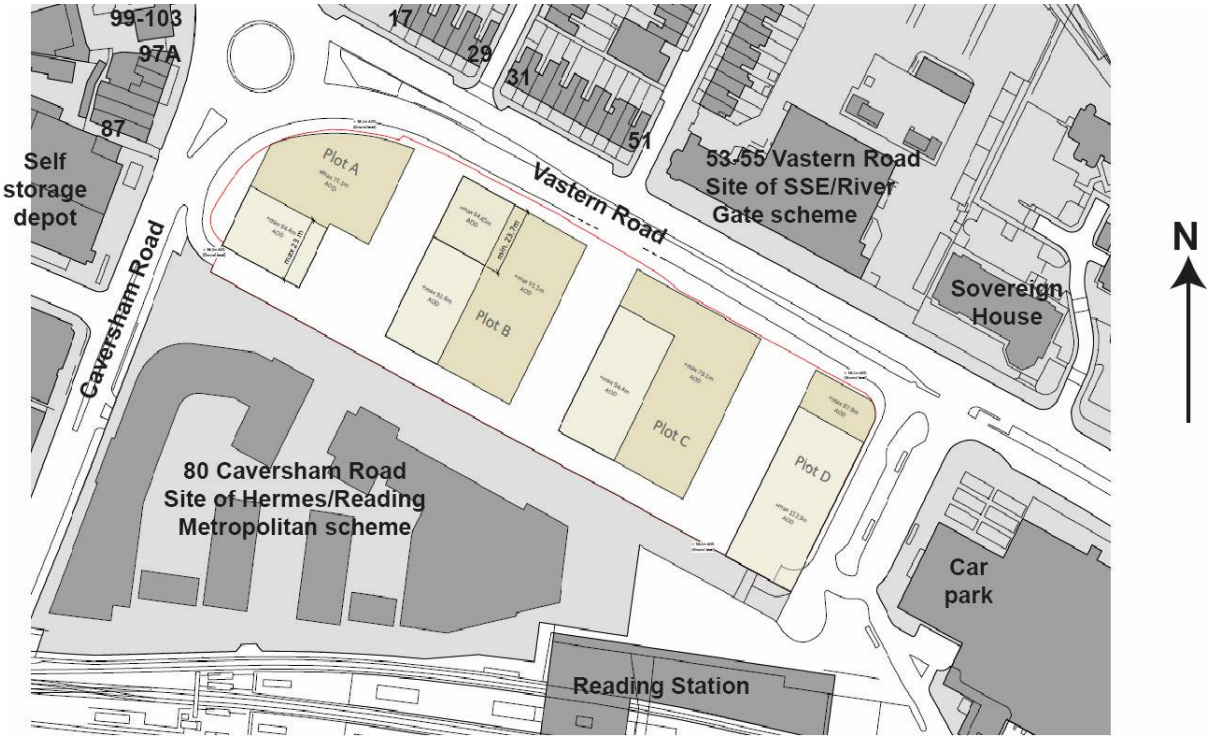

Figure 2. Maximum parameter plan (CD 1.34.10.4) by Collado Collins showing the development in light brown, and annotated to show surrounding buildings. North is at the top of the plan.

2.4 The development site is at the corner of Caversham Road (to the west) and Vastern Road (to the north). There are dwellings that could be affected by it along both roads. To the south of the proposal development is 80 Caversham Road, the site of a Post Office sorting depot. This would be expected to have a lesser requirement for daylight than residential buildings would. However the site is currently the subject of an application for outline planning permission for a large, predominantly residential scheme (Reading Metropolitan, referred to as the Hermes development in the Environmental Statement).

2.5 To the north across Vastern Road is 53-55 Vastern Road, currently an office block, for which loss of daylight may not be as important an issue. This site too has been the subject of a planning application for a predominantly residential scheme, 'River Gate', referred to as the SSE development in the Environmental Statement. This development was recently given planning permission following a successful appeal (CD 5.1).

3 GUIDANCE ON DAYLIGHT AND SUNLIGHT

National Planning Policy Framework (CD 7.36)

3.1 The new (2021) National Planning Policy Framework includes a statement on daylight in its paragraph 125:

> *'local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards).'*

3.2 This latter text is important because it recognises the importance of daylight and sunlight in providing acceptable living standards.

The National Design Guide (2021) (CD 7.17)

3.3 Paragraph 70 of the National Design Guide states:

> *'Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their location and siting; relationship to context; impact on local character, views and sight lines; composition - how they meet the ground and the sky; and environmental impacts, such as sunlight, daylight, overshadowing and wind. These need to be resolved satisfactorily in relation to the context and local character.'*

3.4 Paragraph 126 recommends that

> *'Well-designed homes and communal areas within buildings provide a good standard and quality of internal space. This includes room sizes, floor-to-ceiling heights, internal and external storage, sunlight, daylight and ventilation. The quality of internal space needs careful consideration in higher density developments, particularly for family accommodation, where access, privacy, daylight and external amenity space are also important.'*

3.5 Paragraph 130 deals with external spaces, stating:

> *'Well-designed private or shared external spaces are fit for purpose and incorporate planting wherever possible. The appropriate size, shape and position for an external amenity space can be defined by considering: how the associated building sits in the wider context, including access to public and open spaces; how the amenity space will be used, what for, and by whom; environmental factors that may affect its usability, such as sunlight and shade, noise or pollution'*.

The National Model Design Code (2021) (CD 7.18)

3.6 This document sets out standards that could be included in local plans or design codes. Among these is (paragraph 65(iii)):

> *'Lighting, aspect and privacy: All habitable rooms should receive adequate levels of daylight. Single aspect north-facing dwellings should be avoided'* .

3.7 The guidance notes (paragraph 114) state that

> *'Building height may also have an impact on local environmental conditions in neighbouring properties, amenity spaces and public spaces in terms of daylight, sunlight, overshadowing, wind and micro-climate. The placing of tall buildings needs to maximise user comfort of spaces between buildings by taking into account their impact on orientation and overshadowing of public and private spaces'*.

3.8 Paragraph 187 goes on to give various health effects of design including

> *'The built environment has a significant impact on people's health and wellbeing…There are also specific elements relating to the impact of the design of homes and buildings that affect wellbeing including daylight'*.

3.9 Paragraph 188 states

> *'Good quality housing creates a pleasant indoor environment with adequate levels of natural lighting, and sunlight, without problems of overheating, good quality ventilation, privacy from overlooking and minimal noise impact.'*

Reading Local Plan (2019)

3.10 Within Reading's Local Plan, policy CC8: 'Safeguarding Amenity' (CD 4.9) requires that 'Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties'. It gives a list of potential detrimental impacts including *'Access to sunlight and daylight'*. A footnote to the accompanying guidance states that

> *'For instance, reference to the 'BRE Site Layout Planning for Daylight and Sunlight: A guide to good practice' document may be of use in ensuring that new development adjacent to residential properties is not of adverse bulk and does not block out sunlight and daylight to habitable rooms and outdoor living spaces'*.

3.11 Policy CR10 on tall buildings (CD 4.55) states that, among other things, tall buildings should

> *'Ensure adequate levels of daylight and sunlight are able to reach buildings and spaces within the development'* and *'Avoid significant negative impacts on existing residential properties and the public realm in terms of outlook, privacy, daylight, sunlight, noise, light glare and nighttime lighting'*.

3.12 The accompanying paragraph 5.3.47 states that

> 'Sunlight and daylight should meet the criteria outlined in the 'Site layout planning for daylight and sunlight: a guide to good practice', published by the Building Research Establishment (BRE) and the British Standard Code of Practice for Daylighting (BS8206-2).'

3.13 Paragraph 5.3.49 goes on to say that

> '*Solar issues will influence the orientation of a building, and there are various aspects that need to be considered. These will include solar gains where passive heating is desired, shading from solar gains where they are not desired, the need to maximise daylighting, and renewable energy generation by photovoltaic cells. In terms of effects of developments, the Building Research Establishment (BRE) has guidelines on assessing daylight and sunlight effects of development, which the Council will apply flexibly given the high density of the central area.'*

3.14 Finally, policy H10 (CD 4.36) states that private and communal outdoor spaces should

> '*not be compromised by the relationship of other buildings which may be detrimental in terms of overlooking, overbearing or overshadowing'*.

BRE guidance

3.15 To assess the loss of daylight and sunlight to existing buildings nearby, the Environmental Statement refers to the BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' (CD 7.20). This guidance is widely used by local authorities, including Reading Borough Council, to help determine planning applications.

Loss of light to existing buildings

3.16 To assess the impact on the amount of diffuse daylighting entering existing buildings, the Report uses the vertical sky component (VSC) on the window wall. The Report (paragraph 2.2.7) sets out two guidelines for vertical sky component:

If this VSC is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the VSC, with the new development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the

reduction in the amount of skylight. The area lit by the window is likely to appear more gloomy, and electric lighting will be needed more of the time.

3.17 The BRE Report also gives guidance on the distribution of light in the existing buildings, based on the areas of the working plane which can receive direct sky light before and after. Paragraph 2.2.9 states:

> *If, following construction of a new development, the no sky line moves so that the area of the existing room, which does receive direct skylight, is reduced to less than 0.8 times its former value this will be noticeable to the occupants, and more of the room will appear poorly lit.*

3.18 To verify compliance with the daylight distribution guidelines it is necessary to have data on the internal layouts of the affected rooms. Unless CHP Surveyors had access to, or plans of, the existing buildings, the daylight distribution data are subject to uncertainty.

3.19 These two guidelines address different aspects of the daylit environment in a space. The vertical sky component relates to the amount of light entering the room, while the DD analysis relates to the way the light is distributed. A room can experience an adverse effect if either guideline is not met. So for example, if the amount of light entering the room is significantly reduced but the distribution remains adequate, there would still be a significant effect on the daylight amenity of the room.

3.20 The BRE Report recommends that in existing buildings sunlight should be checked for all main living rooms of dwellings, and conservatories, if they have a window facing within 90° of due south. Access to sunlight should be calculated for the main window of each of the above rooms which faces within 90° of due south. Paragraph 3.2.11 states that

> *the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:*
>
> - *receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March, and*
> - *receives less than 0.8 times its former sunlight hours during either period and*
> - *has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.*

3.21 This guideline is also used in the Environmental Statement.

Daylight and sunlight in new dwellings

3.22 For daylight in new dwellings where room layouts and window designs are known, the average daylight factor (ADF) can be used. The average daylight factor (ADF) is a measure of the amount of daylight in an interior. It depends on the room and window dimensions, the reflectances of interior surfaces and the type of glass, as well as the obstructions outside. Appendix F of the BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' (CD 7.20) explains that *'it is an appropriate measure to use in new buildings because most of these factors are within the developer's control'*. CHP Surveyors have calculated average daylight factors for the new development in their report (CD1.46).

3.23 Appendix C of the BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' refers to guidance on the levels of daylight to be provided given in the former British Standard on daylight, BS 8206 Part 2. It recommends minimum values of average daylight factor of 1% for bedrooms, 1.5% for living rooms and 2% for kitchens. The CHP Surveyors report has used these recommendations.

3.24 BS8206 Part 2 was superseded in May 2019 by a European Standard (BS EN17037:2018). This gives alternative daylight metrics based around median daylight factor and daylight autonomy (the median illuminance in a room for 50% of daylight hours). The main text of the European Standard recommends minimum levels of daylight that are significantly greater than those in BS8206 Part 2. This is partly based on recent research on the health effects of daylight (Ticleanu et al 2017, Aries et al 2015). Daylight and sunlight have been shown (Holzman 2010, Eisenstein 2013) to have an important role in maintaining human circadian rhythms, which is important in preventing various diseases (Choi et al 2012, Joarder and Price 2013) and mental health conditions such as depression (Seasonal Affective Disorder or SAD) (Evans and Ferguson 2011).

3.25 There is a UK National Annex to BS EN 17037 which gives lower levels, similar to those in the superseded BS 8206 Part 2, as minima for new dwellings, for example those with basement rooms or those with significant external obstructions (such as those situated in a dense urban area or with tall trees outside), or for existing buildings being refurbished or converted into dwellings.

3.26 CHP Surveyors have also carried out (CD 1.46) calculations against the recommendations in the new BS. It is assumed that they have used the recommendations in the National Annex to BS EN 17037. This recommends particular internal illuminances to be achieved over at least half the floor area over at least half of daylight hours. These are 200 lux for kitchens, 150 lux for living rooms and 100 lux for bedrooms.

3.27 Currently, as the BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' has not yet been updated to refer to BS EN 17037, consultants assess daylight provision in new buildings using the recommendations in either BS8206 Part 2 or BS EN 17037.

3.28 BS8206 Part 2 and the BRE Report also give guidance on sunlight in new dwellings. This is based on living rooms receiving 25% of annual probable sunlight hours, including 5% in the winter.

3.29 Sunlight can also make outdoor spaces more pleasant, particularly where there are activities like sitting out and children's play. Guidance on sunlight in outdoor spaces is given in the BRE Report 'Site layout planning…'. Paragraph 3.3.3 states:

> *'The availability of sunlight should be checked for all open spaces where it will be required. This would normally include*
>
> - *gardens, usually the main back garden of a house*
> - *parks and playing fields*
> - *children's playgrounds*
> - *outdoor swimming pools and paddling pools*
> - *sitting out areas such as those between non domestic buildings and in public squares*
> - *focal points for views such as a group of monuments or fountains.* '

3.30 Paragraph 3.3.17 of the Report states that

> *'It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.'*

3.31 This assessment has been carried out by CHP Surveyors for open spaces in the proposed development.

Impact assessment

3.32 The BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' (Appendix I, CD 7.20) also gives guidance on assessing the impact of a proposed development. It states that (paragraphs I5-I7)

> *'Where the loss of skylight or sunlight fully meets the guidelines in the document, the impact is assessed as 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 impact 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 and 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 a minor adverse impact include:*
>
> - *only a small number of windows or limited area of open space are affected*
> - *the loss of light is only marginally outside the guidelines*
> - *an 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*
> - *there are particular reasons why an alternative, less stringent, guideline should be applied (see Appendix F).*
>
> *Factors tending towards a major adverse impact 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*
> - *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight, eg a living room in a dwelling or a children's playground.'*

3.33 Some councils use an alternative classification of impact which is applied alongside the BRE guidance on a window by window basis (see tables 10.4-10.8 of the Environmental Statement, CD 1.9.10). Relative losses of 20-30% are classed as minor adverse, 30-40% moderate adverse, and 40%+ major adverse. Although not in the BRE guidance,

this is an objective set of criteria, and, except for daylight distribution, the boundaries of the categories are reasonable, but the results need careful interpretation. For example a large relative loss of light to a secondary window, or a window with a large overhang above it, would not be as serious as the same loss of light to a main living room window.

3.34 Table 10.3 of the Environmental Statement gives alternative criteria for 'high' 'medium' 'small' and 'very small' magnitudes of impact. These do not have any basis in published guidance. However this classification does not appear to have been applied in the Environmental Statement, so this table may be discounted.

4 DAYLIGHT AND SUNLIGHT TO EXISTING PROPERTIES

4.1 The Environmental Statement (CD 1.9.10) has assessed the loss of light to existing dwellings. It has analysed loss of light to residential properties at 87-97 Caversham Road (odd numbers only) and 17-49 Vastern Road (odd numbers only). 51 Vastern Road was not analysed in the Environmental Statement, but data have now been supplied by James Crowley.

4.2 There appear to be no other existing residential properties that could be significantly affected. Other nearby buildings are in commercial uses for which loss of light would be less important.

4.3 87-97 Caversham Road (odd numbers only) are flats above shops and a restaurant (figure 3). Assessed against the existing baseline, loss of vertical sky component to three windows in 87-89 would be outside the BRE guidelines, though the retained values would be in the 26.6-26.9% range, only just below the recommended 27%.

Figure 3. Flats above shops at 87-97 Caversham Road (photo taken in 2019).

4.4 The Environmental Statement has also analysed impacts on daylight distribution. In its appendix 10.2 (CD 1.9.32) the relevant data are headed 'NOSKY'. The data were presented in an unusual way; ratios of the areas 'before' and 'after' were not given, and if the area 'before' is more than 80% of the room it was not given, making it impossible to calculate the ratio. James Crowley has since provided updated tables which give the full data including ratios.

4.5 The impact on daylight distribution would be outside the BRE guidelines for five rooms (all but one of the second floor rooms), though only marginally in the case of number 91. Relative losses of daylit area for these rooms would range from 21%-58%. There appears to be a mistake in tables 10.17, 10.19 and 10.21 of the Environmental Statement (CD 1.9.10) which show all these rooms as complying with the daylight distribution guideline; this does not agree with the detailed data in their Appendix 10.2. However, these results may be subject to uncertainty if room layouts are not known.

4.6 The Environmental Statement states that all the rooms where daylight distributions are affected are bedrooms. The BRE Report states in its paragraph 2.2.8 that impacts on daylight distribution in bedrooms are less important. If the rooms are really bedrooms, the loss of daylight would count as a minor adverse impact to these flats (not negligible as stated in the Environmental Statement).

4.7 Loss of sunlight to 87-97 Caversham Road would be within the BRE guidelines for all windows, and classified as negligible.

4.8 The worst losses of daylight would be to 17-51 Vastern Road (odd numbers only). These are houses, some of which may be divided into flats. Loss of vertical sky component (VSC) to all windows analysed on the Vastern Road frontage would be well outside the BRE guidelines, with relative losses in the 33-45% range.

4.9 Compared to the existing baseline, loss of VSC to all 57 windows analysed at 17-49 Vastern Road would be outside the BRE guidelines. 39 of these windows would have relative reductions of 33.0-39.8% (described as 'moderate reduction' in table 10.14 of the Environmental Statement) and 18 windows would have relative reductions of 40% or more (described as 'major' in table 10.14).

4.10 Effects on daylight distribution, compared to the existing baseline, would be outside the BRE guidelines for 36 rooms of the 50 analysed in 17-49 Vastern Road. 11 of these would have impacts more than double the BRE recommendation.

4.11 Relative losses of daylit area for these rooms would range from 23%-79%. Figures 4 and 5 show where these windows and rooms are.

Figure 4. 17-29 Vastern Road, annotated to show ranges of percentage loss in VSC and daylit area. Photo taken in 2019.

Figure 5. 31-49 Vastern Road, annotated to show ranges of percentage loss in VSC and daylit area. Photo taken in 2019.

4.12 A particular concern is loss of light to the ground floor rooms which would normally be expected to be main living rooms. Thirteen of these rooms would have VSC reductions more than double the BRE guidelines, and eleven of them would have impacts on their daylit area outside the BRE guidelines. These rooms would appear substantially darker, and more of the room would appear gloomy.

4.13 It should be noted that many rooms in 17-49 Vastern Road have a three pane bay window. This includes all the ground floor living rooms in 17-49 Vastern Road and also first floor rooms in 31-49 Vastern Road. In these cases the Environmental Statement has only analysed loss of light to the central window. This is acceptable as it is in line with the guidance in paragraph 2.2.6 of 'Site layout planning for daylight and sunlight: a guide to good practice', which gives recommendations in terms of loss of light to the main window. However it means that the total number of windows actually affected is much more than 57. In total, up to 110 windows in 17-49 Vastern Road could have losses of VSC outside the BRE guidelines.

4.14 Losses of VSC to nine windows at 51 Vastern Road (including some secondary windows lighting a doorway, and in, this case, side bay windows) would be outside the BRE guidelines. Eight of these windows would have relative reductions of 26.7-36.5% and one window would have a relative reduction of 73.9%, though this is a secondary window lighting the doorway and it has an overhang above it. Figure 6 shows where these windows are. Impacts on daylight distribution in number 51 would be within the guidelines.

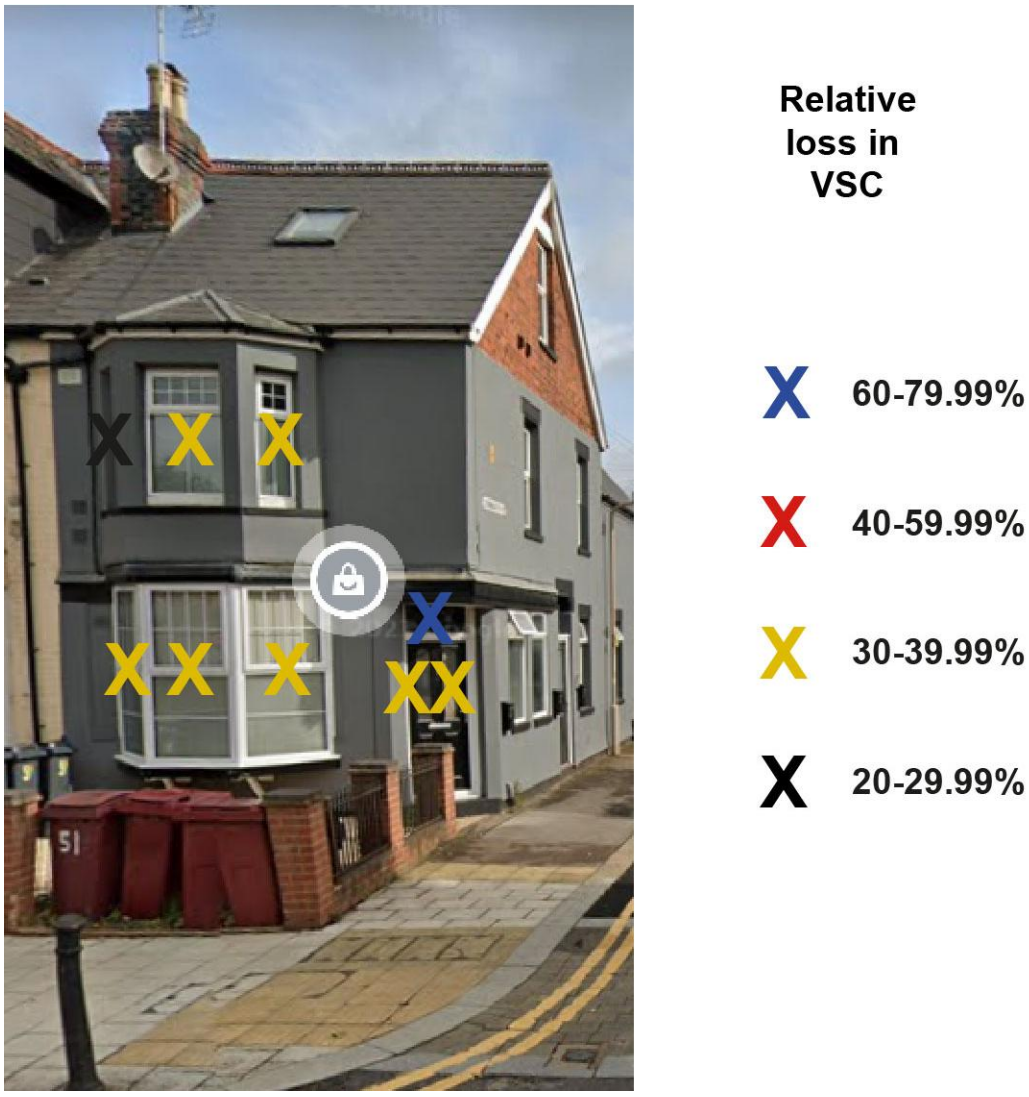

Figure 6. 51 Vastern Road, annotated to show ranges of percentage loss in VSC. Photo from Google Streetview.

4.15 Retained vertical sky components on windows in numbers 17-51 facing Vastern Road would be in the 20-24% range at ground floor level, 22-25% at first floor level and 23-26% at second floor level.

4.16 Paragraph 11.31 of the Environmental Statement states

> *'Given the application site context and based on similar sites, professional judgement has been used to establish that a VSC of 15% could be considered acceptable for such an urban context. However, on balance, it is considered that a VSC of 20% is a more appropriate alternative target'*

4.17 These low targets are not given in the BRE guidelines and are likely to result in inadequate daylight in dwellings that have not been specifically designed for such a

high level of obstruction (for example by having unusually large windows). Although these values of VSC might be typical of a dense urban area, Vastern Road is unusually wide (around 36m from building line to building line) and residents could legitimately expect to retain more light for that reason.

4.18 The Environmental Statement (paragraph 11.33) has also adopted an unusually poor level of daylight distribution as an alternative target, considering an impact acceptable if more than 50% of the room area retains access to direct sky light. However this could give a large gloomy area covering almost half the room, and is unlikely to be acceptable to the occupants.

4.19 As a comparator, the Environmental Statement has analysed loss of light to the dwellings in 17-49 Vastern Road with the Reading Station Area Framework masterplan (CD 7.1). Paragraph 11.200 of the Environmental Statement (CD 1.9.10) states that

> *'The results demonstrate that the RSAF envisaged by the RBC, whilst resulting in less windows and rooms not achieving the numerical values in the BRE guidelines compared with the results for the proposed development, would result in a similar scale of effects as experienced with the proposed development. As this RSAF has been adopted by the RBC, it is considered to be a material consideration which sets a precedent for the levels of daylight and sunlight which could be considered reasonable and acceptable in planning terms and therefore justifies the use of alternative targets'*.

4.20 However this is incorrect. The Reading Station Area Framework masterplan would have a much lower impact on daylight to these dwellings. Only 16 of the windows analysed would not meet the BRE VSC guidelines (with vertical sky components below 27% and below 0.8 times the value before), compared to 57 with the Appeal Scheme. If the Reading Station Area Framework scheme were genuinely be used as an alternative target, the Appeal Scheme would do worse than the target for all 57 windows analysed. This is not surprising because the Appeal Scheme is much taller than the RSAF masterplan.

4.21 Overall the loss of daylight would be assessed as major adverse to 21-49 Vastern Road. This conclusion follows the guidance in Appendix I of the BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' which states that:

> *Factors tending towards a major adverse impact 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*
- *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight, eg a living room in a dwelling.'*

4.22 A major adverse impact would therefore be the correct assessment for these dwellings because a large number of windows are affected, the loss of light is well outside the guidelines, all the windows on this side are affected, and the affected windows would be expected to include main living rooms.

4.23 For 17 and 19 Vastern Road the loss of light is a little lower and could be classified as moderate adverse. The ground floor room in 51 Vastern Road has additional windows facing into Lynmouth Road and therefore in the 'existing baseline' situation the loss of daylight would also be classified as moderate adverse. Unfortunately these additional windows are themselves due to be heavily obstructed by the consented development at 55 Vastern Road, see section 5 below.

4.24 The Environmental Statement paragraph 11.113 assesses the impact as *'Minor to Moderate adverse, with only a number of isolated locations experiencing Moderate adverse effects, which, on balance, would not be considered significant'.* However this assessment ignores the large relative losses of light, the large number of windows affected, and the fact that all the windows on this side are affected including windows to main living rooms.

4.25 All windows in these properties would meet the BRE guidance on loss of sunlight. Loss of year-round sunlight would be classified as negligible. Loss of winter sunlight would be classified as minor adverse, as the windows would lose most of their winter sun, while retaining above the recommended 5%.

5 CUMULATIVE IMPACTS

5.1 The 80 Caversham Road (Reading Metropolitan/Hermes) site to the south and the 55 Vastern Road (SSE) site to the north are expected to be redeveloped in the future (Figure 2), and both developments are expected to include residential buildings. The 55 Vastern Road site has recently been given planning approval by the Secretary of State following an appeal (CD 5.1). The 80 Caversham Road site is the subject of a planning application which has not yet been determined.

5.2 This type of situation gives rise to three different issues:

- The three developments together might have a cumulative daylight/sunlight impact on existing properties nearby
- The Hermes and SSE developments might restrict daylight and sunlight to the proposed Vastern Court development
- The Vastern Court development might limit daylight (though not sunlight, as it lies to the north) to the Hermes development; and might limit both daylight and sunlight to the SSE development.

5.3 The Environmental Statement (CD 1.9.10) has addressed the first of these issues. CHP's report (CD 1.46) dealt with the second issue, see section 6 below. The third issue, the impact of the proposed Vastern Court development on future occupiers of homes on the Reading Hermes and SSE sites, was not considered in the Environmental Statement, and should have been addressed.

Effect on proposed neighbouring developments

5.4 This month James Crowley submitted a graphical presentation of vertical sky components for the Hermes and SSE sites. These are reproduced as Figures 7 and 8 below. These are the drawings with the proposed development in place. Similar plans for the 'existing' situation have been provided, but these are not particularly helpful as for the critical facades they appear to show VSCs in the 27-40% range, which would have been expected anyway.

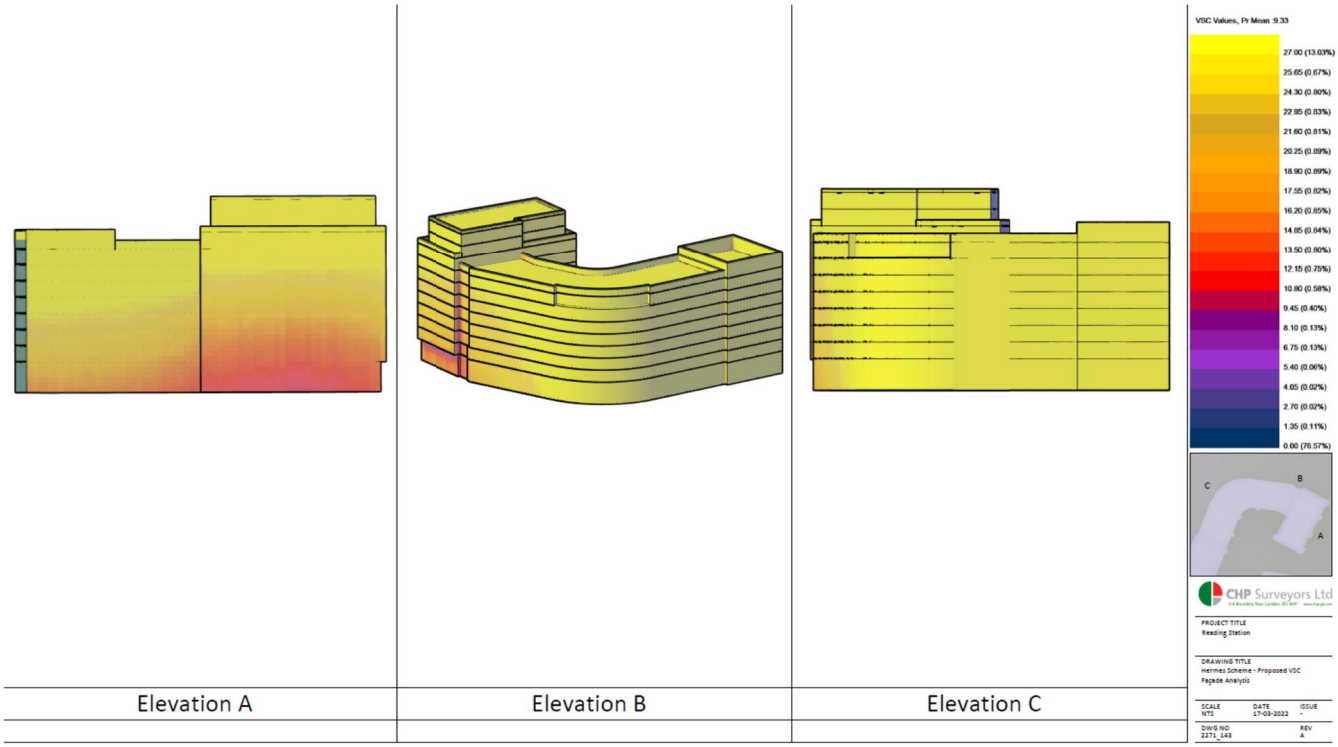

Figure 7. Drawing by CHP Surveyors indicating vertical sky components on the facades of the Hermes (Reading Metropolitan/80 Caversham Road) development with the Appeal Scheme in place.

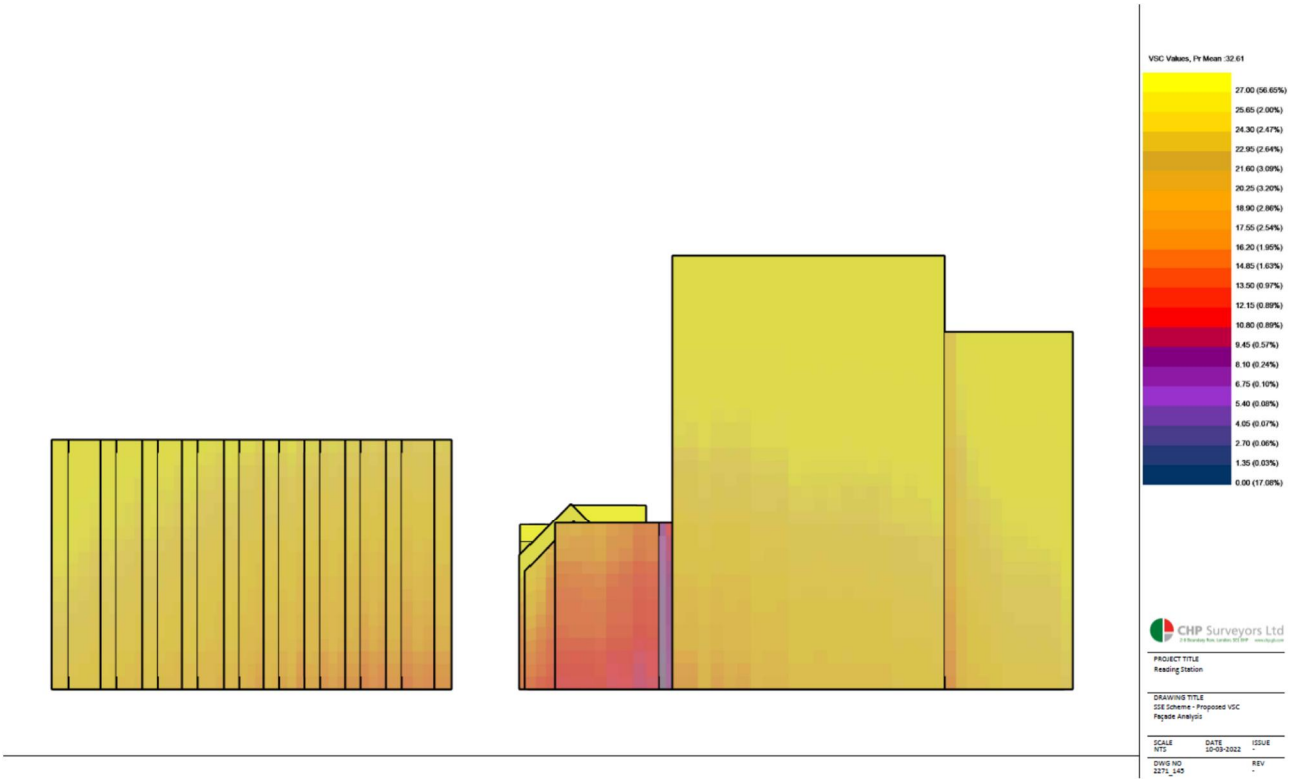

Figure 8. Drawing by CHP Surveyors indicating vertical sky components on the facades of the SSE (55 Vastern Road) development with the Appeal Scheme in place.

5.5 In principle a vertical sky component analysis on a regular grid of points can be used to assess daylight provision to a façade in cases where detailed window design has not yet been carried out. The Hermes scheme, as an outline planning application, could be said to fall into this category. The SSE scheme does not; it is the subject of a detailed planning application, with elevations and floor plans of the affected areas. A detailed study of loss of light to this scheme should have been carried out for the actual window and room layouts.

5.6 In addition the shading on the drawings is not clear and it is not possible to judge accurately what the vertical sky component might be at any particular point. This is a particular issue for the Hermes drawings where the critical façade facing the proposed Appeal scheme is only shown obliquely (it forms the left hand portion of the middle drawing in Figure 7). The Hermes drawings do not give vertical sky components for Block C of the Hermes development; Block C is the block likely to be most affected by the proposed Appeal Scheme, and incorporates shared ownership dwellings in the indicative scheme for the Hermes site.

5.7 Overall, it can be concluded that the proposed Appeal Scheme will have some impact on the Hermes and SSE developments, because the colours are different. But it is not possible to tell how large that impact will be, or whether future residents of those sites would have adequate daylight with the Appeal Scheme in place.

5.8 Some information is available for the SSE scheme in a letter written by consultants Eb7 for that development, dated 20 May 2020. They calculated average daylight factors on ground and first floors of the proposed SSE scheme, with an outline Vastern Court development opposite. Unfortunately the Vastern Court scheme Eb7 analysed does not appear to be the same as that in the maximum parameter plans for the Appeal Scheme; in particular the outline of Block C appears different. However the overall size of the development is similar.

5.9 The results show that, out of the twelve living rooms facing the Vastern Court scheme, eight would have average daylight factors between 1% and 1.4%, below the minimum 1.5% recommendation in the British Standard Code of Practice for daylight, BS 8206 Part 2. The other four have additional windows which do not face Vastern Court, and bedrooms in this area would meet their minimum recommendation.

5.10 Eb7 do not give data for these rooms for the situation with the current retail park, so it is not possible to tell what the loss of light is as a result of construction of the Appeal Scheme. However other dwellings in Vastern Road are predicted to lose 30-40% of their light as a result of the Appeal Scheme, so it is likely that these rooms would meet the BS recommendation without the Appeal Scheme.

5.11 James Crawley has given coloured plans showing annual probable sunlight hours to the SSE scheme, but not winter sunlight. Winter sunlight to six of these living rooms windows would be below the BRE recommendations with the Appeal Scheme in place. Again, Eb7 do not give 'before' values, but it is likely that there would be a significant loss of winter sunlight to these windows as a result of the Appeal Scheme. Annual sunlight hours would remain above the recommended level of 25%.

Cumulative impact on existing dwellings

5.12 To assess the cumulative impact on existing buildings the Environmental Statement (CD 1.9.10) has calculated daylight and sunlight comparing the situation with all three schemes in place with that for the existing baseline with no site redeveloped. This gives the total cumulative impact of all the schemes, but does not give information on how much of the loss of light is due to each one. For most of the affected dwellings, this does not matter much as the Hermes and SSE developments would only have a very minor impact on the residential properties being considered.

5.13 With all three developments in place, there would be an increased number of windows (nine in all) in 87-93 Caversham Road that would not meet the BRE vertical sky component guidelines. There is a mistake in table 10.35 of the Environmental Statement; the number of minor impacts should be zero, not six. The impacts on daylight distribution would be similar to that for the Vastern Court development on its own; there are more mistakes in tables 10.36, 10.40 and 10.44 which erroneously imply that all rooms would meet the guidelines when five would not. Overall the cumulative impact on daylight to 87-97 Caversham Road would be classified as minor adverse. Loss of sunlight would be within the guidelines.

5.14 For 17-49 Vastern Road the other developments make very little difference to the loss of light. The overall daylight impact of all three schemes would be moderate adverse

for numbers 17 and 19, and major adverse for numbers 21-49. Loss of sunlight would be within the BRE guidelines.

Figure 9. 51 Vastern Road (photo from Google Streetview).

5.15 For 51 Vastern Road there would be a substantial cumulative impact. This building (Figure 9) has windows facing Vastern Road and Lynmouth Road. Windows at the front would lose around 40-50% of their light because of the Appeal Scheme and windows at the side (facing Lynmouth Road) a similar proportion due to the 55 Vastern Road scheme. The cumulative effect would be major adverse.

6 DAYLIGHT AND SUNLIGHT TO NEW DWELLINGS

Daylight

6.1 CHP Surveyors' report (CD 1.46) deals with daylight provision within the scheme itself. Although this is an outline scheme, for which internal drawings would not normally be available, CHP have calculated the average daylight factors (ADF) inside specific rooms, based on the illustrative scheme design. This is a reasonable approach. However if the illustrative scheme exceeds the maximum parameters proposed (see paragraph 2.2 above) its use is questionable.

6.2 CHP Surveyors have made various assumptions about glass transmittance and room reflectance in the proposed development (CD 1.46, paragraph 2.7). Room reflectances are reasonable provided that the rooms are actually decorated like this. The glass transmittance used in CHP Surveyors' original report was unusually high. It turned out that no correction had been made in the ADF data for the decreased transmittance of light through glass at oblique angles. James Crowley has since provided new ADF data which does include a correction for this.

6.3 However he has applied a frame factor of 0.9 which is unusually high. For a 1m x 1m window this could only be achieved by having a 25 mm frame, which is not practical with modern windows with a thermal break, even if the window is fixed. For a 2m x2m window, this would correspond to a 100mm frame all the way round. This is practical only with a non-opening window, so if the window was a patio door leading on to a balcony, residents would not be able to access their balcony. A more commonly used frame factor is 0.8, but even this tends to overestimate incoming light for the majority of window types. Thus the calculated ADFs and illuminances would be expected to be overestimated by 12% or more in relative terms.

6.4 James Crowley has analysed a subset of the proposed rooms on the lowest three floors of Blocks B, C and D (data on block D were not in the original CHP Surveyors report; it is understood that Block D may or may not be residential in the final design). Blocks B and C would be expected to be the worst lit blocks as they have enclosed courtyards and other blocks on either side. In principle this is a reasonable approach. Block A would be expected to have more access to daylight overall than blocks B or C, but may still have some residential rooms not meeting the BRE guidelines, for example where they face the other blocks or into the courtyard of Block A.

6.5 Using James Crowley's data with the current surroundings, of the 228 living/kitchen/diners and studios analysed in Blocks B, C and D, 81 (36%) would not meet the minimum 1.5% ADF for a living room. Another 42 (18%) would have an ADF over 1.5% but below the 2% recommended for a kitchen. 105 (46%) would meet both recommendations. Bedrooms have a better compliance rate, with only 9 not meeting the recommended 1%.

6.6 Assuming a more realistic frame factor of 0.8, again with the current surroundings, of the 228 living rooms analysed in Blocks B, C and D, 101 (44%) would not meet the minimum 1.5% ADF for a living room. Another 36 (16%) would have an ADF over 1.5% but below the 2% recommended for a kitchen. Only 91 (40%) would meet both recommendations. 13 bedrooms would not meet the recommended 1%.

6.7 These figures represent poor levels of daylight provision in the living rooms. Although the upper floors of Blocks B and C and most of Blocks A and D would be expected to have more light, having such a large number of living rooms below the minimum standard is unsatisfactory, and contradicts the recommendations of the Design Code (CD 1.47 section 5.6.7). The results are particularly disappointing given that with the existing baseline the development does not have any large nearby obstructions; the limited daylight provision is entirely due to the design of the scheme itself, with tall blocks close to each other.

6.8 With the Hermes/Reading Metropolitan scheme in place, daylight provision would be worse. These data are perhaps the most relevant because it is likely that there will be a large development on this site in the future. Using James Crowley's data (only available for blocks B and C), 96 (53%) of the 180 living/kitchen/diners and studios analysed would not meet the minimum 1.5% ADF. Another 42 (23%) would have an ADF over 1.5% but below the 2% recommended for a kitchen. Only 42 (23%) would meet both recommendations. 16 bedrooms would not meet the recommended 1%.

6.9 Assuming a more realistic frame factor of 0.8, again with the Hermes/Reading Metropolitan scheme in place, 112 (62%) of the 180 living rooms analysed would not meet the minimum 1.5% ADF. Another 35 (19%) would have an ADF over 1.5% but below the 2% recommended for a kitchen. Only 33 (18%) would meet both recommendations. 23 bedrooms would not meet the recommended 1%.

6.10 The results assessed against the BS EN 17037 National Annex criteria are similar in terms of overall compliance rate, but harder to interpret because of the way the data are presented.

6.11 In principle it could be possible to improve daylight provision on these lower floors and potentially to ensure adequate light in some of them; potential measures could include enlarging windows, changing room layouts or moving or omitting balconies. However given the height of the blocks and the levels of mutual obstruction it is not clear whether this would be possible without compromising other requirements, such as those for privacy or private amenity space.

6.12 With the Hermes/Reading Metropolitan scheme in place there are some very low levels of daylight in rooms in the indicative scheme; for example, three living rooms would have average daylight factors of 0.2%, and two bedrooms would have average daylight factors of 0%. Such very low values indicate that any residential rooms in these locations could be expected to have inadequate daylight, however they are designed.

Sunlight

6.13 CHP Surveyors have given sunlight data for the proposed development. However they have only analysed living rooms and studios with a window facing within 90º of due south. With the current surroundings, they predict 40 rooms meeting the BRE/BS recommendations of 25% annual probable sunlight hours and 5% in the winter. This represents just 22% of the total 180 living rooms and studios on these floors. Another 15 rooms, or 8% of the total, would meet the winter target but not the year round one.

6.14 With the large Reading Metropolitan/Hermes development to the south, these figures are even lower. Just 21 (12% of the 180) would meet both recommendations. Another 8 would meet the winter recommendation only, and another 7 would meet the summer recommendation only.

6.15 These are very poor levels of sunlight provision. Although the Reading Metropolitan/Hermes development to the south clearly makes some difference, even without it less than a quarter of the rooms would meet the recommendations. This is largely because the distances between the blocks and within the courtyards are small

compared to the heights of the blocks. In a final scheme there would be little way of markedly improving sunlight provision apart from removing balconies above windows.

7 SUNLIGHT TO OPEN SPACES

7.1 There are no existing gardens which could be affected by the proposed development. The proposed development would have little impact on sunlight in open spaces in the 80 Caversham Road and 55 Vastern Road proposed developments.

7.2 For proposed open spaces, the BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' has a guideline based on 50% of the space receiving at least 2 hours sunlight on March 21.

7.3 James Crowley has analysed sun provision in the gaps between blocks within the maximum parameter scheme. The results show that both with and without the proposed scheme to the south, the spaces between Blocks A and B and between Blocks C and D would meet the BRE guidelines. The space between Blocks B and C has not been analysed; in the illustrative residential scheme it is a street thoroughfare, for which sunlight provision would be less important. Earlier analysis in the Environmental Statement indicated that this space would not meet the sunlight guideline.

7.4 James Crowley has also assessed sunlight provision to courtyards and potential roof terraces in Blocks B and C of the proposed illustrative scheme. The results are given in Figures 10 and 11.

7.5 The results show that most of the roof terraces and the courtyard to Block B would meet the BRE guidelines. The courtyard and one of the roof terraces to Block C would not, and would be viewed as inadequately sunlit. The difference in predicted sunlight provision between the two courtyards is surprising given that the two blocks are of similar design; James Crowley has indicated that this is because of the shadowing caused by the tall Block D, next to Block C.

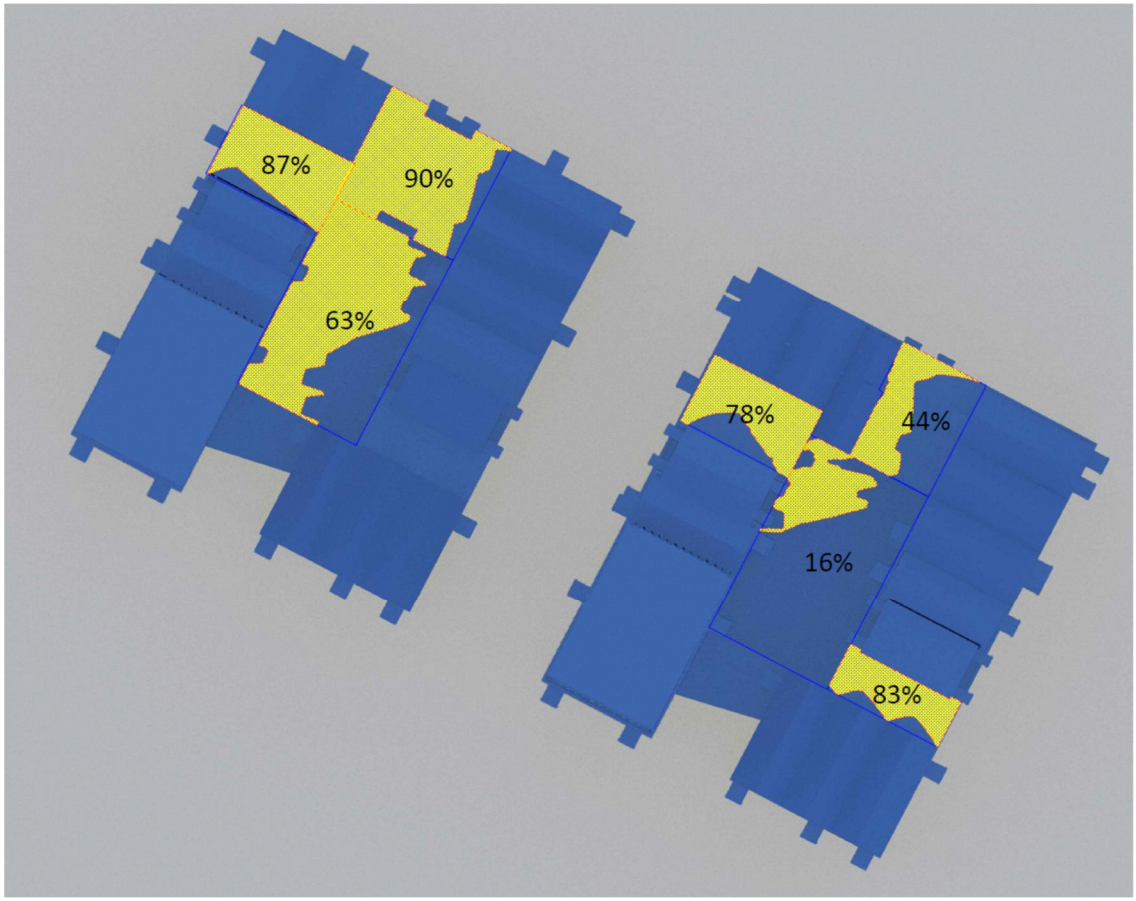

Figure 10. Plan by James Crowley of CHP Surveyors showing areas (in yellow) within Blocks B and C of the illustrative scheme which can receive two hour's sun on March 21, without the proposed 80 Caversham Road scheme. North is at the top of the plan.

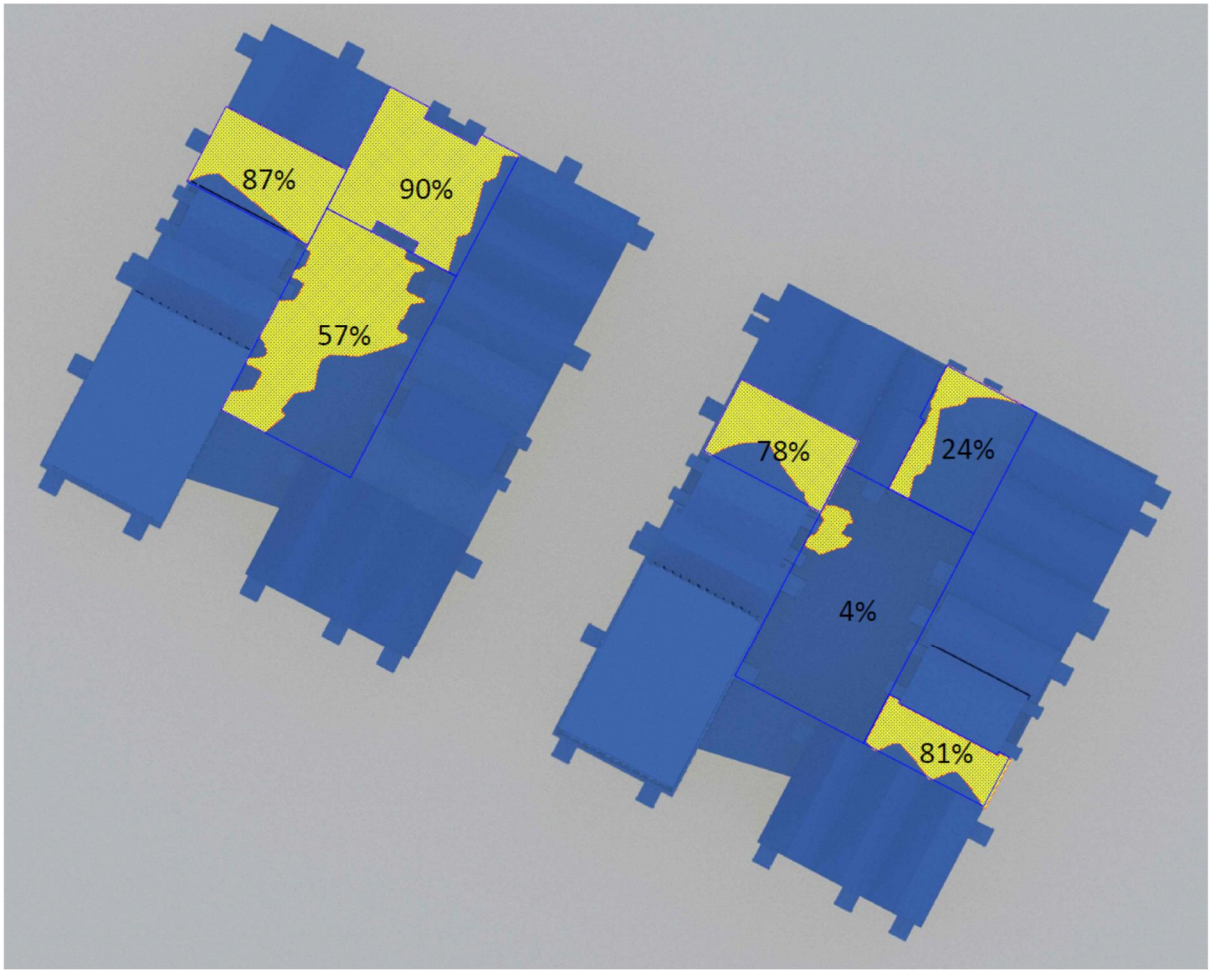

Figure 11. Plan by James Crowley of CHP Surveyors showing areas (in yellow) within Blocks B and C of the illustrative scheme which can receive two hour's sun on March 21, with the proposed 80 Caversham Road scheme in place. North is at the top of the plan.

8 CONCLUSIONS

8.1 This proof has assessed the daylight and sunlight impact of the appeal proposal on existing and proposed dwellings, and daylight and sunlight provision within the proposed scheme. The assessment has been carried out against the guidelines in the BRE Report 'Site layout planning for daylight and sunlight: a guide to good practice' (CD 7.20).

8.2 Loss of daylight to some windows and rooms at 87-97 Caversham Road would be outside the guidelines, though the retained levels would be only just outside the recommended values. This would count as a minor adverse impact. The proposed development to the south (Hermes/Reading Metropolitan) would cause an additional cumulative reduction, but not by much. Loss of sunlight would meet the BRE guidelines.

8.3 Loss of daylight to 17-49 Caversham Road would be outside the BRE guidelines. This is classified as a major adverse impact to numbers 21-49 as all the windows at the front of the houses are affected including main living rooms, and the loss of light is well outside the guidelines. For numbers 17, 19 and 51 the loss of daylight is assessed as a moderate impact. There would be little or no cumulative impact from other proposed schemes, except for number 51 where the combined impact would be major adverse. Loss of sunlight would meet the BRE guidelines.

8.4 The Environmental Statement cumulative assessment did not consider loss of daylight to the Hermes/Reading Metropolitan scheme, or loss of daylight and sunlight to the SSE site across Vastern Road. James Crowley has provided coloured plans indicating daylight and sunlight levels on the facades, but these are not clear and omit one of the blocks on the Hermes scheme that would be affected. More detailed results should have been provided, particularly for the SSE scheme for which full plans are available. Overall, it can be concluded that the proposed Appeal Scheme will have some impact on the Hermes and SSE developments, but it is not possible to tell how large that impact will be, or whether future residents of those sites would have adequate daylight with the Appeal Scheme in place. Results from the SSE (55 Caversham Road) planning submission indicate that some of the living rooms in that development would not meet minimum recommendations for daylight or winter sunlight, once the Appeal Scheme was built.

8.5 A large number of living rooms in the proposed development are predicted to have limited daylight. CHP Surveyors have analysed worst case rooms on the lower floors of Blocks B and C. With the Hermes/Reading Metropolitan scheme in place, 112 (62%) of the 180 living rooms would not meet the minimum recommendation for daylight provision. For bedrooms, compliance rates are better, with 23 not meeting the recommended 1%.

8.6 In principle it could be possible to improve daylight provision on these lower floors by altering the design. However given the height of the blocks and the levels of mutual obstruction it is not clear whether this would be possible without compromising other requirements, such as those for privacy or private amenity space.

8.7 Sunlight provision in these rooms on the lower floors would be poor, with just 21 (12% of 180) living rooms and studios analysed meeting the BRE/BS sunlight recommendations with the 80 Caversham Road scheme in place.

8.8 There are no existing gardens in which sunlight could be affected by the proposed development. Sunlight provision in open spaces in the proposed scheme itself varies, with most of the roof terraces and the courtyard to Block B appearing to meet the recommendation, while the courtyard and a roof terrace to Block C would not. Sunlight in the open spaces between Blocks A and B and between Blocks C and D would meet the recommendation; the space between Blocks B and C would probably not, but in the illustrative scheme it is planned to be a street thoroughfare for which sunlight provision would be less important.

8.9 The council's seventh reason for refusal is:

> *'The proposed development would result in unacceptable loss of daylight to existing residents at 17-51 Vastern Road, and has not demonstrated whether acceptable living conditions (daylight and sunlight) could be achieved for occupants in the new development. In addition, it has not been adequately demonstrated how an acceptable level and quality of private and communal amenity space could be achieved for all future occupiers, whilst meeting appropriate levels of daylight and sunlight penetration. The proposal submission does not also include an assessment of the cumulative impact on the adjoining RMG site and the loss of daylight sunlight to the SSE site. Therefore, the development would be contrary to NPPF, The National Design Guide, National Model Design Code Parts 1 and 2, Reading Borough Local Plan Policies (2019) CC7, CC8, H10 and CR10.'*

8.10 It can be concluded that this reason for refusal is justified because:

a. There would be a major impact on daylight to many of the dwellings at 17-51 Vastern Road;

b. Analysis of an indicative scheme suggests widespread non-compliance with minimum recommendations for daylight and sunlight in the proposed dwellings;

c. Most of the amenity space in one of the blocks, Block C, would be inadequately sunlit;

d. The original submission did not include an assessment of loss of light to the RMG and SSE sites. Some data have now been provided but they are not clear.

8.11 The evidence which I have prepared and provide for this appeal reference APP/E0345/W/21/3289748 in this proof of evidence is true, and I confirm that the opinions expressed are my true and professional opinions.