



Environmental Statement Addendum – Volume 1, Main Text

Station Hill, Reading

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Environmental Statement Addendum – Volume 1, Main Station Hill, Reading

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This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

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1. Introduction

- 1.1. In March 2013 an Outline Planning Application for the redevelopment of approximately 2.14 hectares (ha) of previously developed land at Station Hill was submitted by Sackville Developments Reading Ltd (SDRL) (Planning Reference: 130436). The development was known as the Station Hill 3 Scheme (SH3) and included the demolition of all the existing buildings and structures within the SH3 Site, excluding the existing multi-storey NCP car park, and replacement with four new commercial buildings (referred to as Building Plots A - D) and two new primarily residential buildings (referred to as Building Plots E and F). The existing NCP Car-Park would be reconfigured and refurbished. The description of the development comprised:

“Outline application for mixed use redevelopment of the site through the demolition and alteration of existing buildings and erection of new buildings & structures to provide Offices (Use Class B1), a range of town centre uses including retail and related uses (Use Class A1- A5), leisure (Use Class D2) and residential units, associated infrastructure, public realm works and ancillary development (all matters reserved).”

- 1.2. The Planning Application was subsequently granted planning consent by Reading Borough Council (RBC) in January 2015 and is hereafter referred to as the ‘2015 Consented Scheme’. At the same time, an application for a Temporary Flexible Event Space within the north of the Site (Planning Application Reference: 130440) was also submitted and subsequently granted consent in January 2014.

- 1.3. In August 2015, SDRL submitted two further planning applications to extend and amend Plot E of the 2015 Consented Scheme to incorporate an adjacent site referred to as the Telecom House Site. The applications comprised:

- (i) an application pursuant to section 73 of the Town and Country Planning Act 1990 to amend the 2015 Consented Scheme (this Section 73 application was submitted under planning reference 151427); and
- (ii) an outline planning application for a new Plot E incorporating the areas of both the 2015 Consented Scheme Plot E and the Telecom House Site (planning reference 151426).

- 1.4. The planning application forms defined the Telecom House / Plot E Scheme application as follows:

“Outline Application for mixed use redevelopment of Plot E of the Station Hill site and neighbouring Telecom House Site (48 to 51 Friar Street & 4 to 20 Garrard Street) to comprise the demolition of existing buildings and erection of new buildings/structures to provide residential units, a range of town centre uses including retail and related uses (Use Class A1-A5), associated infrastructure, public realm works and ancillary development (all matters are reserved).”

- 1.5. The planning application forms defined the Section 73 Application to amend the SH3 Scheme as:

“Section 73 application to vary conditions 2, 5, 6, 54 and 57 of Outline Planning Permission 130436 in order to remove Plot E.”

- 1.6. These two applications were granted planning consent in July 2016 and are together referred to in this report as the ‘2016 Consented Scheme’. The area of the 2016 Consented Scheme is hereafter referred to as the ‘Site’.

- 1.7. The Site Location Plan, Site Boundaries of the various applications and overall Red Line Boundary Plan were provided in the 2015 ES as Figures 1.1, 1.2 and 1.3. These have been reproduced in this ES Addendum for clarity although Figure 1.1 has not changed and only the base plan has changed in Figure 1.2 and 1.3 to reflect demolition of the buildings on Site since the 2015 ES.

Proposed Amendments to the 2016 Consented Scheme

- 1.8. Following acquisition of the Site from SDRL in 2018, SH Reading Master LLP (the Applicant) is seeking to make changes to the 2016 Consented Scheme in respect of Plots E and F to respond to a series of design alterations. This is proposed by way of applications pursuant to Section 73 of the Town and Country Planning Act 1990 (hereafter referred to as “the Section 73 Applications”). At the same time, reserved matters applications will be submitted for Plots E and F.
- 1.9. The changes to the 2016 Consented Scheme are hereafter referred to as the ‘Proposed Amendments’ and the 2016 Consented Scheme as amended by the Proposed Amendments is hereafter referred to as the ‘Development’. The Proposed Amendments comprise:
- A change in residential use from market housing to ‘Build to Rent’;
 - A change in approved residential floor space area from between 26,000m² and 41,050 m² as previously consented to between 41,050m² and 45,000 m²;
 - A change in the number of residential units which were assumed in the 2015 ES from 300-475 units to 475-550 units;
 - A reduction in the minimum retail floorspace area provided within Plot F from a minimum of 800 m² to 390 m²;
 - A change to Parameter Plan 3: Building Plot Parameters (including heights) (Consolidated plan reference SHR-CL-SB-ZZ-PL-A-100-122-P1, included in Volume 3 of this ES Addendum) to reflect the creation of two open courtyards in Plot E rather than single courtyard enclosed by a perimeter block. The ‘zone for courtyard’ in Plot F has also been removed as this is no longer required in the proposed design;
 - A change to Parameter Plan 3: Building Plot Parameters (including heights) to reflect an increase in the minimum building height of Plot F from 63m AOD to 81m AOD. The maximum building height of Plot F remains unchanged at 85m AOD;
 - A change to Parameter Plan 3: Building Plot Parameters (including heights) to reflect a reduction in the minimum height of Plot E from 63m AOD to 50m AOD. This is as a result of the lower height of the Friars Walk facades and the revised courtyard layout. The maximum height of Plot E has also increased from 85m AOD to 85.6m AOD;
 - A change to Parameter Plan 3 to increase in the limit of deviation on the Plot F facades facing Friars Walk and Merchants Place from +/- 2.5m to +/-5m. This is to increase the distance from Plot E and the properties on Merchant’s Place, thereby preserving residential amenity by maximising window to window distances. The limit of deviation on the Friar Street façade of Plot E has also been increased from +/- 1.5m to +/- 2.5m;
 - A change to Parameter Plan 5: Vehicle and Pedestrian Access Routes (Consolidated plan reference SHR-CL-SB-ZZ-PL-A-100-124-P1, included in Volume 3 of this ES Addendum) to create an additional zone for servicing along the Friar Street frontage of Plot E;
 - A change to Parameter Plan 6: Ground Floor Uses (Consolidated plan reference SHR-CL-SB-ZZ-PL-A-100-125-P1, included in Volume 3 of this ES Addendum) to reflect the fact that leisure will be included at lower ground, mezzanine and ground floor level in Plot F and also that Plot F will be mixed residential and retail uses at ground floor level rather than retail as previously shown. There is no change to this parameter plan in relation to Plot E;
 - A change to Parameter Plan 7: Upper Floor Uses (Consolidated plan reference SHR-CL-SB-ZZ-PL-A-100-126-P1, included in Volume 3 of this ES Addendum) to remove leisure uses from first floor level in Plot F. There is no change to this parameter plan in relation to Plot E;

- Extending the lower ground floor of Plot E eastward up to the application boundary of Plot F and introducing some lower ground floor space beneath Plot F, meshing with the extended Plot E lower ground floor. This is to provide a more useable and efficient space for parking, servicing and back of house requirements;
- Provision of level access along Friars Walk rather than stepped or ramped access as previously proposed;
- An alteration in the phasing of the proposed Development with Plots E and F now forming part of Phase 1 rather than the plots to the north of Garrard Street (A, B, C, D and G) as previously proposed; and
- A change in the year of completion as 2018 was previously assumed to be the year of completion in the 2015 ES but the year of completion is now 2025.

1.10. There would be no change to the 2016 Consented Scheme maximum footprint parameters.

EIA Background and Strategy

- 1.11. In 2013, an Environmental Impact Assessment (EIA) was undertaken of the SH3 Scheme and an Environmental Statement (ES) prepared to accompany the planning application. An ES Addendum was subsequently prepared and submitted in September 2013 to address additional environmental issues that had come to light during the determination period. Together, the ES and ES Addendum are hereafter collectively referred to as the '2013 ES'.
- 1.12. In 2015, an ES was prepared to accompany the applications to revise Plot E to incorporate the Telecom House Site (planning references 151426 & 151427). This ES was a full update of the 2013 ES and covered the entire SH3 Scheme as amended by Telecom House. During the determination period, amendments were made to the planning application for Plot E incorporating the Telecom House Site and a letter setting out the EIA implications of the design amendments was submitted to RBC in December 2015. Together, the ES and EIA implications of design amendments letter are referred to as the '2015 ES'. The 2015 ES is the ES to which the Proposed Amendments to Plots E and F should be compared.
- 1.13. The Proposed Amendments to the 2016 Consented Scheme together with new cumulative schemes that have come forward since the 2015 ES and / or changes to the baseline conditions at, and surrounding the Site compared with those in place at the time of the 2015 ES, may result in changes to the assessment of the effects described in the 2015 ES. Where there is potential for changes to the significance of effects, updated or new assessments have been undertaken. This ES Addendum reports the findings of these updated or new assessments. This ES Addendum also makes reference, where necessary, to the 2015 ES.
- 1.14. In addition, since preparation of the 2015 ES, new Environmental Impact Assessment Regulations have come into force; the Town and Country Planning (Environmental Impact Assessment) Regulations 2017¹ (hereafter referred to as the '2017 EIA Regulations'). These 2017 EIA Regulations introduce additional topic areas that should be considered in an EIA. The scoping exercise undertaken to inform this ES Addendum has therefore included consideration of whether these new topic areas should be considered in further detail. This is described in **Chapter 2**. Where further assessment of these additional topics has been undertaken, this is reported in this ES Addendum.
- 1.15. Information and impact assessments that remain unchanged from the 2015 ES have not been reproduced within this ES Addendum unless explicitly stated. This ES Addendum should be read in conjunction with the 2015 ES which is included as **Technical Appendix 1.1**; together, the 2015 ES and this ES Addendum form the ES for the Section 73 applications.

Project Team

- 1.16. The ES Addendum has been compiled by Waterman Infrastructure & Environment Ltd (Waterman IE), in conjunction with the Applicant and a team of specialist consultants. These consultants are presented in Table 1.1 along with their respective disciplines and contributions to the EIA.

Table 1.1: EIA and Design Team

Organisation	Expertise/EIA Input
Station Hill Master LLP	Applicant
Cast Real Estate and Construction Consultancy	Development Project Managers
CRTKL	Architect
Cityscape	Visualisations
DP9	Planning consultants
GIA	Daylight, sunlight and overshadowing assessors
Hatch Regeneris	Socio economics and health consultants
Hoare Lea and Partners	Building services engineer and energy and sustainability consultants
Peter Brett Associates (PBA)	Traffic and transportation consultants
Ramboll	Structural and Civil Engineers
RWDI	Wind microclimate consultants
Waterman	EIA co-ordinators, air quality, noise and vibration, ecology, archaeology, land quality, flood risk and townscape and visual consultants

ES Availability and Comments

- 1.17. Additional copies of this ES Addendum and Non-Technical Summary are available free of charge. Copies of the full ES documentation are available for purchase. For copies of these documents please contact:

Waterman Infrastructure & Environment Limited
 Pickfords Wharf
 Clink Street
 London
 SE1 9DG
 Email: ie@watermangroup.com

- 1.18. Additional copies are also available for viewing by the public during normal office hours in the planning department of RBC. Comments on the application, should be forwarded to RBC at the address below:

Reading Borough Council
 Planning and Building Control
 Reading Borough Council
 PO Box 17
 Civic Centre
 Reading
 RG1 7AE

¹ Town and Country Planning. (2017) *Environmental Impact Assessment: EIA Regulations 2017*.

2. EIA Methodology

Introduction

- 2.1. This Chapter sets out the general approach to, and methodology followed in the preparation of this ES Addendum. The EIA scoping process is also described.

General Approach

- 2.2. The General Approach to the EIA described in the 2015 ES remains unchanged. However, as described in Chapter 1, since preparation of the 2015 ES, the 2017 EIA Regulations came into force in England on 16 May 2017.
- 2.3. This ES Addendum has considered the implications of the 2017 Regulations and provided additional information where necessary in order to ensure that the 2015 ES, when considered alongside this ES Addendum, complies with the requirements of the 2017 Regulations.
- 2.4. Paragraph 18 of the 2017 Regulations sets out the requirements of an ES for the purposes of the 2017 EIA Regulations. Schedule 4 details the information for inclusion in Environment Impact Assessment Statement. An assessment of the way in which the ES meets the requirements of Paragraph 18, as well as Schedule 4, of the 2017 Regulations is included at **Technical Appendix 2.1**.

Additional Requirements of the 2017 EIA Regulations

New Topic Areas

- 2.5. The 2017 EIA Regulations introduced new topic areas that needed to be considered part of the EIA. The new topics comprise population and human health, climate change and risk of major accidents or disasters. The need for assessment of these new topics was considered in the EIA Scoping Letter submitted to Reading Borough Council in October 2018 as described in the Scoping Section below.

Competent Experts

- 2.6. In accordance with 2017 EIA Regulations Part 5(18)(5), SH Master LLP confirms that the 2015 ES and this ES Addendum have been prepared by persons with sufficient expertise to ensure the completeness and quality of the Statement. Further information on the competencies of the relevant technical contributors is presented in **Technical Appendix 2.2**.

Proposed Monitoring Arrangements

- 2.7. Those environmental issues or potential effects identified as a result of the 2015 ES where additional verification or monitoring was considered necessary included issues of drainage, daylight, sunlight and overshadowing, wind, ecology, noise, archaeology, ground conditions and construction management. Conditions were added to planning permission 151426 and 151427 requiring further testing and/or verification of these effects at reserved matters stage, during or post, construction.
- 2.8. Matters relating to drainage, daylight, sunlight and overshadowing and wind and ecology have been addressed as part of the Reserved Matters Submissions for Plots E and F. However, it is anticipated that conditions requiring verification in respect of noise, archaeology, ground conditions and

construction management will continue to apply to any new planning permission. The changes assessed by this ES Addendum do not introduce further requirements for post-project analysis or monitoring.

Baseline Scenario

- 2.9. The 2015 ES included consideration of a 'future baseline' scenario. This included schemes within the vicinity of the Site that were under construction at the time of the 2015 ES. These schemes comprised Phase 2, Land at Chatham Place (Application Ref. 12/00798/FUL), 21 Caversham Road (Application Ref. 110628), Energis House, Forbury Road (Application Ref. 12/01856/FUL), Thames Tower (Application Ref: 141043) and Aldwych House 2 Blagrove Street Reading RG1 1AZ. These schemes have now been constructed and therefore form part of the existing baseline condition. There are no other schemes within the immediate vicinity of the Site which are currently in an advanced stage of construction that should be considered as part of a new Future Baseline scenario.
- 2.10. In addition to conditions in the area surrounding the Site having changed since the 2015 ES, the baseline conditions prevailing at the Site (hereafter referred to as the 'existing baseline conditions') are different from those assessed as part of the 2015 ES. This is because the buildings within Plots B, C and D have been demolished and the Temporary Events Space constructed. Where the authors of each technical chapter of the ES consider that the Proposed Amendments may result in a change to the significance of the effects, the existing baseline conditions have also been considered.
- 2.11. A brief description of the existing baseline conditions is presented in **Chapter 3: Existing Land Use**.

Assessment of Effects

- 2.12. As described in Chapter 1, concurrent with the submission of the Section 73 Applications to amend the parameters of Plots E and F of the 2016 Consented Scheme, Reserved Matters Applications will be submitted for Plots E and F. As a result, where the authors of each technical chapter of the ES consider that the Proposed Amendments may result in a change to the significance of the effects, the following completed Development scenarios have been assessed:
- Proposed Development Scenario: Reserved matters details for Plots E and F with the remaining Station Hill Development (as maximum parameters) in place; and
 - Cumulative Scenario: Reserved matters details for Plots E and F with the remaining Station Hill Development (as maximum parameters but with Plot B in accordance with the reserved matters consent for that plot) plus Cumulative Surrounds.

Comparison with the 2016 Consented Scheme

- 2.13. In order to provide RBC, other statutory consultees and interested parties with an understanding of the differences between the effects of the 2016 Consented Scheme and those of the Development (that is the 2016 Consented Scheme as amended by the Section 73 Applications), each technical chapter of the ES has included a summary, in the summary and conclusions section and where appropriate, throughout the chapter, of the differences between the effects of the 2016 Consented Scheme and those of the Development. This may be a qualitative or a quantitative assessment, depending upon the technical study in question.

Scoping the ES Addendum

- 2.14. A letter setting out the proposed scope of the ES Addendum was submitted to Reading Borough Council (RBC) in October 2018. The Scoping Letter is presented in **Technical Appendix 2.3**. A Scoping Opinion was provided by RBC on the 14 November 2018 and is provided in **Technical Appendix 2.4**. Since preparation of the Scoping Request in October 2018, the maximum height of Plot E has increased such that it now marginally exceeds the maximum height parameter for this Plot by 525mm. Similarly, the maximum residential floorspace area has exceeded that approved as part of the 2016 Consented Scheme. However, these changes are not considered to alter the scope of this ES Addendum as proposed in the Scoping Request of October 2018 and the changes have been assessed by the various technical contributors to the ES Addendum.
- 2.15. The Scoping exercise included consideration of whether the new topics introduced by the 2017 EIA Regulations, required further assessment.
- 2.16. Table 2.1 sets out the scope of the assessment for each technical Chapter and the new technical topics brought about by the 2017 EIA Regulations, as agreed with RBC.

Table 2.1 Scope of the ES Addendum

Chapter	Assessment Proposed in the EIA Scoping Letter	RBC Comment
7 Socio Economics	Due to the changes to floorspace areas, increase in residential units proposed, and the change from market housing to Build to Rent, a review of the Socio-Economics assessment would be completed. This would assess whether the Proposed Amendments alter the significance of the effects as presented in the 2015 ES. The methodology broadly follows that presented in the 2015 ES; where amendments have been made, this is identified in the Chapter.	The Socio-Economic effects of the increase in residential floorspace and shift from owner occupied to Build to rent should be addressed in terms of their impact on the borough as a whole. Note: the Scoping Opinion also referred to a reduction in Class B1 Office floorspace but this does not form part of the Proposed Amendments.
8 Archaeology	The 2015 ES assumed that excavation in the ground would be limited to: - Nominal excavation (approximately 1m) and then grading of the Site to allow the construction of the service trenches and lower ground level; - The installation of new services such as electricity, gas, drainage and water mains; and - Establishment of foundations, such as the installation of piles, pile caps and ground beams. There is no intention to change these assumptions as part of the Proposed Amendments and therefore the archaeology assessment would remain unchanged and no further assessment is considered to be necessary. As previously, archaeological evaluation would be undertaken post demolition to enable a mitigation strategy to be developed to record and / or preserve archaeological remains that may be present.	RBC consulted with Berkshire Archaeology regarding the scope of Archaeology. Berkshire Archaeology agreed with the conclusion that archaeology did not need to be considered further in the ES Addendum.

Chapter	Assessment Proposed in the EIA Scoping Letter	RBC Comment
9	Transportation	The Transport Chapter of the 2015 ES showed that the Station Hill Scheme incorporating the Telecom House Site (the 2016 Consented Scheme) resulted in a reduction of trips compared with the 2015 Consented Scheme when considering the potential trip generation of the extant uses of Telecom House. The net reduction in vehicle trips is shown in Table 9-12 of the Transport chapter of the 2015 ES, which concluded that the traffic modelling presented in the 2013 ES (and reproduced in the 2015 ES) demonstrated a 'worst-case' scenario. The anticipated increase in vehicle trips generated by the increase in the maximum number of units (additional 75 units) brought about by the Proposed Amendments, is less than the net reduction in vehicle trips shown in the 2015 Transport ES Chapter. Peter Brett Associates, the Transport Consultants for both the 2015 and 2016 Consented Schemes and authors of the 2013 and 2015 ES Chapters, therefore consider that the transport modelling presented in the 2013 ES (and reproduced in the 2015 ES) still represents a 'worst-case' scenario, with the impacts previously assessed considered to accurately represent the likely significant effect of the proposed Development.
10	Air Quality	On the basis that the traffic flow data, used in the air quality assessment presented in the 2015 ES, represents a worst-case scenario even with the Proposed Amendments, the findings of the air quality chapter will remain unchanged and no further assessment is considered to be required.
11	Noise	On the basis that the traffic flow data, used in the air quality assessment presented in the 2015 ES, represents a worst-case scenario even with the Proposed Amendments, the findings of the noise chapter will remain unchanged and no further assessment is considered to be required.
12	Ground Conditions	The proposed amendments to the 2016 Consented Scheme are not considered to alter the significance of effects on Ground Conditions and Contamination as set out in the 2015 ES. No further assessment of ground conditions and contamination is therefore considered to be required.

Chapter	Assessment Proposed in the EIA Scoping Letter	RBC Comment
		and remediation of contamination, as necessary.
13	Flood Risk and Drainage	Due to the proposed level changes brought about by the provision of level access along Friars Walk rather than stepped or ramped access as previously proposed, extension of the lower ground floor level and updates to guidance, a review of the Flood Risk Assessment and Drainage Strategy would be undertaken. An Addendum Flood Risk Assessment and Drainage Strategy would be prepared and used to inform the assessment of whether the significance of the effects in the 2015 ES have changed as a result of the Proposed Amendments.
		RBC's Transport Development Control Manager confirmed that the proposed scope of work identified in the documents provided is sufficient in terms of impact on Sustainable Drainage Systems (SuDS). The Environment Agency (EA) made no comments regarding the application or the proposed scope of the ES Addendum
14	Ecology	An update PEA has been undertaken across the whole of the Station Hill Site. This did not identify any material changes in the baseline conditions since completion of the PEA to support the 2015 ES other than an increased potential for bats in Friars Walk Shopping Centre. However, subsequent bat surveys undertaken in August 2018 confirmed that bats are not roosting in the buildings and the effects on bats therefore remains negligible. The significance of ecological effects therefore remains unchanged from that set out in the 2015 ES, and no further ecological assessment is considered to be required to support the Section 73 Applications. The update PEA and Bat Survey Report are appended to Scoping Request (as previously) included in Technical Appendix 2.3 .
		Natural England had no comments on the scope of the proposed ES Addendum. RBC's Ecologist recommended that the PEA and Bat Survey were appended to the ES Addendum.
15	Wind	A wind tunnel test is required at Reserved Matters Stage as a condition of the 2016 Consented Scheme. This would be undertaken to ensure that the effects of the Proposed Amendments on wind, specifically those associated with building entrances, revised public realm and pedestrian routes, are fully assessed. The findings of the wind tunnel test have been reported within this ES Addendum.
		RBC requested that the detailed wind tunnel assessment was of the actual building design rather than just the parameters.
16	Daylight, Sunlight and Overshadowing	An updated assessment would be undertaken to consider the detailed design for Plots E and F and the changes in the current baseline condition and adjacent cumulative schemes. The findings of the DSO Assessment have been reported in this ES Addendum.
		RBC requested that the daylight, sunlight and overshadowing assessment was of the actual building design rather than just the parameters.
Vol 2	Townscape, Conservation and Visual	An updated assessment would be undertaken to consider the detailed design for Plots E and F and the changes in the current baseline condition and
		RBC requested that three additional viewpoints be included

Chapter		Assessment Proposed in the EIA Scoping Letter	RBC Comment
	Assessment and Visual	adjacent cumulative schemes. Also, a number of viewpoints where the Proposed Amendments may be visible have been updated from the 2015 ES. These also reflect the updated baseline conditions or additional cumulative schemes.	in the Townscape, Conservation and Visual assessment addendum. However, subsequent to the scoping opinion it has been agreed with RBC that these additional viewpoints do not need assessing as part of the ES Addendum of Plots E and F as the Proposed Amendments would not be visible in these views.
New Topic	Population and Human Health	Population and human health is a 'new' topic introduced by the 2017 EIA Regulations. Therefore, an assessment of potential effects to population and human health would be undertaken using the NHS London Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment tool. This would be appended to this Socio Economics Chapter of the ES Addendum (Technical Appendix 7.1) with any significant effects identified described in the Socio Economics Chapter. The Socio Economics Chapter would therefore be re-titled 'Socio Economics and Health'.	No comments.
New Topic	Climate Change	In accordance with the 2017 EIA Regulations, the potential for a development to have significant effects on climate change has been considered. As part of the Flood Risk Assessment and Drainage Strategy, the effects of climate change on rainfall volumes and intensities has been considered in line with best practice. With regard to the building structures, it is proposed to re-use existing slabs and retaining walls in the temporary construction case where possible and use cement replacements such as ground granulated blast slag (GGBS) or pulverised fuel ash (PFA). Where early concrete strength development is not required, higher cement replacements will be used. The facades of the building will also be optimised to reduce the heating and ventilation requirements. In terms of energy consumption, a revised Energy Strategy has been prepared by Hoare Lea to reflect current approaches to energy provision. The alternative energy strategies considered have been discussed in the ES Addendum and an Energy Strategy detailing the energy approach and carbon reduction measures to be implemented will be submitted with the Section 73 Applications. However, a specific Climate Change Chapter is not considered to be required.	No comments on the proposed approach. RBC has requested that the Energy Strategy will need to be described in the ES once it has been agreed.

Chapter		Assessment Proposed in the EIA Scoping Letter	RBC Comment
New Topic	Risk of Major Accidents or Disasters	In accordance with the 2017 EIA Regulations the potential for a proposed development to have significant environmental effects resulting from major accidents or disasters need to be considered. Previous studies undertaken have not identified historic or current notable hazards or risks at the Site. The proposed Development will be constructed in line with current industry standards including for building, fire and drainage regulations. It is therefore considered that further consideration of the Risk of Major Accidents or Disasters can be scoped out of this ES Addendum.	No additional comments although further consultation with the emergency services and emergency planners will be required in due course.
17	Cumulative Effects	Given the time that has elapsed since preparation of the 2015 ES, the list of cumulative schemes requiring consideration has been updated and been considered in the assessments being updated as part of this ES Addendum.	RBC requested that two additional cumulative schemes be added to the list of schemes assessed and that liaison be undertaken with RBC in relation to the proposals for 29-35 Station Road.

2.17. On the basis of the above review, further information and / or assessment has been provided in relation to Socio Economics, Flood Risk and Drainage, Wind, Daylight, Sunlight and Overshadowing, Townscape, Conservation and Visual Assessment and Population and Human Health (within Socio Economic and Health Chapter), Climate Change (within the Alternatives Chapter) and Cumulative effects. These have been included within this ES Addendum in accordance with the chapter numbering used in the 2015 ES. Therefore, the chapter numbering within this ES Addendum is as follows:

- Chapter 1: Introduction;
- Chapter 2: EIA Methodology;
- Chapter 3: Existing Land Use;
- Chapter 4: Alternatives and Design Evolution (to include consideration of Climate Change through alternative energy strategies);
- Chapter 5: Description of the Development;
- Chapter 6: Development Programme, Demolition and Construction;
- Chapter 7: Socio Economics and Health;
- Chapter 13: Surface Water Drainage and Flood Risk;
- Chapter 15: Wind;
- Chapter 16: Daylight, Sunlight and Overshadowing;
- Chapter 17: Cumulative Effects; and
- Volume 2: Addendum Townscape, Conservation and Visual Assessment.

2.18. Where Tables and Figures have been updated, the original Table or Figure number of the 2015 ES has been referenced for clarity where relevant.

- 2.19. As there has been no change to the assessment of archaeology (Chapter 8), transportation and access (Chapter 9) air quality (Chapter 10), noise and vibration (Chapter 11), ground conditions and contamination (Chapter 12) or ecology (Chapter 14) effects, these chapters of the 2015 ES have not been reproduced in this ES Addendum.

Assumptions and Limitations

- 2.20. The principal assumptions that have been made, and any limitations that have been identified in undertaking the EIA remain the same as set out in the 2015 ES with the exception of:
- Where the authors of each technical chapter of the 2015 ES consider that the Proposed Amendments may result in a change to the significance of the effects, the updated or new assessment has considered the existing baseline conditions, that is those currently prevailing at the Site;
 - The year of completion assessed in the 2015 ES was 2018. Whilst the year of completion is now anticipated to be 2025, the assessments are considered to remain valid for this later year of completion on the basis that the forecast traffic data is valid up to 2026 (refer to the 2015 ES Chapter 9: Transportation and Access).

3. Existing Land Use

- 3.1 As described in Chapter 1, the existing land uses on the Site are slightly different from those at the time of the 2015 ES because the Mecca Bingo Hall, Bus Station, Western Tower and associated retail arcade and the elevated walkway around the NCP Car Park have been demolished. The area of the Mecca Bingo Hall, Bus Station and Western Tower now comprises bare ground with some stockpiles of material present, all of which is contained within construction hoardings. The area of the retail arcade now comprises a Temporary Events Space; an area of hardstanding on which events can be held such as ice rinks, markets and marketing events.
- 3.2 Xafinity House, the NCP Car Park, Friars Walk Shopping Centre and Telecom House are still present on the Site. The NCP Car Park remains in use. Xafinity House, which was in use at the time of the 2015 ES is now vacant. Part of this building, along Station Hill, was demolished at the same time as the Mecca Bingo Hall.
- 3.3 The current quantum of existing land uses on the Site is shown in **Table 3.1** and photographs of the Site are included in **Figure 3.1**. These update Table 3.2 and Figure 3.1 of the 2015 ES respectively.

Table 3.1: Current Quantum of Land Uses on the Site

Use Class	Approximate Gross External Area (GEA) m ²
Office	16,765
Retail & Related Uses (Use Class A1 – A5) m ²	5,743
Leisure m ²	0
Residential m ²	0
Total Floor Space Area	22,508
Car Parking spaces	1,089*

* This figure includes 950 spaces in the NCP Car Park, 58 spaces in Telecom House and 81 spaces in Xafinity House. The spaces in Telecom House and Xafinity House are not currently in use.

Sensitive Receptors

- 3.4 As part of the scoping exercise for the ES Addendum, the Sensitive Receptors were reviewed to determine if new sensitive receptors were present in the surrounding area. The list of existing sensitive receptors considered in this ES Addendum is set out in **Table 3.2**. This updates Table 3.3 of the 2015 ES. The Existing Sensitive Receptors set out in Table 3.2 are unchanged from those presented in the 2015 ES except that 39 Friar Street has been de-listed by Historic England and is therefore no longer included in the list of Built Heritage receptors. In addition, Garrard House, Summit House and 7-11 Station Road have now been converted to residential uses and so have been included in the list of existing sensitive receptors. These were included as future sensitive receptors in the 2015 ES.
- 3.5 **Figures 3.2, 3.3 and 3.5** have been updated to reflect the changes in the Existing Surrounding Land Uses, Listed Buildings and residential receptors.

Table 3.2 Sensitive Receptors

Category	Existing Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
Residential Properties	Garrard House, 30 Garrard Street	Immediately adjacent to the site
	The Gateway Public House, 31 Greyfriars Road, with residential use at first floor level	15m west
	Malthouse Public House, 53 Greyfriars Road/Tudor Road junction, residential uses above the pub.	15m west
	Summit House, 49-51 Greyfriars Road (Application Number: 141751- – change of use to provide residential units	20m west
	Projection West, Merchant's Place (flats and serviced apartments)	20m south east
	Projection East, Merchant's Place (flats and serviced apartments)	30m south east
	Icon House, Merchant's Place	50m east
	7-11 Station Road	80m east
	25a-25b Friar Street	100m south east
	32-34 Friar Street	35m east
	1 st Floor Flat, 125 Friar Street	20m south
	136-137 Friar Street (Building to the rear of)	50m south east
	144 Friar Street	80m south east
	Bridewell House/Samuel House (student accommodation), junction of Friar Street/Greyfriars Road	60m west
	Terrace Housing Stanshawe Road	35m west
	Terrace Housing, Vachel Road	65m south east
	54 Russell Street	750m south west
	107 Castle Hill	650m south west
	Alms House Castle Street	475m south west
	41 Bath Road	1500m south west
	96 Berkeley Avenue	1500m south west
	88 Queens Road	900m south east
	Grantley Heights	890m south east
	90 Kings Road	800m south east
	119 Caversham Road	400m north
	20-30 New Bright Street	650m south
	10-20 Hieatt Close	1100m south east
	44 Crown Street	825m south east

Category	Existing Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
	6 Tilehurst Road	850m south west
	Blenheim Terrace, Castle Street	675m south west
	162 Castle Hill	815m south west
	31a Vastern Road	370m north
	68 George Street	890m north east
	10 Trinity Place	600m south west
	33 Caversham Road	120m west
	Kennet House, 80-82 Kings Road	680m south east
	5 to 21 Tudor Road	60m west
Hotels	Malmaison, Station Road	70m east
	Novotel, Friar Street	85m east
	Ibis, Friar Street	85m east
Commercial properties	Occupants of existing office and retail premises adjacent to the Site, including on Station Road, Friar Street and Greyfriars Road.	Adjacent east, south and west.
Educational	Forbury Gardens Day Nursery	600m east
Local Views	Views to and from the Site, (including those associated with listed buildings, conservation areas, Scheduled Monuments and historic parks and gardens).	Not applicable.
Places of Worship	Greyfriars Church (Church of England).	120m south-west.
	St Laurence's Church.	280m east.
Built Heritage	Reading Abbey Scheduled Monument and associated Forbury Gardens Historic Park and Garden.	300m east.
	High Bridge Scheduled Monument	480m south-east
	Forbury Gardens Historic Park and Garden	300m east
	Market Place/London Street Conservation Area.	120m east.
	St. Mary's Butts/Castle Street Conservation Area.	250m south-west.
	Russell Street/Castle Hill Conservation Area.	350m south-west.
	St Peter's Conservation Area	850m north
	Grade I listed Reading Abbey and Associated Forbury Gardens	400m east
	Grade I listed Greyfriars Church.	120m south-west.
	Grade I Church of St Laurence	280m east
	Grade II listed Abbey Mill ruins in Abbey Square.	495m south-east.
	Grade I listed St. Mary's Church in St. Mary Butts.	245m south-west
	Grade II* listed Town Council Chamber and Offices with Clock Tower	280m east

Category	Existing Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
	Grade II* listed Church of St Peter	950m north
	Grade II listed St Giles' Church	700m south
	Grade II listed (Three Guineas Public House) Reading General Station, Station Hill.	30m north
	Grade II Listed High Bridge, London Road	450m south east
	Grade II listed statue of King Edward VII.	30m east
	Grade II listed Great Western House	50m south-east.
	Grade II Listed 13 & 15 Station Road	60m east
	Grade II Listed Quadrant Walls and Railings to Former No.64 (Greyfriars Vicarage)	100m south-west
	Grade II listed The Mitre Inn	125m south-west
	Grade II listed Regent Place	130m west
	Grade II listed WI Palmer Memorial Hall	130m south-west
	Grade II Listed 11, 12, 13, 14 & 15 Friar Street	230m east
	Grade II listed 147 Friar Street.	150m south-east
	Grade II listed 154 Friar Street	230m east
	Grade II listed 155 Friar Street	230m east
	Grade II listed 1-31 & 2-32 Queen Victoria Street, 148, 149 & 150 Friar Street and 24-28 & 35-38 Broad Street	220m east
	Grade II listed Reading Prison	690m east
	Grade II listed Church of St James	690m east
	Grade II listed 29 & 31 Caversham Road	160m west
	Grade II listed 35 and 37 St Mary's Butts	240m south-west
	Grade II listed 55 and 55a St Mary's Butts	240m south-west
Archaeology	Potential archaeological remains beneath the Site; the southern part of the Site between Garrard Street and Friar Street is located within an Archaeology Priority Area.	On-Site.
Transportation	Users of Reading Mainline Railway Station and taxi rank on Station Road.	Adjacent north and north-east.
	Pedestrian, cyclists and other road users in the local area.	Adjacent in all directions.
	Users of buses including the bus interchanges located on Station Hill, Station Road and to the north of Reading Station.	Adjacent to the north and east.
Controlled Waters	Principal Aquifer (Seaford Chalk Formation)	Beneath the Site.
	Secondary A Aquifer (Alluvium and the Taplow Gravel Formation)	Beneath the Site
	River Thames.	400m north-east.

Category	Existing Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
	River Kennet / Kennet and Avon Canal.	500m south-east.
Habitats and Species	Black Redstart observation in 2012.	On-Site.
	Peregrine Falcon observation in 2012.	On-Site.

- 3.6 Future potentially sensitive receptors are those receptors that are not yet present but planning applications have been consented for developments surrounding the Site that would introduce sensitive receptors. These have therefore been considered in the assessments. The list of future sensitive receptors considered in this ES Addendum is set out in **Table 3.3**. This updates Table 3.4 of the 2015 ES.
- 3.7 The future sensitive receptors set out in Table 3.3 of this ES Addendum remain largely unchanged from that of the 2015 ES except that an application has been approved for the redevelopment of 52-55 Friar Street and 12 Greyfriars Road to provide residential and retail uses. In addition, the developments that have completed since the 2015 ES (Garrard House, Summit House and 7-11 Station Road) have been moved into the existing sensitive receptors list in Table 3.2.

Table 3.3: Future Potentially Sensitive Receptors

Category	Future Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
	Proposed: Residential Buildings Plot E and F	On Site
Residential Properties	136-137 Friar Street Reading RG1 1EX (Application Ref: 150068) - – change of use to provide residential units	50m east
	30-31 Friar Street, Reading (Application Ref: 150829, pending) - – change of use to provide residential units	35m east
	52-55 Friar Street and 12 Greyfriars Road, Reading (Application Ref: 162210) - residential and retail redevelopment	Immediately adjacent to the west of the Site
	29-35 Station Road (Application Ref 141275) – change of use to provide residential units. Note this is likely to be superseded by Application ref 181753 which is for office and a hotel use.	80m east

4. Alternatives and Design Evolution

- 4.1. No alternative development proposals for the Site have been considered since the 2016 Consented Scheme and the main alternatives remain as presented in the 2015 ES. This includes the discussion regarding the 'Do Nothing' Alternative, that is, leaving the Site in its current state. The 2017 EIA Regulations requires the ES to include '*an outline of the likely evolution [of the baseline] without implementation of the development*'. The Do Nothing Alternative assessment in the 2015 ES is considered to address this requirement and remains valid. It has therefore not been reproduced in this ES Addendum.
- 4.2. Whilst no alternative development proposals for the Site have been considered since the 2016 Consented Scheme, the Proposed Amendments represent a design evolution of the southern part of the site (to the south of Garrard Street) since the 2015 ES and the rationale for the design evolution is set out below.
- 4.3. In addition, in developing the design for the southern part of the Site, alternative building structures and energy strategies have been considered in conjunction with their contribution towards climate change. The rationale behind the selection of the building structure and energy strategy is set out below.

Design Evolution

Place Making Principles

- 4.4. The Proposed Amendments have been designed to enable more daylight penetration (compared to the 2016 Consented Scheme), with greater width and announcement of the public realm at its junction with Friar Street. Level access has also been provided on Friars Walk. Key design developments include:
 - Revised massing to meet requirements of Build to Rent accommodation;
 - Two courtyards in Plot E;
 - A wider Friars Walk improving retail offer and experience; and
 - An improved public realm at the junction of Friar Street and Friars Walk.

Building Structure Alternatives

- 4.5. The three possible material options for the structure of Plots E and F are:
 - Cross laminated timber;
 - Steel framed building with composite floors of concrete poured on metal deck; and
 - Reinforced concrete.
- 4.6. The cross laminated timber option was dismissed early in the project due to the building height and the number of storeys supported having major implications on the fire protection of the building.
- 4.7. The composite steel option is not considered appropriate to the proposed use of Plots E and F (primarily residential) as these structures do not perform well with respect to acoustics and floor vibrations. To ensure these criteria were met, additional finishes and structure would have been needed. This would mean a structural depth that would not allow the Development to achieve the proposed number of storeys within the planning parameters.

- 4.8. A reinforced concrete frame would meet the above requirements but also has other benefits, such as thermal mass. This is useful in residential spaces as it leads to smaller fluctuations in the internal temperatures. In the summer, it can absorb the heat during the day and release it back to the atmosphere during the night.
- 4.9. Other advantages of a reinforced concrete structure are that it can accommodate more storeys within the rights of light parameters and has inherent fire resistance meaning that there would be no requirement for carbon-intensive intumescent paint. In addition to this, reinforced concrete offers durability reducing the risk of damage and replacement of materials through the building's life-cycle.

Reduction of the Carbon Footprint of the Building Structure

- 4.10. Having determined that the building structure would be a reinforced concrete frame, measures were considered to reduce the embodied carbon of the building further. These comprised:
- Using ground granulated blast-furnace slag (GGBS) or Pulverised Fuel Ash (PFA) as cement replacements in areas where early concrete strength development is not required. This is because cement has the highest carbon footprint amongst concrete's material components;
 - Avoiding the use of visual concrete, that requires high percentages of cement, where possible.
 - Using recycled aggregates if possible, in low grade applications;
 - Re-using as much of the existing slab and perimeter retaining walls as possible to reduce unnecessary cut and fill and reduce the amount of new and temporary works structures required;
 - Taking advantage of the existing levels to create a semi-basement that accommodates a split-level car park. This helps to minimise the cut and fill; and
 - Use of a close centre grid to reduce the slab depth, minimising the amount of material used. A considerable amount of the carbon is stored in concrete slabs.
- 4.11. Re-using the foundations of the existing buildings was also considered. However, due to the building height and the consequential change in the total loads, this was not a viable option.

Energy Strategy

- 4.12. Hoare Lea has prepared an Energy Strategy for the proposed Development which is included as part of the reserved matters application submission as required by planning conditions 19 and 20 attached to planning permission 151427. The Energy Strategy describes the passive and active design measures that would be incorporated into the development to reduce the energy demand and then considers a range of options for energy supply to the development including renewable energy options. On the basis of this review, the measures considered potentially suitable for implementation in the development comprise:
- Option A – A gas fired boiler with combined heat and power (CHP) unit and photovoltaic panels (PV);
 - Option B – Air source heat pumps (ASHP) and PV;
 - Option C – Ground source heat pump and PV;
 - Option D – All electric with PV.
- 4.13. The Energy Strategy then reviewed the carbon savings of each option using the Standard Assessment Procedure (SAP) factors which are currently included in the Building Regulations,

referred to as SAP 2012, and the latest released SAP factors, known as SAP10. These latest SAP factors have yet to be incorporated into the Building Regulations but are being requested by some local planning authorities to inform emerging energy strategies. This is because these later SAP carbon factors reflect the increased contribution of renewable energy technologies to national energy generation, known as decarbonisation of the electricity grid. This means that the carbon factors associated with electricity have halved in the latest iteration of SAP (SAP10).

4.14. The conclusion of the review of the options is provided below.

Option A – Gas fired boiler, CHP and PV

4.15. This strategy has been considered the 'norm' for the last 10 to 15 years and can be seen to produce the highest carbon savings using the SAP 2012 approach (17% reduction against a base building). However, this methodology uses carbon factors from over 5 years ago which do not reflect the current state of the grid nor do they reflect the carbon factors that will be in place when the Development is built or in use. This strategy does not perform as well with the SAP10 carbon factors (28% increase in carbon emissions compared to a base building) as both the boiler and CHP unit are gas-fired and use of energy derived from fossil fuels such as gas is, and will continue to be a depleting resource that has a negative impact on the environment. This option is therefore not the proposed strategy.

Option B – Air source heat pumps and PV

4.16. In this option, Air Source Heat Pumps (ASHP) would be located on the roof to provide heating and hot water demand. This option performs well using either SAP2012 or SAP10 with a 19% and 43% reduction in carbon emissions respectively compared to a base building. However, this option would require a large amount of outdoor space to accommodate sufficient ASHP to provide heating and hot water and would therefore impact the overall height, number of floor levels or areas of landscaping and to avoid impacting on rights of light. ASHP also represents a source of noise. ASHP is therefore not the proposed strategy.

Option C – Ground source heat pumps and PV

4.17. In this option, Ground source heat pumps would be used to provide the heating and hot water demand for the development. This option performs well using either SAP2012 or SAP10 with a 40% and 58% reduction in carbon emissions respectively compared to a base building. However, supplementary boiler systems may be required to generate suitable hot water temperatures. In addition, due to the proximity to a large sewer system, installation of a ground source heat pump is not recommended. Since Plots E and F are predominantly residential and there are therefore no cooling loads which would be required to recharge with heat over the summer months to ensure that the system works efficiently, ground source heat pumps are not the recommended strategy.

Option D – All electric strategy and PV

4.18. As expected, the carbon savings using SAP 2012 and SAP10 are very different for this option reflecting the change in electricity carbon factors in the latest SAP10. The carbon savings using SAP2012 show an increase of 18% in carbon emissions compared to a base building. However, the results using SAP10 carbon factors show a 17% reduction in carbon emissions compared to a base building and reflect how the dwelling will perform now. This is expected to improve further in future as renewable energy supplies an even larger proportion of energy.

- 4.19. In addition, an all-electric approach will help to reduce the likelihood of overheating due to a lack of heat distribution pipework around the building and in the communal corridors. There will also be a reduction of site waste, water use and materials as the heating and power will be provided by the same medium. An all electric approach would also not increase NOx emissions in the centre of Reading as would occur with Option 1. This is therefore the proposed strategy for Plots E and F and would provide greater actual carbon reductions than the energy strategy previously proposed for the 2016 Consented Scheme.

5. Description of Development

- 5.1. As set out in the 2015 ES, the principles of the Development, as assessed in the 2015 EIA were defined by the Parameter Plans, a Development Specification and Framework and Design Code. These were secured through planning conditions. As a result of the Proposed Amendments, the Parameter Plans and Design Codes have been amended. The changes brought about by the Proposed Amendments on the Description of the Development Chapter of the 2015 ES are described below.

Overview of the Development

- 5.2. The minimum and maximum floorspace for each land use compared with that of the 2016 Consented Scheme is set out within Table 5.1. Whilst the floorspace mix was not fixed as part of the 2016 Consented Scheme, it was intended that the floor space would not fall below the specified minimum or above the maximum floorspaces for each land use. The maximum and minimum residential floor space areas have increased compared with the 2016 Consented Scheme but the remaining maximum and minimum floor space areas remain unchanged although the minimum area of retail use in Plot F (as set out in planning condition 54) has reduced as a result of the Proposed Amendments. These changes are described in the notes below Table 5.1.

Table 5.1: Proposed Total Minimum and Maximum Floorspace by Land Use

Land Use/Use Class	2016 Consented Scheme Overall Minimum Gross External Area (m ² GEA)	2016 Consented Scheme Overall Maximum Gross External Area (m ² GEA)	Proposed Development Overall Minimum Gross External Area (m ² GEA)	Proposed Development Overall Maximum Gross External Area (m ² GEA)
Retail (Class A1-A5)	3,900*	13,500	3,900* [no change]	13,500 [no change]
Leisure (Class D2)	0	2,200	0 [no change]	2,200 [No change]
Residential	26,000 (300 units)	41,050 (475 units)	41,050 (475 units)	45,000 (550 units)
Offices (Class B1)	69,000	122,000	69,000 [no change]	122,000 [no change]
Back of House Facilities	0	3,200	0 [no change]	3,200 [no change]
Residential amenity space (internal)	0	0	1000	1,500
Total Floorspace	101,000	182,400	117,050	184,676
Car Parking	550	1000	550 [no change]	1000 [no change]

* Within the 2015 ES the minimum area of retail was set at 6,000m². However, the planning conditions on 130436 and 151427 specify minimum areas of retail within each plot which totals 3,900m². The above table has therefore been amended in line with the planning conditions. Although this change would result in a reduction of associated jobs as assessed in Chapter 7:

Socio Economics of the 2015 ES, the overall assessment of effects would remain unchanged as demonstrated by the assessment presented in this ES Addendum.

1. All proposed floorspace figures exclude basement plans as per Condition 6 (of Planning application reference 151426 & 151427) excluding Plot F Leisure which is used to activate Garrard Street.
 2. The public realm may additionally include small retail kiosks (Use Class A1 –A5), which in total will not exceed 10% of the approved retail floorspace.
 3. The leisure floorspace excludes the roof top pitches on the roof of Plot G.
 4. Condition 54 of the Outline Planning Consent (130436 as amended by 151427) set a minimum amount of retail space in Plot F of 800m². However, following the detailed design process, the retail floorspace area provided within Plot F is 390 m².
- 5.3. The remaining elements of this Section of the 2015 ES Description of Development Chapter remain unchanged.

Parameter Plans

- 5.4. As a result of the Proposed Amendments, a number of the approved Parameter Plans have been changed. In addition, the indicative phasing plan has also been updated. For clarity, a full new suite of Parameter Plans and updated Phasing Plan (now referred to as a Sequencing Plan) has been prepared by CRTKL for each Section 73 Application. In addition, as the EIA is of all Plots within the Site, a consolidated set of plans (showing all plots) has also been prepared and included in this ES Addendum (Volume 3). However, the consolidated plans would not be approved as part of the Section 73 Applications.
- 5.5. A summary of the changes to the Parameter Plans and the revised plan references is set out below:

Table 5.2: Minimum and Maximum Building Heights.

Parameter Plan Number	Parameter Plan Title	Change since 2016 Consented Scheme	Revised Plan References
1	Red line boundary plan	No change	SHR-CRL-SB-ZZ-PL A-100-101-Rev P3 SHR-CRL-SB-ZZ-DR A-100-003- Rev P2 Consolidated plan referenced SHR-CRL-SB-ZZ-PL A-100-120-Rev P1.
2	Demolition and Retained Buildings	No change	SHR-CRL-SB-ZZ-PL A-100-102- Rev P2 SHR-CRL-SB-ZZ-PL A-100-111-Rev P2 Consolidated plan referenced SHR-CRL-SB-ZZ-PL A-100-121-Rev P1.
3	Building Plot (including heights)	Change in the layout of Plot E to reflect the creation of two open courtyards rather than a single courtyard enclosed by a perimeter block as previously proposed. The 'zone for courtyard' in Plot F has also been removed as this is no longer required.	SHR-CRL-SB-ZZ-PL A-100-102- Rev P4 SHR-CRL-SB-ZZ-PL A-100-110-Rev P5 Consolidated plan referenced SHR-CRL-SB-ZZ-PL A-100-122-Rev P1.

Parameter Plan Number	Parameter Plan Title	Change since 2016 Consented Scheme	Revised Plan References
		The Limit of Deviation on the Plot F façades facing Friars Walk and Merchants Place have been increased from +/-2.5m to +/-5m. The Limit of Deviation of the Friar Street façade of Plot E has increased from +/- 1.5m to +/- 2.5m. The minimum building height of Plot F has increased from 63m AOD to 81m AOD. The maximum building height of Plot F remains unchanged at 85m AOD. The minimum height of Plot E has reduced from 63m AOD to 50m AOD except in the north western corner of Plot E where the minimum height has increased from 63m AOD to 81.6m AOD. The maximum height of Plot E has also increased from 85m AOD to 85.6m AOD. The maximum height of the central section of Plot E (which is lower than the overall maximum height) has also increased from 78m AOD to 78.5m AOD.	
4	Public realm	No change	SHR-CRL-SB-ZZ-PL A-100-103- Rev P4 SHR-CRL-SB-ZZ-PL A-100-111-Rev P3 Consolidated plan referenced SHR-CRL-SB-ZZ-PL A-100-123-Rev P1.
5	Vehicular and Pedestrian Access Routes	Amended to create an additional zone for servicing along the Friar Street frontage of Plot E.	SHR-CRL-SB-ZZ-PL A-100-104- Rev P4 SHR-CRL-SB-ZZ-PL A-100-112-Rev P4 Consolidated plan referenced SHR-CRL-SB-ZZ-PL A-100-124-Rev P1.
6	Ground floor uses	Amended to reflect the fact that leisure will be included at lower ground, mezzanine and ground floor level in Plot F (rather than first floor level as previously proposed) and also that Plot F will be predominantly mixed residential and retail uses at ground floor level rather than retail as previously shown. There is no change to this parameter plan in relation to Plot E	SHR-CRL-SB-ZZ-PL A-100-105-Rev P4 SHR-CRL-SB-ZZ-PL A-100-113-Rev P3 Consolidated plan referenced SHR-CRL-SB-ZZ-PL A-100-125-Rev P1.
7	Upper floor uses	Amended to remove leisure uses from first floor level in Plot F. There	SHR-CRL-SB-ZZ-PL A-100-106-Rev P4

Parameter Plan Number	Parameter Plan Title	Change since 2016 Consented Scheme	Revised Plan References
		is no change to this parameter plan in relation to Plot E	SHR-CRL-SB-ZZ-PL A-100-114-Rev P3 Consolidated plan referenced SHR-CRL-SB-ZZ-PL A-100-126-Rev P1.
N/A	Indicative Sequencing	The sequencing is now anticipated to be Plots E and F as part of Phase 1 and Plots A, B, C, D and G as part of Phase 2.	SHR-CRL-SB-ZZ-PL A-100-100-Rev P2 Included in this ES Addendum as Figure 6.1 (Update to Figure 6.1 of the 2015 ES)

- 5.6. The above plans are included as Figures in Volume 3 of this ES Addendum.

Layout of Built Development

- 5.7. Parameter Plan 3 (consolidated plan reference SHR-CRL-SB-ZZ-PL A-100-122-Rev P1) illustrates the layout of the proposed buildings and each building plot's maximum footprint (subject to limits of deviation) whilst Parameter Plan 4 (consolidated plan reference SHR-CRL-SB-ZZ-PL A-100-123-Rev P1) shows the minimum distances between the Plots. The Plot layout and minimum distance between the Plots remains as described in the 2015 ES but the courtyard layout in Plot E has been revised to create two open courtyards rather than a courtyard enclosed by a perimeter block. In addition, the zone for courtyard has been removed from Plot F as this is no longer required. With regard to the limits of deviation, the limits of deviation on the façades of Plot F facing Friars Walk and Merchant's Place have been increased from +/- 2.5m to +/-5m.at the upper floor levels to increase distances from Plot E and properties on Merchant's Place, thereby preserving residential amenity by maximising window to window distances. The limits of deviation on the Friar Street Frontage of Plot E have also increased from +/- 1.5m to +/- 2.5m.

Building Heights and Massing

- 5.8. Minimum and maximum building heights are annotated on Parameter Plan 3 (consolidated plan reference SHR-CRL-SB-ZZ-PL A-100-122-Rev P1). The maximum footprints would remain unchanged from the 2016 Consented Scheme although, in localised areas the limits of deviation have changed as described above. However, the minimum height of F has been increased from 63m AOD to 81m AOD and the minimum height of the majority of Plot E has been reduced from 63m AOD to 50m AOD to reflect the revised courtyard layout and reduced height of facades on Friars Walk. The minimum height of the north western corner of Plot E has been increased from 63m AOD to 81.6m AOD, again reflecting the revised courtyard layout. The maximum height of Plot E has also increased from a maximum of 85m AOD to 85.6m AOD whilst the maximum height of the central section of Plot E (which is lower than the overall maximum height) has also increased from 78m AOD to 78.5m AOD. The amendments are shown in Table 5.3. This updates Table 5.3 of the 2015 ES. Whilst the minimum and maximum heights have changed slightly, the design rationale for the varying heights and relationship of building heights to each other, as set out in the 2015 ES remains unchanged.

Table 5.3: Minimum and Maximum Building Heights.

Building Plot	Minimum Building Heights (metres Above Ordnance Datum (AOD))	Maximum Building Heights (m AOD)
Plot A	67m	91m
Plot B	94m	121m
Plot C	109m	128m
Plot D	75m	105m
Telecom House / Plot E	50m / 81.6m [Change from 63m AOD in the 2016 Consented Scheme]	66.5 to 85.5m [Change from 66m to 85m AOD in the 2016 Consented Scheme]
Plot F	81m [increase from 63mAOD in 2016 Consented Scheme]	85m
Plot G	72m	83m

Elevational Treatment

- 5.9. The description of the elevational treatment of the commercial buildings and multi-storey car park remains unchanged from the 2015 ES. The description of the residential buildings also remains unchanged except that masonry or stone-like material would be used as a potential material for the façade rather than natural or reconstituted stone. The use of zinc is also being considered.

Site Levels

- 5.10. Proposed ground levels within the Site boundary remain in the same as the 2016 Consented Scheme (shown on Parameter Plan 3 - Consolidated Plan reference SHR-CRL-SB-ZZ-PL A-100-122-Rev P1). However, the Proposed Amendments introduce level access along Friars Walk with steps and a lift down to Garrard Street rather than stepped or ramped access along Friars Walk as previously proposed.

Land Uses

- 5.11. Parameter Plans 6 and 7 (consolidated plan references SHR-CRL-SB-ZZ-PL A-100-125-Rev P1 and SHR-CRL-SB-ZZ-PL A-100-126-Rev P1) illustrate the location and distribution of the proposed land uses within the Development. These remain as set out in the 2016 Consented Scheme except that the leisure uses in Plot F would now be at lower ground floor, mezzanine level and / or ground floor level rather than the upper levels as previously proposed.
- 5.12. In addition, the residential unit numbers have increased to between 475 and 550 units rather than 300 to 475 units as previously proposed. The mix has changed to reflect the fact that the residential uses will be Build to Rent. The unit mix is now 11% studio apartments, 46% one bedroom, 41% two bedroom and 3% three bedroom (note: these are rounded figures and therefore the sum is greater than 100%). This compares to 30% one-bedroom units and 70% 2 bedroom units assumed in the 2015 ES. There would be 10% affordable housing provision on-site comprising a 50:50 split of affordable private rented and intermediate private rented levels. Approximately half of the affordable housing would be 1 bed apartments and half 2 bed apartments.

- 5.13. Retail uses in Plot F are lower than originally envisaged as part of the 2016 Consented Scheme with 390m² of retail uses proposed rather than a minimum of 800m² as originally proposed.

Vehicular Access, Circulation, Parking and Servicing

- 5.14. Parameter Plan 5 (consolidated plan reference SHR-CRL-SB-ZZ-PL A-100-124-Rev P1) illustrates the proposed means of vehicular access, servicing and pedestrian circulation within the Development. This remains in accordance with the 2016 Consented Scheme except that Plot E would be serviced from Friar Street as well as Garrard Street as previously proposed.

Pedestrian Access and Circulation

- 5.15. Parameter Plan 5 (consolidated plan reference SHR-CRL-SB-ZZ-PL A-100-124-Rev P1) defines the pedestrian routes within the Development. These remain in accordance with the details set out in the 2015 ES except that level access would be provided along Friars Walk with steps and a lift down to Garrard Street to address the level changes rather than stepped or ramped access along Friars Walk as previously proposed.

Open Spaces and Landscape

- 5.16. The principal areas of public realm are shown on Parameter Plan 4 (consolidated plan reference SHR-CRL-SB-ZZ-PL A-100-123-Rev P1). These remain as described in the 2015 ES.
- 5.17. With regard to private amenity areas, each apartment would have access to a shared amenity space and / or private balcony as previously proposed. However, given the number of units now proposed, each residential unit would have a minimum of 6m² of private or shared amenity space rather than 10m² as previously anticipated. Shared amenity spaces for residents would be provided at ground floor level and/or roof level.
- 5.18. The proposals for Green / Brown roofs, Tree planting and landscaping remain as set out in the 2015 ES.

Utilities and Services

- 5.19. There have been some minor changes to the utilities providers present on Site compared with that presented in the 2015 ES and the utilities proposals across the Site are still subject to further detailed design. However, this is not considered to impact upon the findings of the 2015 ES.

Surface Water Drainage Strategy

- 5.20. This section remains as set out in the 2015 ES.

Energy

- 5.21. The Energy Strategy proposed for Plots E and F has been updated by Hoare Lea since preparation of the 2015 ES as set out in Chapter 4 of this ES Addendum. This proposes an all electric strategy for Plots E and F incorporating solar photovoltaics. Using SAP10 carbon factors, this shows a 17% reduction in carbon emissions compared to a base building and reflects how the dwelling will perform now. This is expected to improve further in future as renewable energy supplies an even larger proportion of energy.

- 5.22. The Energy Strategy for the remainder of the Site remains in accordance with that submitted as part of the 2015 planning application (for the 2016 Consented Scheme). Further details will be determined at the detailed design stage for these plots.

Waste Generation and Management

- 5.23. In the residential blocks, residents would be responsible for taking their rubbish to the base of each building core and placing it in the appropriate euro bin for collection. Each residential unit would be provided with an internal recycling storage area to encourage residents to segregate their recyclable waste and store it prior to collection.

Environmental Performance and Sustainability

- 5.24. This section remains as set out in the 2015 ES except that the commercial spaces within the Development would be designed to achieve an Excellent BREEAM rating rather than a Very Good rating as previously proposed.

6. Development Programme, Demolition and Construction

- 6.1. This Chapter has been prepared by Waterman Infrastructure & Environment Ltd (Waterman) with input from the Applicant's Team. The majority of the Chapter remains unchanged from that presented in the 2015 ES with the exception of the programme and sequence of works section and construction waste calculations. These changes are described below.

Programme of Works

- 6.2. An updated indicative sequencing plan has been prepared by CRTKL and is included as **Figure 6.1**. This updates Figure 6.1 of the 2015 ES. Plots E and F would form Phase 1 of the Development with Plots A to D and G forming Phase 2.
- 6.3. Demolition of the buildings within Plots E and F is anticipated to commence in mid-2019 with construction of these Plots anticipated to be completed by December 2022. Demolition across much of the remainder of the Site has already been completed (except Xafinity House) and construction of the new buildings is anticipated to be completed by December 2025.
- 6.4. **Table 6.1** summarises the main activities to be undertaken during the demolition and construction works and the approximate duration of the works. This updates Table 6.1 of the 2015 ES. It is important to note that Table 6.1 indicates the approximate duration of each main stage of the works, some of which would be occurring concurrently. This is due to the overlaps in the construction programme.

Table 6.1 Indicative Demolition and Construction Activities and Duration

Activity	Approximate Duration of Works (Months)
Enabling Works Phase 1	9
First phase of site preparation and demolition	9
Construction of Phase 1	37
Enabling works Phase 2	7
Second phase of site preparation and demolition	7
Construction of Phase 2	70

Sequence of Works

- 6.5. As described above, the proposed sequence of works has changed since the 2015 ES with Phase 1 now comprising of Plots E and F and Phase 2 comprising the remainder of the Development. The proposed sequence is described below

Phase 1

- Phase 1 enabling works;
- Site preparation and demolition of buildings within Phase 1 comprising:
 - Friars Walk Shopping Centre;
 - Telecom House;
- Archaeological investigations and Site Investigations.

- Construction of Phase 1 including:
 - Construction, cladding and fit-out of Blocks E & F;
 - Completion of the pedestrian route from Friar Street to Garrard Street (known as Friars Walk); and
 - Landscaping works.

Phase 2

- Phase 2 Site enabling works.
- Phase 2 Site preparation and demolition of Xafinity House;
- Archaeological Investigations and Site Investigations.
- Construction of Phase 2 including:
 - Construction, cladding and fit-out of buildings within Plots A, B, D and car park (G);
 - Creation of the public realm adjacent to Plot C;
 - Landscaping works.

Description of the Works

6.6. This section remains as set out in the 2015 ES.

Materials and Resource Use

Excavation and Demolition

6.7. This section remains as set out in the 2015 ES.

Construction

6.8. As set out in the 2015 ES, the generation of waste material would occur at all stages of the construction process, from structural and foundation works to fit-out of the new buildings. Following a number of audits, the Building Research Establishment (BRE) has determined that, as a broad guideⁱⁱ, approximately 18.1m³ of waste is generated in the construction of 100m² of residential developments, approximately 19.8m³ of waste is generated in the construction of 100m² of commercial offices, 20.98m³ of waste is generated in the construction of 100m² of retail developments, and 14.4m³ of waste is generated in the construction of 100m² of leisure developments. The waste generated by the construction of the Development has been estimated based on these figures, as shown in **Table 6.2**. This updates Table 6.3 of the 2015 ES.

Table 6.2: Waste Arisings

Land Use/Use Class	Minimum Gross External Area (m ² GEA)	Waste Arisings (m ³)	Maximum Gross External Area (m ² GEA)	Waste Arisings (m ³)
Offices (Class B1)	69,000	13,662	122,000	24,156
Retail (Class A1-A5)	3,200	671	13,500	2,833
Leisure (Class D2)	0	0	2,200	317

Land Use/Use Class	Minimum Gross External Area (m ² GEA)	Waste Arisings (m ³)	Maximum Gross External Area (m ² GEA)	Waste Arisings (m ³)
Back of House Facilities	0	0	3,200	671
Residential	41,050	7,430	45,000	8,145
Residential Amenity	1,000	181	1,500	272
Total Floorspace	114,250	21,944	187,400	36,394

- 6.9. Using the BREs broad indicators, and including additional waste generated by the refurbishment of the car-park, it is estimated that approximately 41,000m³ of waste would be generated, equivalent to approximately 8,200m³ per year. This is slightly higher than that of the 2016 Consented Scheme, which estimated that there would be approximately 40,000m³ of waste generated, equivalent to approximately 8,000m³ per year. This due to the slight increase in floor space areas. However, as set out in the 2015 ES, all relevant contractors would be required to investigate opportunities to minimise waste arisings at source and, where such waste generation is unavoidable, to maximise the recycling and reuse potential of demolition and construction materials. Wherever feasible, such arisings would be dealt with in a manner that reduces environmental impact and maximises potential re-use of materials.
- 6.10. The remainder of this Chapter remains unchanged from the 2015 ES and has therefore not been repeated in this ES Addendum.

ⁱⁱ Building Research Establishment, June 2012, BRE Waste Benchmark Data, Watford

7. Socio Economics and Health

Introduction

- 7.1. This Chapter provides an update to the Socio-Economic baseline and assesses the Socio Economic effects associated with the proposed Development. An assessment of the potential for health-related effects associated with the proposed Development has also been undertaken and is presented in a separate Health Impact Assessment Report. Where significant health related effects have been identified, these have been summarised in this Chapter. This assessment has been prepared by Hatch Regeneris and should be read in conjunction with the 2015 ES.

Legislation, Planning Policy and Guidance

- 7.2. This section provides a summary of any new or updated legislation, planning policy and guidance since the 2015 ES.

National Legislation and Policy

National Planning Policy Framework, 2018 & Planning Practice Guidance, 2018

- 7.3. The National Planning Policy Framework (NPPF)¹ and Planning Practice Guidance (PPG)² were revised and published in July 2018. The key principle of the NPPF remains a presumption in favour of sustainable development, which should be interpreted and applied locally to meet local aspirations. The planning system has three overarching objectives where opportunities can be taken to secure net gains across each of them, namely:
- An **economic** objective – to help build a strong, responsible and competitive economy;
 - A **social** objective – to support strong, vibrant and healthy communities;
 - An **environmental** objective – to contribute to protecting our natural, built and historic environment.
- 7.4. The NPPF sets out to deliver a sufficient supply of new homes by encouraging a sufficient amount and variety of land to come forward where needed and to ensure that the needs of groups with specific housing requirements are addressed and that land with permission for development comes forward without delay.
- 7.5. In terms of building a strong, competitive economy, the NPPF encourages planning and decision makers to help create the conditions in which businesses can invest, expand and adapt with particular weight placed on the need to support economic growth and productivity. This includes:
- Seeking to address potential barriers to investment, such as inadequate infrastructure, services or housing, or a poor environment; and
 - Being flexible enough to accommodate needs not anticipated in the plan, allow for new and flexible working practices and to enable a rapid response to changes in economic circumstances.

- 7.6. The NPPF also makes clear the need to achieve healthy, inclusive and safe places which can promote social interaction through mixed-use developments and enable and support healthy lifestyles.

Local Policy

Reading Borough Local Plan, Submission Draft (March 2018)

- 7.7. Reading Borough Council (RBC) is currently working on producing a new Local Plan³ which will replace the current development plans (the Core Strategy, Reading Central Area Action Plan and Sites and Detailed Policies Document). The new plan will set out how Reading will develop up to 2036. The emerging plan defines the amount of development that will take place within the borough, the areas and sites where development is expected to be accommodated, and where it will be restricted, and sets out policies for how planning applications will be decided.
- 7.8. The priorities of the plan are as follows:
- *“Safeguarding and protecting those that are most vulnerable;*
 - *Providing the best help through education, early help and healthy living;*
 - *Providing homes for those most in need;*
 - *Keeping the town clean, safe, green and active;*
 - *Providing infrastructure to support the economy; and*
 - *Remaining financially sustainable to deliver these service priorities.”*
- 7.9. The draft submission Local Plan for Reading sets out a housing target of 15,433 new dwellings to be delivered in the period 2013-2036 equating to 671 dwellings per annum (dpa) and with an affordable housing target of 30% on sites with 10 dwellings or more.
- 7.10. The Plan also notes that around 7,700 new homes are expected to be delivered within the central area of Reading over the plan period. The Plan indicates that a mix of different sized dwellings are required in the Central area of Reading and sets maximum threshold for the proportion of one-bedroom units (40%) together with a minimum threshold for the proportion of three bedroom units (5%) in order to ensure a diverse mix of sizes.

Reading Borough Local Development Framework, Adopted Core Strategy, 2008 (updated 2015)

- 7.11. The information in this document remains the same as described in the 2015 ES.

Reading Borough Local Development Framework, Sites and Detailed Policies Document, Adopted 2012 (updated 2015)

- 7.12. The information in this document remains the same as described in the 2015 ES.

Reading Borough Local Development Framework, Reading Central Area Action Plan, 2009

- 7.13. The information in this document remains the same as described in the 2015 ES.

Station Hill South Planning and Urban Design Brief, 2007

- 7.14. The information in this document remains the same as described in the 2015 ES.
[Station Area Framework, 2010](#)
- 7.15. The information in this document remains the same as described in the 2015 ES.
[Affordable Housing Supplementary Planning Document, 2013](#)
- 7.16. The information in this document remains the same as described in the 2015 ES.
[Employment, Skills and Training Supplementary Planning Document, 2013](#)
- 7.17. The information in this document remains the same as described in the 2015 ES.

Assessment Methodology and Significance Criteria

- 7.18. The assessment methodology has remained largely the same as that presented in the 2015 ES although the methods of calculation have, in some cases, been updated. In terms of baseline conditions, other than the 2011 Census, the baseline socio economic survey data has been updated since the 2015 ES. The revised baseline data sources and calculation methodologies are described below.
- 7.19. The baseline socio-economic conditions used to inform this Chapter have been established through the interpretation of nationally recognised research and survey information, including:
- 2011 Census data⁴;
 - Business Register and Employment Survey data (2017)⁵;
 - Indices of Multiple Deprivation (2015)⁶;
 - Claimant Count (JSA) data (2018)⁷;
 - National Health Service (NHS) Choices and NHS South Reading Clinical Commissioning Group (CCG);
 - Department for Education (DfE) (school locations and capacity information); and
 - Reading Childcare Sufficiency Assessment⁸.
- 7.20. Where relevant, the assessment of effects has been undertaken using the following methods, estimates and assumptions:
- Construction related employment effects have been assessed using the Homes and Communities Agency (HCA) Labour Coefficients¹ (person years of employment per £1m spend) applied to the costs associated with the demolition and construction works. Person years of employment are divided by the expected timescale of the demolition and construction works to provide an average annual number of jobs. This method of calculation is an update from the 2015 ES in line with recognised industry standards;
 - Completed Development commercial floorspace employment was calculated by applying standard job density ratios and based on the quantum of Development sought for approval. The jobs density ratios have been updated from the 2015 ES to reflect the latest available guidance⁹.

¹ See Homes and Communities Agency (2015), 'Calculating Cost Per Job – Best Practice Note. Third Edition'

- Completed Development population projections have been forecast using a model based on data from the 2011 Census (Average Household Size for flats in Reading is 1.8 persons per household). The methodology remains the same as stated in the 2015 ES;
- An estimate of the demand for education provision within the 2015 ES was calculated based on the child yield methodology set out in Reading Borough Council's SPD on Planning Obligations published in 2004¹⁰. This document was updated in 2015 and the 2004 version is no longer available. However, the child yield methodology has not been included in the 2015 revisions to the SPD. In the absence of any further guidance on this matter, Brighter Futures for Children² have advised that pupil product ratios produced by Cognisant are suitable for use in Reading]. These ratios have been applied to an assumed housing mix for the maximum number of units (550) which reflects a worst-case scenario in terms of child yield;
- An estimate of the spending generated as a result of the completed and operational Development is calculated using an average regional household expenditure figure of £196.80 per week on convenience and comparison goods (ONS, 2017)¹¹ and £12³ per day¹² on food and drink by employees. This is broadly the same approach as used in the 2015 ES although spending figures have been updated to reflect more recently available data and to take account of expenditure on convenience and comparison goods rather than total expenditure; and
- A comparison of the existing average ratio of patients to General Practitioners (GPs) with the most frequently used planning assumptions of an acceptable average ratio of 1,800 patients per GP. This is the same as the approach used in the 2015 ES.

Approach to Outline Assessment

- 7.21. The assessment of the Development has been based on the minimum and maximum area schedules set out in Chapter 5: Description of Development, to identify the likely significant effects.
- 7.22. The ranges proposed would vary the level of employment generated in the commercial floorspace, and the number of residential units and associated population effects. Therefore, for the purpose of this assessment and the associated effects arising from the Development, two development scenarios are assessed. The minimum development scenario is based on the minimum area schedule and includes 72,900m² GEA of commercial floorspace (B1 and A1-5) and 475 residential units. The maximum development scenario is based on the maximum area schedule and includes 137,700m² GEA commercial and leisure floorspace (B1, A1-5 and D2) and 550 residential units. These figures exclude back of house, residential amenity space or car parking areas as this is not typically included in employment calculations. However, an estimate of employment generated by these elements in the impact assessment section later in this Chapter.

Limitations and Assumptions

- 7.23. The assessment of effects was carried out against socio-economic baseline conditions as defined by the data sources referenced throughout this Chapter. As with any data set, these may be subject to change.
- 7.24. The assessment of effects assumes that the Development would be constructed in accordance with the parameters and area schedules being applied for.

² Bright Futures are Reading Borough Council's Children's Social Services.

³ Visa Europe 2014. N.B. this figure has been updated to 2018 prices

Consultation

- 7.25. An EIA Scoping Letter was prepared by Waterman Infrastructure & Environment Ltd and submitted to RBC, together with a request for a formal Scoping Opinion, in October 2018. The Scoping Opinion received from RBC on 14th November 2018 requested that the effects of the increase in residential floorspace and the shift from owner-occupied to Build to Rent should be addressed and that impacts should be assessed in terms of their impact on the Borough as a whole.

Comparison with the 2016 Consented Scheme

- 7.26. As discussed in Chapter 1 of this ES Addendum, the Site benefits from existing planning consents, collectively referred to as the 2016 Consented Scheme. The key differences between the 2016 Consented Scheme and the proposed Development (that is the 2016 Consented Scheme as amended by the Proposed Amendments) in relation to socio-economics impacts are set out under each area of assessment in order to provide a clear comparison.

Significance Criteria

- 7.27. The significance criteria used in the assessment of socio economic effects remain the same as set out in the 2015 ES.
- 7.28. A Health Impact Assessment (HIA) has been carried out and the findings are reported in a separate standalone document ('HIA Report'). The methodology used to undertake the HIA is described in full within the HIA Report. Where relevant to the socio-economics assessment, the findings of the HIA have been referred to within this chapter.

Baseline Conditions

- 7.29. This section provides an update to the socio-economic baseline conditions set out within the 2015 ES. Where there has been either no change in conditions reported in the 2015 ES, or there is no more recently published data, this has been stated.

Existing Site and Spatial Context

- 7.30. The existing Site comprises of Xafinity House, the NCP Car Park, Friars Walk Shopping Centre and Telecom House. The Mecca Bingo Hall, Bus Station, Western Tower and associated retail arcade which were included in the 2015 ES, have been demolished. The area of the Mecca Bingo Hall, Bus Station and Western Tower now comprises bare ground with some stockpiles of material present, all of which is contained within construction hoardings. The area of the retail arcade now comprises a Temporary Events Space; an area of hardstanding on which events can be held such as ice rinks, markets and marketing events. Of the remaining buildings, the NCP Car Park remains in use. Xafinity House, which was in use at the time of the 2015 ES is now vacant. Part of this building, along Station Hill, was demolished at the same time as the Mecca Bingo Hall. Friars Walk shopping Centre is also vacant as is the majority of Telecom House with the Savers retail unit being the only occupied unit. With 482 sqm Gross Internal Area (GIA)/434 sqm Net Internal Area⁴ (NIA) it is estimated that the unit currently supports 25 FTE jobs.

⁴ Based on the HCAs employment density guidance (3rd Edition) a 90% ratio has been applied to convert GIA to NIA and an employment density of 17.5 sqm (mid-way between 15-20) has been used.

- 7.31. The Site is located in Reading Town Centre, within Abbey Ward in the administrative boundary of RBC (as shown in Figure 7.1 of the 2015 ES).

Demographics

Population

- 7.32. According to ONS mid-year population estimates from 2017¹³, there are 14,300 people living in Abbey ward. This represents 9% of Reading's population of 163,100. The ward's population was around 9,700 in 2007, indicating an increase of 4,600 or 47%. Over the same period, Reading's population grew by 13,400 or 9%.

Age Profile

- 7.33. Based on ONS mid-year population estimates from 2017¹³, Abbey ward has a higher proportion of working-age residents (77% are aged between 16 and 64) than Reading (67%) and the South East (62%). This is shown in Table 7.1. Abbey ward has a young working-age population, with 62% of working-age residents aged 45 or under, compared to Reading (47%) and the South East (37%). There is a lower proportion of children living in Abbey ward (17% of residents are under 16 years old) compared to Reading (21%) and the South East (19%).

Table 7.1: Age Profile

	Abbey Ward		Reading Borough		South East	
	2017 No.	2017 % Share	2017 No.	2017 % Share	2017 No.	2017 % Share
Total residents	14,300	100%	163,100	100%	9,080,800	100%
0-15	2,400	17%	33,800	21%	1,737,500	19%
16-64	11,100	77%	109,500	67%	5,607,500	62%
16-45	8,900	62%	76,500	47%	3,347,700	37%
65+	900	6%	19,800	12%	1,735,800	19%

Source: Mid-Year Population Estimates, Office for National Statistics, 2017

Ethnicity

- 7.34. The available baseline data on ethnicity remains the same as described in the 2015 ES.

Qualifications

- 7.35. Abbey ward has a high proportion of residents with at least degree level qualifications. According to the 2011 Census¹⁴, 50% of residents hold these qualifications compared to 35% in Reading and

30% in the South East. However, based on Annual Population Survey¹⁵ data for 2017, this proportion has risen to 48% for Reading and 41% for the South East.

Economic Profile

Unemployment

- 7.36. Economic activity refers to residents who are either in employment or actively seeking employment. According to data from the 2011 Census¹⁴, 80% of usual residents aged 16 to 74 in Abbey ward were economically active. This compared to 74% in Reading and 72% in the South East. However, the Annual Population Survey¹⁵ provides more up to date information on Reading and the South East. In 2017, Reading had an economic activity rate of 80%, while the South East had 81%.
- 7.37. The 2011 Census¹⁴ also provided information on the unemployment rate of economically active residents. 5.1% in Abbey ward were unemployed compared to 4.6% in Reading and 3.4% in the South East.
- 7.38. Claimant count¹⁶ data shows that 2.5% of economically active residents in Abbey ward are both claiming work-related benefits and actively seeking employment. This compares to 2.2% in Reading and 1.4% in the South East.

Occupation and Industry

- 7.39. According to data from the 2011 Census¹⁴, 60% of Abbey ward residents hold high-value occupations, including managerial and senior official roles, professional occupations and associate professional and technical occupations. This compares to 47% in Reading and the South East. However, the 2018 Annual Population Survey¹⁵ provides more up to date information for Reading and the South East. It states that the share of people employed in high-value jobs is now 60% in Reading and 50% in the South East.
- 7.40. The 2011 Census¹⁴ also shows that a high proportion of residents of Abbey ward work in the information and communications sector (20%) and the professional, scientific and technical activities sector (12%). This compares to 11% in Reading and 6% for the South East employed in the information and communications sector and the 9% in Reading and 8% in the South East employed in the professional, scientific and technical activities sector. The wholesale, retail and motor trade sector makes up the largest proportion of the employment of residents in Reading and the South East (both 16%), a lower proportion (13%) of Abbey ward's residents are employed within this sector.

Business Base

- 7.41. There are 41,600 jobs in Abbey ward, according to the Business Register and Employment Survey¹⁷ from 2017. This represents 40% of Reading borough's 103,100 jobs.
- 7.42. The largest sector in Abbey ward is financial and professional services with 23% of total jobs in this sector. This sector makes up a larger proportion of jobs in Abbey ward compared to both Reading

and the South East. The second most common sector in Abbey ward is retail, with a job share of 15%. This share is also slightly greater than the job share in Reading and the South East.

- 7.43. The third most common sector in Abbey ward in terms of employment is public admin, education and health, with 14% of jobs. However, this job share is lower than the 23% in Reading and 26% in the South East.

Table 7.2: Key Sectors

	Abbey Ward		Reading Borough		South East	
	No.	% Share	No.	% Share	No.	% Share
Agriculture and Mining	0	0%	100	0%	56,800	1%
Business Support Services	4,600	11%	9,800	9%	339,600	8%
Construction	500	1%	2,700	3%	239,700	6%
Creative	4,800	12%	15,200	15%	267,100	6%
Financial and Professional Services	9,600	23%	15,900	15%	502,700	12%
Hospitality, Leisure and Recreation	4,200	10%	8,800	9%	434,500	10%
ICT & Digital	200	0%	300	0%	36,900	1%
Manufacturing	400	1%	1,900	2%	255,600	6%
Other Services	500	1%	1,900	2%	86,000	2%
Public Admin, Education, Health	5,700	14%	23,500	23%	1,085,100	26%
Retail	6,400	15%	13,100	13%	485,900	11%
Transport	2,200	5%	2,900	3%	115,700	3%
Utilities and Waste - gas, water, electricity	1,500	4%	2,200	2%	54,100	1%
Warehousing and Logistics	300	1%	1,300	1%	77,300	2%
Wholesale	700	2%	3,600	3%	199,500	5%

Source: Business Register and Employment Survey, Office for National Statistics, 2017

Housing Profile

- 7.44. The available baseline data on the housing profile remains the same as described in the 2015 ES.

Deprivation

- 7.45. The Index of Multiple Deprivation¹⁸ measures a number of social, economic and housing indicators to measure deprivation across lower super output areas (LSOA) across England. Table 7.3 shows how Reading's LSOAs perform in terms of the different domains and overall. Of the 97 LSOAs in Reading, only 10 are in the top 20% most deprived LSOAs nationally. None of these ten LSOAs is located in Abbey ward. Figure 7.2 shows the level of deprivation in Reading Borough. This has been updated since the 2015 ES.

Table 7.3: Index of Multiple Deprivation

	Overall	Income	Employment, Skills and Training	Health Deprivation and Disability	Crime	Housing and Access to Services	Living Environment
Top 10% Deprived	2	5	2	9	0	6	1
Top 20%	8	10	6	9	3	10	16
Top 30%	14	10	9	9	5	14	18
Top 40%	15	12	15	12	15	16	19
Top 50%	17	13	10	6	14	13	12
Bottom 50%	41	47	55	52	60	38	31

Source: Index of Multiple Deprivation, Ministry of Housing, Communities and Local Government, 2015

Crime

- 7.46. Given the Site's location within Reading town centre and its proximity to a major transport interchange it would be expected to have higher crime rates, particularly for opportunistic crimes. Town centres tend to have higher crime levels due to concentration of people passing through and the mix of uses such as retail, entertainment and transport interchanges.
- 7.47. The crime domain of the Index of Multiple Deprivation (IMD)¹⁸ measures the incidence of recorded crime including burglary, theft, criminal damage and violence. Figure 7.3 illustrates the crime IMD figures; this has been updated since the 2015 ES. This shows that 16 of Reading's 97 LSOAs are in the 20% most deprived LSOAs nationally in terms of crime, four of which are in Abbey Ward.
- 7.48. Data from the ONS¹⁹ show that overall crime figures have risen in the Thames Valley area since June 2017. Table 7.4 sets out a summary of notifiable offences in Reading as the number of crimes per 1,000 population.

Table 7.4; Crime Data

Crime Type	Crimes per 1000 population	
	2016/17	2017/18
Violence Against the Person	13.1	16.2
Sexual Offences	1.9	2.1
Robbery	0.5	0.6
Burglary	5.3	5.3
Vehicle Offences	6.0	6.6
Criminal Damage and Arson	8.0	8.2
Total Victim Based Crime	34.7	39.1
Crimes Against Society (Drugs, public disorder, possession of weapons etc.)	5.3	3.9
All Crime	40.1	43.0

Source: Police Force Area Data Tables, Office for National Statistics

Social Infrastructure

Education

- 7.49. There is a total of 40 primary schools and 10 secondary schools across the borough of Reading.²⁰ The Council's latest Infrastructure Delivery Plan²¹ (IDP) suggests there is a borough-wide lack of surplus capacity within primary and secondary schools, in particular amongst primary schools. According to the IDP, Reading sends about 10% of primary pupils and 38% of secondary pupils across the borough's boundaries to attend school in surrounding authorities.
- 7.50. For primary schools, the Education Authority has identified pressure on capacity in the east of Reading, the town centre and along the Oxford Road corridor. According to the IDP, housing growth will exacerbate this position.
- 7.51. Table 7.5 sets out capacity data for schools that fall within 3.2 km (two miles) of the Site. These are also illustrated on Figure 7.4 which has been updated since the 2015 ES. This suggests that only 1 of the 26 primary schools within the catchment of the Site is currently over capacity. Among the schools within the catchment, there are 1,674 surplus places.

Table 7.5: Primary Schools

Name of School	Capacity	Pupil Roll	Surplus
Alfred Sutton Primary School	630	551	79
All Saints Junior School	120	95	25
Caversham Primary School	450	455	-5
Coley Primary School	270	239	31
E P Collier Primary School	420	307	113
Battle Primary Academy	420	391	29
The Palmer Primary Academy	498	391	107
Civitas Academy	420	101	319
Oxford Road Community School	240	236	4
The Heights Primary School	350	167	183
Redlands Primary School	240	234	6
The Hill Primary School	540	476	64
Wilson Primary School	420	414	6
Ranikhet Academy	396	230	166
Emmer Green Primary School	480	478	2
Southcote Primary School	630	530	100
New Town Primary School	420	265	155
Thameside Primary School	420	409	11
Katesgrove Primary School	630	614	16
Micklands Primary School	480	394	86
New Christ Church Church of England (VA) Primary School	210	193	17
All Saints Church of England Aided Infant School	60	60	0
St John's Church of England Primary School	420	399	21
St Mary and All Saints Church of England Voluntary Aided Primary School	420	360	60
St Anne's Catholic Primary School	240	190	50

Name of School	Capacity	Pupil Roll	Surplus
Whitley Park Primary and Nursery School	630	601	29
Total	10454	10454	1674

Source: School Capacity Survey, Department for Education, 2017

- 7.52. In terms of secondary schools, there are 10 across the Borough of Reading, with the closest to the Site being Kendrick School, which has a capacity of 790 and a current pupil roll of 740. Table 7.6 provides a list of secondary schools within the borough together with their capacity information and indicates that a large majority have a current surplus in capacity. However, by 2023/24, data from the DfES suggests that demand will outstrip capacity and there will be a requirement for additional secondary school places in the borough to meet demand.

Table 7.6: Secondary Schools

Name of School	Capacity	Pupil Roll	Surplus
UTC Reading	600	381	219
Maiden Erlegh School in Reading	900	358	542
The WREN School	1176	241	935
Highdown School and Sixth Form Centre	1440	1260	180
Reading Girls' School	947	487	460
Reading School	887	959	-72
Prospect School	1700	1282	418
Blessed Hugh Farringdon Catholic School	992	885	107
Kendrick School	790	740	50
John Madejski Academy	1100	699	401
Total	10532	7292	3240

Source: School Capacity Survey, Department for Education, 2017

Healthcare

- 7.53. Healthcare facilities within 1.6km of the Site are illustrated on Figure 7.5. This has been updated since the 2015 ES. There are ten GP surgeries within 1.6km (1 mile) of the Site²². All of these surgeries are currently accepting new patients. Within these surgeries there are 48 GPs operating (based on information available from the NHS, which assumes each GP is a full time equivalent). The average list size of these surgeries is approximately 1,844 patients per GP. The Healthy Urban

Development Unit (HUDU) benchmark list size is 1,800 patients per FTE GP. This indicates there may be limited surplus capacity within the existing surgeries.

Open Space

- 7.54. The available data on Open Space remains as described in the 2015 ES.

Potential Effects

Demolition and Construction

- 7.55. The existing uses on the Site include vacant office buildings and retail units and the Garrard Street NCP car park. The majority of retail units were vacated in March 2013 with only one currently remaining occupied and accommodating up to 25 FTE jobs (as set out in the baseline).
- 7.56. The Development would require the retention and refurbishment of the car park and the demolition of the remaining buildings on the Site.

Loss of Existing Employment

- 7.57. The construction works associated with the Development would require vacant possession of all the existing buildings. Therefore, the remaining 25 jobs on site would be displaced and would need to relocate. It is assumed that these jobs would relocate within the Borough and would not be lost to the economy as a whole. Therefore, the potential effect of the proposed Development on existing employment remains unchanged from that set out within the 2015 ES that is **temporary, short term, adverse** and of **minor significance** at the local level, and in the **long-term, negligible**.

Construction Employment

- 7.58. The construction works associated with the proposed Development would generate employment within the construction industry, both on-site and off-site and across a wide range of occupation including labourers to professional management. The level of employment would fluctuate throughout the course of the demolition and construction period which is estimated at three years for Plots E and F and six years for the Site as a whole.
- 7.59. The costs associated with the demolition and construction of the proposed Development are expected to generate approximately 7,600 person years of employment, equating to an average of 1,170 per annum over the course of the demolition and construction period.
- 7.60. For reference, the costs associated with the demolition and construction of Plots E and F is expected to generate approximately 2,093 person years of employment, equating to an average of 700 per annum over the course of the construction programme.
- 7.61. Construction employment is relatively mobile and therefore employees will likely be drawn from across the region and beyond. The likely direct effects of the construction employment on regional construction levels remains unchanged from that set out within the 2015 ES, that is **negligible**.

Construction Workforce Spending

- 7.62. Construction workers based onsite would contribute to the local economy through additional spending on food and drink. The level of the construction workforce onsite would fluctuate over the course of the construction programme and it is therefore not possible to estimate the level of spending that could be generated and spent within the local area. However, qualitatively, based on professional judgement, it is considered that the likely effect of the construction phase on spending remains unchanged from that set out within the 2015 ES, that is **temporary, short-term, beneficial** and of **minor significance** at the **local level**.

Interim Conditions: Temporary Flexible Event Space

- 7.63. The Temporary Flexible Event Space has been constructed and is currently operational. The effects of the Temporary Flexible Events Space remain the same as those assessed in the 2015 ES, that is **temporary minor beneficial** at the **local level**.

Completed Development

- 7.64. The proposed Development would result in the comprehensive redevelopment of the Site. The mixed-use proposals would comprise of the following land uses:
- Office (B1);
 - Retail (A1-A5);
 - Leisure (D2);
 - Residential (475 to 550 units);
 - Public realm and open space; and
 - Car parking.
- 7.65. The completed Development would have a range of effects including employment generation, delivery of new housing, effects on social infrastructure and the creation of new areas of open space and public realm.

Employment

- 7.66. The provision of office, retail and leisure floorspace would generate employment on Site. The minimum and maximum parameters would vary the level of employment generated by the commercial floorspace. Table 7.7 sets out the number of FTE jobs generated based on the minimum and maximum Gross External Area (GEA) floorspace proposed within the Development using standard job densities as set out in the Methodology Section.

Table 7.7 Proposed Employment Generating Floorspace and Job Creation

Land Use	Min. GEA	Max. GEA	Jobs Min.	Jobs Max.
Office (B1)	69,000	122,000	4,760	8,410
Retail (A1-A4)	3,900	13,500	190	660
Leisure (D2)	0	2,200	0	30
Total			4,950	9,100

Source: Hatch Regeneris

Note: Job numbers have been rounded to the nearest 10

- 7.67. Table 7.7 indicates that the Development would generate a minimum of 4,950 FTE jobs and a maximum of 9,100 FTE jobs through the commercial end uses. This compares with the 2015 ES which estimated that the Development would generate 4,900 FTE jobs and a maximum of 8,845 FTE jobs through the commercial end uses. In addition, a small number of jobs (up to 10) would be created from car-parking and residential uses through management and maintenance roles. This is consistent with the 2015 ES.
- 7.68. Despite some changes to the amount of floorspace uses described above from the 2016 Consented Scheme, the overall effect of the additional employment created on Site remains unchanged from the 2015 ES, that is **substantial beneficial** in the **long term** at **district level**.

Demand for Housing

- 7.69. The Development would deliver a minimum of 475 and a maximum of 550 residential build-to-rent units. These would be studio, one, two and three-bedroom apartments and would include 10% affordable units with a 50:50 split of affordable private rented and intermediate private rented levels. These units would make a significant contribution towards Reading's annual housing targets, equating to between 3% and 4% of the of the 2013-2036 housing target (15,433) set out within the submission draft Local Plan, 2018 and between 6% and 7% of the target (7,700) for the central area of Reading for the same period. The units will be build-to-rent units thereby contributing to the variety and mix of units on offer in the centre of Reading.
- 7.70. Although there has been an increase in the maximum number of residential units provided as part of the Development compared with the 2016 Consented Scheme, the overall effect of the Development in delivering new housing remains unchanged from the 2015 ES, that is **moderate beneficial** in the **long term** at the **local** level. At the Borough (District) level, the overall effect is considered to be minor beneficial in the long term.

Population

- 7.71. The expected residential population of the new housing is estimated to be between 950 and 1,100 people⁵. This compares to an estimated population of between 540 and 855 residents for the 2015 ES. These new residents would create demand for community facilities, particularly primary healthcare, education and open space. These are considered in further detail below.

⁵ Based on an average household size for Abbey Ward of 1.99 derived from the Census 2011

Education

- 7.72. Based on the methodology set out earlier in this Chapter, it is estimated that there would be around 53 primary school children, 14 secondary school children and around 5 post-16 aged children living within the new residential units.
- 7.73. However, the net demand for school places could be lower than predicted as some children living within the Development are likely to have moved from within the local area and therefore already have a place in schools in the area.
- 7.74. As set out in the Baseline Section there are fourteen primary schools within 3.2 km of the Site. There are 1,674 surplus places within these schools. However, additional pressure on existing primary schools is likely to have been generated from residential schemes that have been completed subsequent to the publication of data on school capacity. In light of this, and despite of the overall surplus in capacity at present, without mitigation, increased demand for primary school places is assessed to remain unchanged from the 2015 ES Chapter that is of **minor adverse** significance at the **local** level.
- 7.75. Across Reading Borough there are ten secondary schools, which have a surplus of 3,000 places amongst them. Whilst additional pressure may have been generated from housing completions since the schools' data was published, given the relatively small number of secondary school pupils anticipated to be generated by the proposed Development the effect of the Development is assessed to remain unchanged from the 2015 ES, that is **negligible**.

Healthcare

- 7.76. The additional population could increase demand for primary healthcare facilities. As set out in the Baseline Section above, there is considered to be limited surplus capacity available locally based on the average number of patients per GP in the local surgeries compared to the HUDU benchmark of 1,800 patients per GP. However, it must also be noted that these surgeries are still accepting new patients. Nevertheless, an additional population of 950-1100 residents may place additional pressure on existing facilities. Without mitigation the effect of the Development on demand for primary healthcare is therefore assessed to remain unchanged from the 2015 ES that is of **minor adverse** significance at the **local** level. Further details can be found in the Health Impact Assessment (HIA) appended to this Chapter.

Additional Spending

- 7.77. In addition to the direct effect of additional employment and housing on Site there are likely to be indirect spending effects as a result of the Development.
- 7.78. ONS data estimates that the average weekly household spending on comparison and convenience goods in the South East is £196.80 per week. Therefore, the additional 475 – 550 residential units are estimated to generate spending of £4.8 million to £5.6 million per year.
- 7.79. Employees working on Site would also generate additional spending. As set out in the Assessment Methodology section above, research shows that on average workers spend £12 per day on food

and drink alone in the area local to their place of employment. Therefore, as a result of the Development, local spending by employees could range from £13.9 million to £25.6 million per year.

- 7.80. Given the town centre location of this Site, it would be expected that a significant proportion of this spending would be captured locally.
- 7.81. On the basis of the above, the generation of additional spending as a result of the Development is assessed to remain unchanged from the 2015 ES, that is of **minor beneficial** significance under the minimum Development scenario to **moderate beneficial** significance under the maximum Development scenario in the **long term** at the **local** level.

Open Space

- 7.82. There is currently no open space on the Site. The Development would include approximately 5,500m² of public realm which remains unchanged from the 2015 ES. In addition, each apartment would have access to a shared amenity space and / or private balcony. A minimum of 6m² of private or shared amenity space would be provided per residential unit.
- 7.83. The effect of the proposed Development on delivering open space and improved public realm therefore remains unchanged from the 2015 ES, that is of **minor beneficial** significance in the **long term** at the **local level**. Further details can be found in the HIA appended to this Chapter.

Crime & Safety

- 7.84. As set out in the 2015 ES, the masterplan for the Development has considered various aspects of crime and safety in order to minimise opportunities for crime on Site. The effect of the proposed Development on crime and safety therefore remains unchanged from the 2015 ES that is of **minor beneficial** significance in the **long term** at the **local** level. Further details can be found in the HIA appended to this Chapter.

Mitigation

Demolition and Construction

- 7.85. The mitigation measures for the demolition and construction phase remain unchanged from those described within the 2015 ES.

Completed Development

- 7.86. The mitigation measures for the completed development remain unchanged from those described within the 2015 ES.

Residual Effects

Demolition and Construction

- 7.87. The residual effects for the demolition and construction phase remain unchanged from those described within the 2015 ES.

Completed Development

- 7.88. The residual effects for the completed development remain unchanged from those described within the 2015 ES.

Summary and Conclusions

Summary of Effects

- 7.89. A summary of potential and residual socio-economic effects of the Development are summarised within Table 7.8. All the effects and mitigation remain unchanged from that set out in the 2015 ES.

Table 7.8: Summary of Effects

Issue	Potential Effect	Mitigation	Residual Effect
Demolition and Construction			
Construction Employment	Negligible	None required. Consider implementation of job brokerage schemes, apprenticeships and training schemes	Negligible
Loss of Existing Employment	Temporary, short term, Minor, Adverse, Local. Long term, negligible	None required	Temporary, short term, Minor, Adverse, Local. Long term, negligible
Construction workforce spending	Temporary, Minor Beneficial, Local	None required	Temporary, Minor Beneficial, Local
Temporary Flexible Event Space			
Creation of Temporary employment and community and cultural uses.	Temporary, Minor Beneficial, Local	None required	Temporary, Minor Beneficial, Local
Completed Development			
Employment	Long Term, Substantial Beneficial, District	None required	Long Term, Substantial Beneficial, District

Issue	Potential Effect	Mitigation	Residual Effect
Housing	Long Term, Moderate Beneficial, Local Long Term, Minor Beneficial Borough	None required	Long Term, Moderate Beneficial, Local Long Term, Minor Beneficial Borough
Education (Primary)	Short term, Minor, Adverse, Local	Financial Contributions	Negligible
Education (Secondary)	Negligible	None required	Negligible
Healthcare	Short term, Minor, Adverse, Local	Financial Contributions	Negligible
Additional Spending	Long Term, Minor/Moderate, Beneficial, Local	None required	Long Term, Minor/Moderate, Beneficial, Local
Open Space	Long Term, Minor Beneficial, Local	None required	Long Term, Minor Beneficial, Local
Crime	Long Term, Minor Beneficial, Local	None required	Long Term, Minor Beneficial, Local

Comparison of Effects between this ES Addendum and the 2015 ES

- 7.90. The Development considered within this Chapter is the 2016 Consented Scheme as amended by the Proposed Amendments to Plot E and F. The key differences between the Development and the 2016 Consented Scheme of relevance to the socio-economic impact assessment is the increase in the maximum number of residential units, a change to build-to-rent units and a reduction in the maximum commercial (retail and leisure) floorspace. Despite these changes, the scale and significance of potential socio-economic effects on employment, housing, spending, education, health and crime remains unchanged from the 2015 ES.

References

- ¹ National Planning Policy Framework, Ministry for Housing, Communities and Local Government, 2018
- ² Planning Policy Guidance, Ministry for Housing, Communities and Local Government, 2018
- ³ Reading Borough Local Plan, Reading Borough Council, 2018
- ⁴ Census data;
- ⁵ Business Register and Employment Survey data (2017);
- ⁶ Indices of Multiple Deprivation (2015);
- ⁷ ONS Claimant Count, (September 2018);
- ⁸ Reading Borough Council, Childcare Sufficiency Assessment 2017, October 2017
- ⁹ Homes and Communities Agency (2015) Employment Densities, 3rd Edition
- ¹⁰ Reading Borough Council, 2004. Supplementary Planning Guidance, Planning Obligations under Section 106 of the Town and Country Planning Act 1990.
- ¹¹ Office for National Statistics, 2017, Family Sending.
- ¹² Visa Europe, 2014, UK Working Day Spend Report
- ¹³ ONS Mid-Year Population Estimates, 2017
- ¹⁴ ONS Census, 2011
- ¹⁵ ONS Annual Population Survey, January 2017-December 2017

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- ¹⁶ ONS Claimant Count, September 2018
¹⁷ ONS Business Register and Employment Survey, 2017
¹⁸ Index of Multiple Deprivation, Ministry of Housing, Communities and Local Government, 2015
¹⁹ ONS Police Force Area Data Tables, 2018
²⁰ School Capacity Survey, Department for Education, 2017
²¹ Reading Infrastructure Delivery Plan, May 2017, Reading Borough Council
²² NHS Choices, 2018

13. Surface Water Drainage and Flood Risk

Introduction

- 13.1. This Chapter has been prepared by Waterman Infrastructure & Environment Ltd and provides an update to the assessment of the effects of the Development on flood risk and drainage as presented in Chapter 13 of the 2015 ES. The Chapter is supported by the following documents:
- Technical Appendix 13.1 – Addendum Flood Risk Assessment (incorporating the Drainage Strategy for Plots E and F).

Legislation, Planning Policy and Guidance

- 13.2. The following sections provide a review of relevant legislation, guidance and national, regional and local planning policy in terms of flood risk and drainage that has been revised following the 2015 ES.

National Legislation and Policy

National Planning Policy Framework, 2018

- 13.3. The National Planning Policy Framework (NPPF)¹ sets out the Government's strategy for economic, environmental and social planning policy with the aim of promoting sustainable development in England. The NPPF was introduced in 2012; the 2018 revised plan was produced following a period of public consultation with the aim of providing a comprehensive approach for planners, developers and councils to build more homes, more quickly and in the places where people want to live.
- 13.4. The NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.
- 13.5. The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding.
- 13.6. If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives), it may be necessary to demonstrate through the Exception Test that:
- The development would provide wider sustainability benefits to the community that outweigh the flood risk; and
 - The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
- 13.7. The NPPF states that when determining planning applications, Local Planning Authorities (LPA) should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific Flood Risk Assessment. Development should only be allowed in areas at risk of flooding where it can be demonstrated that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
- The development is appropriately flood resistant and resilient;
- It incorporates Sustainable Drainage Systems (SuDS), unless there is clear evidence that this would be inappropriate;
- Any residual risk can be safely managed; and
- Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

13.8. Major developments should incorporate SuDS unless there is clear evidence that this would be inappropriate. The systems used should:

- Take account of advice from the lead local flood authority;
- Have appropriate proposed minimum operational standards;
- Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
- Where possible, provide multifunctional benefits.

Planning Practice Guidance, 2018

13.9. The national Planning Practice Guidance (PPG)² was launched in March 2014 and provides a web-based resource in support of the NPPF. The PPG is subject to regular reviews and rolling updates to reflect current guidance and best practice. The Planning Practice Guidance (PPG) provides additional guidance to LPAs to ensure effective implementation of the planning policies set out within the NPPF regarding development in areas at risk of flooding.

13.10. The PPG states that developers and LPAs should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of SuDS. Referencing information provided by the EA, the PPG provides advice on taking account of climate change, setting out recommended contingency allowances for net sea level rise and peak rainfall intensities, which should be increased by between 5% and 105% from now until the year 2115. It also advises on flood resilience and resistance measures when dealing with the residual risks remaining after applying the sequential approach and mitigating actions.

13.11. The PPG also includes advice on flood risk vulnerability and flood zone compatibility. The following flood zones refer to the probability of river and sea flooding, without the presence of defences:

- Zone 1 - low probability: less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year;
- Zone 2 - medium probability: between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% to 0.1%) in any year;
- Zone 3a - high probability: 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability flooding from the sea (>0.5%) in any year; and
- Zone 3b - the functional floodplain: where water has to flow or be stored in times of flood; identification should take account of local circumstances but would typically flood with an

annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme 1 in 1,000 (0.1%) flood.

- 13.12. Flood risk vulnerability is split into five classifications in Table 2 of the PPG, as follows, and the compatibility of these within each Flood Zone is set out in Table 3 of the PPG:
- Essential Infrastructure, e.g. essential transport and utility infrastructure, wind turbines;
 - Highly Vulnerable, e.g. emergency services (those required to be operational during flooding), basement dwellings;
 - More Vulnerable, e.g. residential dwellings, hospitals, schools, hotels, drinking establishments;
 - Less Vulnerable, e.g. retail, offices, storage and distribution, leisure, restaurants; and
 - Water-Compatible Development, e.g. docks, marinas, wharves.
- 13.13. Within the Flood Risk and Coastal Change chapter of the PPG, the Site Specific Flood Risk Assessment Checklist has been updated since the 2015 ES (in November 2016). However, this has not altered the methodology adopted in the Flood Risk Assessment.

Local Policy

Reading Borough Local Plan, Submission Draft (March 2018)

- 13.14. Reading Borough Council (RBC) is currently working on producing a new Local Plan³ which will replace the current development plans (the Core Strategy, Reading Central Area Action Plan and Sites and Detailed Policies Document). The new plan will set out how Reading will develop up to 2036. The emerging plan defines the amount of development that will take place within the borough, the areas and sites where development is expected to be accommodated, and where it will be restricted, and sets out policies for how planning applications will be decided.
- 13.15. In relation to flood risk and drainage, Policy CC3: Adaptation to Climate Change states:
-All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change...."*
- 13.16. Policy EN18: Flooding and Sustainable Drainage Systems states that "Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change."

Strategic Flood Risk Assessment

- 13.17. A Strategic Flood Risk Assessment (SFRA)⁴ was prepared by Peter Brett Associates on behalf of RBC in June 2017 to inform planning policy and decisions and the application of the Sequential Test by considering the different aspects of flood risk within the Borough. Based on available EA modelling / mapping at the time, it includes:
- Delineation of Flood Zones across the Borough;
 - Identification of historic flooding information and potential localised flooding issues to highlight 'at risk' areas;
 - Identification of measures proposed or underway within the Borough to address flooding issues;

- Specification of measures for incorporation in new development, to ensure development in the Borough is safe, sustainable and does not detrimentally impact on flood risk to third parties (ideally providing a reduction in flood risk).
- 13.18. A more detailed Level 2 Strategic Flood Risk Assessment⁵ on individual sites was published in December 2017. The Site is not considered within this document.

Assessment Methodology and Significance Criteria

- 13.19. The methodology employed in the assessment of flood risk and drainage remains the same as described in Chapter 13 of the 2015 ES.
- 13.20. As a result of the Proposed Amendments to Plots E and F and in support of the Section 73 Reserved Matters Applications (RMAs), a Flood Risk Assessment Addendum and a Drainage Strategy for Plots E and F have been prepared (refer to **Technical Appendix 13.1**). There have been no amendments to the remainder of the Site, therefore the flood risk would remain the same as set out in the 2015 FRA. The Drainage Strategy for the remainder of the Site also remains unchanged.
- 13.21. A new topographical survey and utilities search report and survey was undertaken by Plowman Craven in September and October 2018 for the Site. An updated Contaminated Land Desk Study and Party Wall Below Ground Drainage Report were undertaken by Ramboll in December 2018. These surveys and reports were reviewed as part of the Drainage Strategy included in **Technical Appendix 13.1**.
- 13.22. The Environment Agency (EA), RBC and Thames Water (TW) have been re-consulted to confirm whether there have been any updates to the baseline information that would alter the findings of the 2015 FRA.

Baseline Conditions

Topography

- 13.23. The topographical survey undertaken in 2018 indicates that in the south of the Site (Phase 1) generally ranges in level from circa 39.0m AOD in Garrard Street to circa 45.7m AOD in Friar Street to the south. Site levels fall toward the northwest of the Site. In the north of the Site (Phase 2), the levels range from 41.5m AOD in the north-east (Xafinity House). In the centre of the Site, north of Garrard Street, the multi-storey car park levels at around 38.15m AOD.
- 13.24. This is broadly consistent with the levels reported in Chapter 13 of the 2015 ES, which stated that land in the south of the Site along Friar Street lies at a maximum of approximately 45.8m Above Ordnance Datum (AOD), falling to a minimum of approximately 38.3m AOD in the north-west of the Site at the junction of Greyfriars Road and Stanshawe Road. Garrard Street and Station Hill fall in a westerly direction from 44.0m AOD to 38.7m AOD and from 43.7m AOD to 39.3m AOD, respectively.

Geology and Ground Water

- 13.25. A Site Investigation of the northern Site was undertaken in 2014 and the southern Site was undertaken in November 2018. The reports of these investigations stated that the Site is underlain

by made ground, underlain by Alluvium which is in turn underlain by Taplow Gravel Member. Bedrock at this location comprises Seaford and Newhaven Chalk Formations.

- 13.26. Groundwater was encountered in several boreholes at depths of between 3.60m and 5.3m below ground level (bgl), rising to between 3.5m and 5.3m bgl.
- 13.27. These findings are consistent with the information provided in Chapter 13 of the 2015 ES.

Surface Water and Foul Water Drainage

- 13.28. The latest Thames Water Asset maps, included in Appendix 4 of the Drainage Strategy included in **Technical Appendix 13.1**, show several existing sewers in Garrard Street, Merchant's Place and Friar Street. A large diameter foul water sewer north of Garrard Street is noted on the Thames Water Asset Plan as 1100 x 750, depth and condition unknown. The foul water sewers in Friar Street and Merchant's Place are noted as 225mm diameter and 150mm diameter, respectively. The existing surface water sewers in Garrard Street and Friar Street are noted on the Thames Water asset plans as 375mm diameter and 225mm diameter, respectively, depth and condition unknown.
- 13.29. An inspection and associated CCTV survey works were undertaken to validate and identify the existing utility sewerage and drainage infrastructure on and adjacent to the Site, particularly to identify the location of discharge points for both foul and surface water systems. The findings of this survey are included in a separate report entitled Party Wall Below Ground Drainage Report (ref. 1620004716-SHR-RAM-RP-C-001), dated 6 December 2018.

Flood Risk

Risk from Tidal and Fluvial Flooding

- 13.30. Within the EA's consultation response (Appendix A of **Technical Appendix 13.1**), they stated that updated hydraulic modelling had been carried out for the Thames between Sandford and Mapledurham in 2018, subsequent to the 2015 application being submitted.
- 13.31. The EA have provided modelled floodplain flood levels for appropriate points for this Site for both the 2011 Mapledurham to Sonning modelling, assessed within the 2015 FRA, and the newer 2018 Sandford to Mapledurham modelling (Appendix B of **Technical Appendix 13.1**).
- 13.32. As can be seen from the outlines from the 2018 modelling, flood water reaches the railway embankment approximately 160m to the north west of the Site, however it does not pass under the embankment and therefore poses no risk to the Site.
- 13.33. The maximum flood level during the 1 in 100 year plus climate change (35% allowance) event would be 38.33m AOD at Flood Point 6, located approximately 260m to the north of the Site.
- 13.34. The 1 in 1,000 year maximum flood level would be 38.47m AOD, again located at Flood Point 6. Minimum existing ground levels at the Site are 38.5m AOD confirming the Site lies within Flood Zone 1.
- 13.35. The 2018 modelling indicates that the Site is at a lower risk of flooding than the 2011 modelling. The reason for this has been queried with the EA, however, they have not responded to date.

- 13.36. Maps of historical flooding provided by the EA (refer to Appendix 13.1) confirm that there have been no historic incidents of any type of flooding at the Site. The risk of flooding from fluvial and tidal sources therefore remains low, as reported in Chapter 13 of the 2015 ES.

Risk from Surface Water Drainage Flooding

- 13.37. Based on a review of the EA's Flood Risk from Surface Water maps, the risk of flooding from pluvial sources of flooding has not changed. The baseline conditions of Chapter 13 of the 2015 ES therefore remain valid.

Risk of Groundwater Flooding

- 13.38. The groundwater levels reported in Chapter 13 of the 2015 ES remain valid and the Site remains the same in regards to existing building extents. The risk of on-Site groundwater flooding therefore remains low, as reported in Chapter 13 of the 2015 ES.

Risk from Foul Drainage Flooding

- 13.39. Thames Water have re-confirmed that the flooding records they hold indicate that there have been no incidents of flooding within or near to the Site as a result of surcharging. The risk of foul sewer flooding is therefore considered to be low, as reported in Chapter 13 of the 2015 ES.

Potential Effects

Demolition and Construction

- 13.40. The change in construction programme and phasing will not alter the potential effects of the Development on flood risk and drainage set out within Chapter 13 of the 2015 ES. Furthermore, the change in proposed building footprints and extents as part of the Proposed Amendments would not result in a significant change to the demolition and construction activities and methodologies. A build over agreement would still be sought from Thames Water in regards to constructing the foul water drainage.
- 13.41. As such, the potential effects during demolition and construction in relation to flood risk and drainage remain unchanged from those set out within Chapter 13 of the 2015 ES, that is:
- The flood risk to construction workers would remain negligible;
 - The risk of surface water flooding would remain temporary and local effect of minor adverse significance; and
 - The potential effect on foul drainage flooding would remain negligible.

Interim Conditions: Temporary Flexible Event Space

- 13.42. The Temporary Flexible Event Space has been constructed and is currently operational. The effects of the Temporary Flexible Events Space remain the same as those assessed in the 2015 ES, i.e. negligible.

Completed Development

Flood Risk to Occupants of the Development

- 13.43. The minimum ground level at the Site would be 39.00m AOD located within Garrard Street and the car parking area at lower ground level, providing 0.53m freeboard above the maximum flood level. The proposed change at Friars Walk from a stepped slope to provision of level access along the walkway with steps and a lift down to Garrard Street would not affect the maximum or minimum ground levels at the Site and therefore the conclusions on flood risk would remain the same.
- 13.44. The potential effects of the proposed Development on flood risk to occupants of the Development remain unchanged from those set out within Chapter 13 of the 2015 ES, i.e. negligible for tidal and fluvial flooding; and a permanent, minor adverse effect from surface water flooding.

Surface Water Drainage

- 13.45. Surface water drainage for the 2015 application was assessed within a standalone report produced by Hoare Lea and referenced within the 2015 FRA. The surface water drainage strategy for Plots E and F has been updated and a standalone report for these two Plots has been produced by Ramboll (Appendix B of **Technical Appendix 13.1**).
- 13.46. The updated drainage strategy for Plots E and F follows the same principles as the 2015 drainage strategy in attenuating surface water drainage in geocellular tanks and oversized pipes before discharging to the Thames Water sewer network.
- 13.47. The 2015 drainage strategy set out that Plot E would discharge at a rate of 42.47 l/s with a maximum of 197m³ of storage volume provided to restrict flow to this rate. It was set out that Plot F would discharge at a rate of 20.16 l/s with a maximum of 94m³ of storage volume provided.
- 13.48. The updated drainage strategy proposes to restrict surface water discharge to the 2015 rates and has updated the attenuation calculations to include a 40% allowance for the impacts of climate change in line with current guidance. Following this approach, 223m³ of attenuation would be required in Plot E to restrict discharge to 42.47 l/s and 94m³ would be required in Plot F to restrict discharge to 20.16 l/s.
- 13.49. No changes have been made to the surface water drainage strategy for the remainder of the Site (Plots A to D, F and G).
- 13.50. The change attenuation volumes outlined above would not affect the overall potential effect of the completed development on surface water flood risk identified within Chapter 13 of the 2015 ES and therefore this would remain negligible.

Groundwater Flow

- 13.51. The extension of the lower ground floor as part of the Proposed Amendments would not be of sufficient mass to adversely affect groundwater flows or levels. As such, the potential effects as reported within Chapter 13 of the 2015 ES would remain negligible on groundwater flow and would not increase the risk of groundwater flooding at the Site or elsewhere.

Foul Drainage Flooding

- 13.52. The Proposed Amendments would involve an increase in the number of residential units and therefore a further increase in foul water discharge rates. The proposed foul water drainage

strategy has not changed as a result of the Proposed Amendments. It is envisaged that all building drainage will discharge via gravity, to private external foul water networks, prior to discharging via gravity off site to the existing Thames Water public sewers.

- 13.53. As set out in Chapter 13 of the 2015 ES, should the receiving foul drainage network be close to capacity, the additional effluent generated by the new population of the Development has the potential to overload the existing drainage system outside of the Site. In the absence of mitigation, the effect could be minor adverse.

Mitigation

Demolition and Construction

- 13.54. The mitigation measures for the demolition and construction phase remain unchanged from those described within the 2015 ES.

Completed Development

- 13.55. The mitigation measures for the demolition and construction phase remain unchanged from those described within the 2015 ES.

Residual Effects

Demolition and Construction

- 13.56. The residual effects of the proposed Development remain unchanged from those set out within Chapter 13 of the 2015 ES, i.e. negligible.

Completed Development

- 13.57. The residual effects of the proposed Development remain unchanged from those set out within Chapter 13 of the 2015 ES, i.e. negligible.

Summary and Conclusions

Summary of Effects

- 13.58. A summary of potential and residual flood risk and drainage effects of the Development are summarised within Table 13.1. All the effects and mitigation remain unchanged from that set out in the 2015 ES.

Table 13.1: Summary of potential and residual effects

Issue	Potential Effect	Mitigation	Residual Effect
Demolition and Construction of Wider Development			
Flood risk to construction workers.	Negligible	None required.	Negligible
Surface water drainage	Temporary and local risk of minor adverse significance	Drainage routes to be maintained. Discharge rates to be agreed.	Negligible

Issue	Potential Effect	Mitigation	Residual Effect
Demolition and Construction of Wider Development			
Foul drainage	Negligible	None required.	Negligible
Completed Temporary Events Space			
Risk from surface water drainage flooding.	Negligible	None required.	Negligible
Completed Wider Development			
Flood risk to occupants of the Development.	Negligible	None required.	Negligible
Surface Water Flooding	On the Development: Minor adverse	Review of designs to ensure no new low points are created and finished floor levels are above the level of the surrounding highway network.	Negligible
	From the Development: Negligible	Implementation of appropriate drainage strategy incorporating attenuation tanks and hydrobrakes.	Negligible
Risk of groundwater flooding.	Negligible	None required.	Negligible
Risk of foul drainage flooding.	Minor Adverse	Foul drainage infrastructure upgrades if required.	Negligible

Comparison of Effects between this ES Addendum and the 2015 ES

13.59. The potential and residual effects and mitigation measures remain the same as presented in the 2015 ES.

¹ Ministry of Housing, Communities & Local Government, Revised National Planning Policy Framework, July 2018

² Ministry of Housing, Communities & Local Government, Planning Practice Guidance, 2018

³ Reading Borough Council (2018). Reading Borough Local Plan, Submission Draft. March 2018.

⁴ Peter Brett Associates (2017); Reading Borough Council, Strategic Flood Risk Assessment, June 2017.

⁵ Peter Brett Associates (2017); Reading Borough Council, Level 2 Strategic Flood Risk Assessment, December 2017.

15. Wind

Introduction

- 15.1. This Chapter has been written by RWDI. It assesses the likely significant effects of the Development on the local wind microclimate within and around the Development. In particular, it considers the likely significant effects of wind upon pedestrian comfort and safety and summarises the findings of a full wind tunnel testing exercise undertaken by RWDI. The full results of this testing study are presented within Technical **Appendix 15.1**.
- 15.2. The Chapter updates the assessment presented in Chapter 15 of the 2015 ES and should be read in conjunction with that Chapter.

Planning Policy Context

National Planning Policy and Guidance

National Planning Policy Framework, 2018

- 15.3. The National Planning Policy Framework was revised in 2018¹. However, in accordance with the 2015 ES, there are still no planning policies directly relating to wind microclimate issues.

National Planning Practice Guidance

- 15.4. The national Planning Practice Guidance² (PPG) was launched in March 2014 and provides a web-based resource in support of the NPPF. The PPG is subject to regular reviews and rolling updates to reflect current guidance and best practice. However, there has been no change to the section addressing 'Design' which includes consideration of wind. This section therefore remains as set out in the 2015 ES.

Local Planning Policy

Reading Borough Local Plan, Submission Draft (March 2018)

- 15.5. RBC is currently working on producing a new Local Plan³ which will replace the current development plans described in the 2015 ES (the Core Strategy, Reading Central Area Action Plan and Sites and Detailed Policies Document). The new plan will set out how Reading will develop up to 2036. The emerging plan defines the amount of development that will take place within the borough, the areas and sites where development is expected to be accommodated, and where it will be restricted, and sets out policies for how planning applications will be decided.
- 15.6. The priorities of the plan are as follows:
- "Safeguarding and protecting those that are most vulnerable;
 - Providing the best help through education, early help and healthy living;
 - Providing homes for those most in need;
 - Keeping the town clean, safe, green and active;
 - Providing infrastructure to support the economy; and
 - Remaining financially sustainable to deliver these service priorities."

15.7. In relation to wind, Policy CC8: Safeguarding Amenity states:

“Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

...Access to sunlight and daylight;.....Visual dominance and overbearing effects of a development;... Noise and disturbance;.... Vibration;... Dust and fumes... Wind, where the proposals involve new development of more than 8 storeys.”

Assessment Methodology and Significance Criteria

Assessment Methodology

15.8. The assessment methodology remains largely as set out in the 2015 ES except that wind speed measurements were taken at 188 locations around the Site rather than 143 as part of the 2015 ES. This is because additional probes were included at ground level and on the roof terraces of Plots E and F. The scenarios tested also differ slightly from those of the 2015 ES due to amendments in the baseline conditions prevailing at the Site. The scenarios tested are described below. Finally, in accordance with current best practice, the way in which the Lawson Comfort Criteria⁴ and Strong Winds are reported are slightly different from the 2015 ES and have therefore been described below for clarity.

Scenarios Tested

15.9. Wind tunnel testing has been undertaken and the analysis conducted for the full year with regards to pedestrian safety and for all seasons with regards to pedestrian comfort. The results are presented for the windiest season (typically December, January and February in the UK), and summer season (June, July and August) for the following test configurations, all of which have made use of 1:300 scale models of the configuration tests:

- Configuration 1: Existing Baseline comprising the existing Site incorporating the Temporary Events Space with existing surrounding buildings;
- Configuration 2: Proposed Development without Mitigation comprising reserved matters details for Plots E and F with the remaining Station Hill Development (as maximum parameters) in place. As per the 2015 ES, the maximum parameters were modified for the purposes of the wind microclimate assessment to include the proposed set-back at ground level around Plots B, C, D and G, as these have the potential to channel wind at ground level and generate the worst-case wind conditions;
- Configuration 3: Proposed Development With Mitigation comprising reserved matters details for Plots E and F with the remaining Station Hill Development (as maximum parameters) in place and wind mitigation measures; and
- Configuration 4: Cumulative Scenario comprising the Reserved matters details for Plots E and F with the remaining Station Hill Development (as maximum parameters but with Plot B in accordance with the reserved matters consent for that plot) plus Cumulative Surrounds.

15.10. The results of the cumulative scenario assessment are presented in Chapter 17: Cumulative Effects.

15.11. Photographs of the wind tunnel model in the above scenarios are shown in **Figure 15.2**. This updates Figure 15.2 of the 2015 ES.

Lawson Comfort Criteria

- 15.12. The Lawson Comfort Criteria define a scale for assessing the suitability of wind conditions in the urban environment based upon threshold values of wind speed and frequency of occurrence, as set out within **Table 15.1** (this updates Table 15.1 of the 2015 ES). If the measured wind conditions exceed the threshold wind speed for more than 5% of the time, then they are unacceptable for the stated pedestrian activity and the expectation is that there may be complaints of nuisance or people will not use the area for its intended purpose.
- 15.13. The Lawson Comfort Criteria sets out four pedestrian activities and reflects the fact that less active pursuits require more benign wind conditions. The four categories are sitting, standing, strolling and walking, in ascending order of activity level, with a fifth category for conditions that are uncomfortable for all uses. In other words, the wind conditions in an area for sitting need to be calmer than a location that people merely walk past.
- 15.14. The distinction between strolling and walking is that in the strolling scenario pedestrians are more likely to take on a leisurely pace, with the intention of taking time to move through the area, whereas in the walking scenario, pedestrians are intending to move through the area quickly and are therefore expected to be more tolerant of stronger winds.
- 15.15. The Lawson Comfort Criteria are derived for open air conditions and assume that pedestrians would be suitably dressed for the season. The desire for sitting conditions in amenity spaces, terraces and balconies is weighted towards achieving this in the summertime when people are more likely to more frequently use such areas.
- 15.16. The coloured key in **Table 15.1** corresponds to the presentation of wind tunnel test results described in later in this report.

Table 15.1: Lawson Comfort Criteria

Key	Comfort Category	Threshold	Description
	Uncomfortable	>10 m/s	Winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.
	Walking	8 - 10 m/s	Relatively high speeds that can be tolerated if the objective is to walk, run or cycle without lingering.
	Strolling	6 - 8 m/s	Moderate breezes that would be appropriate for strolling along a city/town centre street, plaza or park.
	Standing	4 - 6 m/s	Gentle breezes suitable for main building entrances, pick-up/drop-off points and bus stops.
	Sitting	0 - 4 m/s	Light breezes desired for outdoor restaurants and seating areas where one can read a paper or comfortably sit for long periods.

- 15.17. Target conditions based on the above criteria are outlined as:

- thoroughfares (target conditions are strolling use during the windiest season);
- entrances (target conditions are standing / entrance use during the windiest season);
- amenity spaces (target conditions are sitting use during the summer season); and
- outdoor seating (target conditions are sitting use during the summer season).

Strong Winds

- 15.18. The wind tunnel tests undertaken also provide a notification of stronger winds, which are defined as wind speeds in excess of 15 m/s for more than two hours of the year which would require wind mitigation. Strong winds are generally associated with areas which would be classified as acceptable for walking or as uncomfortable. In a residential-led urban development, walking and uncomfortable conditions would not usually form part of the 'target' wind environment and would usually require mitigation to improve the situation.

Significance Criteria

- 15.19. The significance criteria remain as set out in the 2015 ES that is, based on the relationship between the desired pedestrian uses (as defined by the Lawson Comfort Criteria) and the wind conditions predicted at a particular location with the Development in place. Any adverse effect is considered a 'significant effect' because it implies that a location, or area, has a wind microclimate that is unsuitable for the desired use of that area. On this basis, effects that are adverse need mitigating.
- 15.20. The geographical extent of the wind microclimate is expected to be within the site and its immediate surroundings, i.e. a **local impact**, for all receptors. Therefore, effects during the enabling and construction works are **direct, local and short-term (temporary)** and **reversible**. Effects once the proposed Development is completed are **direct, local and long-term (permanent)** and **irreversible**.
- 15.21. Strong winds (affecting pedestrian safety) are not assigned a scale of effect and so overall significance but, are reported separately, as any strong wind exceedance is significant and cannot be scaled to substantial/moderate/minor. Where strong winds occur, mitigation is required.

Limitations and Assumptions

- 15.22. It is assumed that there will be restricted access to the Site during demolition and construction works, and therefore windier conditions will be tolerable as the area is not for typical pedestrian use where the tolerable wind speed threshold would be lower.
- 15.23. It is assumed that construction workers will be following all relevant health and safety protocols, and that any wind-sensitive operation would cease during storm events.
- 15.24. The limitations and assumptions relative to the maximum parameter plans identified in the 2015 ES remain valid.

Baseline Conditions

General Meteorological Conditions

- 15.25. Updated meteorological data derived from the Heathrow Airport meteorological station was reviewed to develop a statistical model of wind speed and direction, representative of wind

conditions in Reading. **Figure 15.1** demonstrates meteorological standard conditions at 10m above open, flat, level countryside terrain. This updates Figure 15.1 of the 2015 ES.

- 15.26. The meteorological data indicate that the prevailing wind direction at the Site and throughout the year is from the south-west. This is typical for many areas of southern England. There is a secondary peak from the north-easterly winds, especially during the spring, and these tend to be cold winds. Winds from the prevailing south westerly sector account for around 45% of all wind for Heathrow. These conditions are consistent with those presented in the 2015 ES.

Terrain Roughness

- 15.27. The meteorological station data was corrected to standard conditions of 10m above open flat level country terrain. The meteorological model was then adjusted to the Site conditions taking account of the terrain roughness using the BREVe3 software package which models the wind characteristics caused by changes in the terrain roughness at the stated reference height of 120m above the surface. The results are shown in **Table 15.2** (which updates Table 15.3 of the 2015 ES).

Table 15.2: BREVe3 Mean Factors for the Site at 120m

	Direction (Degree)											
Height	0	30	60	90	120	150	180	210	240	270	300	330
120m	1.41	1.42	1.44	1.43	1.39	1.45	1.46	1.51	1.46	1.41	1.41	1.40

Baseline Scenario - Configuration 1

- 15.28. **Figure 15.3** and **Figure 15.4** show the worst-case (windiest season) and summer season results respectively for the baseline scenario (Configuration 1).
- 15.29. Wind conditions in and around the Site are generally suitable for standing use or calmer during the windiest season. There are localised areas where conditions are suitable for strolling use. These are along thoroughfares and are thus suitable for their intended use.
- 15.30. Wind conditions in and around the Site are generally suitable for sitting use during the summer season. As such, wind conditions at amenity spaces in and around the Site are suitable for their intended use during the summer season.

Strong Winds

- 15.31. There are no occurrences of strong winds exceeding the pedestrian safety criteria in or around the existing Site.

Potential Effects

Demolition and Construction

- 15.32. The effects during demolition and construction would remain as set out in the 2015 ES and have therefore not been re-produced in this Chapter.

Configuration 2 - Proposed Development Without Mitigation -

- 15.33. Configuration 2 was tested with the proposed Development in place comprising the reserved matters details for Plots E and F with the remaining Station Hill Development (as maximum parameters). No landscaping was included. Wind conditions are shown in **Figure 15.5** at ground level during the windiest season, and Figures **15.6 and 15.7** at ground and terrace levels respectively during the summer season.

Existing Surrounding Streets

- 15.34. Wind conditions across existing streets are generally suitable for their intended strolling use or calmer during the windiest season. This therefore represents a **Negligible (not significant)** effect. However, windier conditions, suitable for walking use during the windiest season occur at the north-western corner of Plot A (location 51). This represents a **Minor Adverse (significant)** effect.

Proposed Thoroughfares

- 15.35. Wind conditions at the majority of thoroughfares within the proposed Development Site are suitable for their intended strolling use, as suitable for strolling or calmer during the windiest season. This therefore represents effects ranging from **Moderate Beneficial (not significant)** to **Negligible (not significant)**.
- 15.36. There are however, three thoroughfare locations within the northern part of the Site where conditions are windier, being suitable for walking use during the windiest season (locations 54, 80 and 81); one category windier than the recommended criteria for their intended use. Wind conditions at location 81, along the east facing façade of Plot B only marginally exceed the pedestrian comfort criteria for their intended use. This represents a **Minor Adverse (significant)** effect.

Entrances

- 15.37. Wind conditions at entrance locations to the proposed Development and buildings surrounding the Site are suitable for standing use or calmer during the windiest season. These conditions are suitable for their intended use and thus represent effects ranging from **Minor Beneficial (not significant)** to **Negligible (not significant)** for both on- and off-site locations tested.

Ground Level Amenity Spaces

- 15.38. Wind conditions at ground level amenity spaces are suitable for their intended sitting use during the summer season. This represents a **Negligible (not significant)** effect.

Podium Roof Terraces

- 15.39. Wind conditions at the majority of podium and roof terrace amenity spaces on Plots E and F are suitable for their intended sitting use during the windiest season. This represents a **Negligible (not significant)** effect.
- 15.40. There are however, four areas on the roof terrace of Plot E (locations 167, 168, 173 and 174) where conditions are suitable for standing use during the summer season; one category above the recommended criteria for their intended use. This represents a **Minor Adverse (significant)** effect.

Balconies

- 15.41. Wind conditions at all balconies within Plots E and F are suitable for their intended sitting use during the summer season. This represents a **Negligible (not significant)** effect.

Strong Winds

- 15.42. In Configuration 2, There are five occurrences of strong winds exceeding the pedestrian safety criteria. These are located in the northern part of the Site (location 51, 54, 80, 81 and 89). These would require mitigation in order to be made safe for pedestrian use and are therefore be considered an **Adverse (significant)** effect.

Mitigation

Demolition and Construction

- 15.43. No mitigation measures are required during the demolition and construction stages as no adverse wind effects are expected.

Completed Development

- 15.44. The following areas in and around the proposed Development would require wind mitigation measures:
- The roof terraces on Plot E; and
 - Existing and proposed thoroughfare locations within the northern part of the Site.
- 15.45. Windier than desired conditions within the northern part of Site would be mitigated when their detailed design comes forward. This chapter therefore focuses on mitigation for the roof terraces of Plot E.
- 15.46. Wind mitigation measures were developed through further wind tunnel testing.
- 15.47. The following mitigation measures were developed to improve wind conditions on the roof terraces of the Plot E:
- Porous screens, approximately 1.2m tall and 50% porous on the roof terraces; and
 - Shrubs, approximately 1.2m tall on the roof terraces.
- 15.48. The above wind mitigation measures are shown in Figures 22 to 24 of Technical Appendix 15.1.

Residual Effects – Configuration 3

Demolition and Construction – Wider Development

- 15.49. The residual effects during demolition and construction would remain **Negligible (not significant)**.

Configuration 3 - Completed Development With Mitigation

- 15.50. Configuration 3 was tested with the proposed Development in place comprising the reserved matters details for Plots E and F and the remaining Station Hill Development (as maximum parameters). Wind mitigation measures as described above were included. Wind conditions are

shown in **Figure 15.8** at ground level during the windiest season, and **Figures 15.9 and 15.10** at ground and terrace levels respectively during the summer season.

Existing Surrounding Streets

- 15.51. Wind conditions across existing streets remain suitable for their intended strolling use or calmer during the windiest season. These represent a **Negligible (not significant)** residual effect. Wind conditions at Location 51, at the north-western corner of Plot A remain suitable for walking use during the windiest season, one category above the criteria for their intended use. These conditions represent a **Minor Adverse (significant)** effect and would require further wind mitigation measures. These wind mitigation measures would be developed when the detailed design of the northern site, specifically Plot A, comes forward.

Proposed Thoroughfares

- 15.52. With the introduction of wind mitigation measures, wind conditions at the majority of thoroughfares within the proposed Development Site remain suitable for their intended strolling use during the windiest season. These conditions are suitable for their intended use and therefore represent residual effects ranging from **Moderate Beneficial (not significant)** to **Negligible (not significant)**. Conditions at Location 81, which marginally exceeded the intended strolling conditions by one category in Configuration 2 are calmer in Configuration 3 such that they are now marginally suitable for their intended use. However, this is likely to be associated to the experimental procedure and expected error margins. and therefore, the effect is considered to remain **Minor Adverse (significant)**.
- 15.53. Exceedances of the pedestrian comfort criteria persist along the east facing façade of Plot A (location 54) and the east facing façade of Plot B (location 80) where conditions are suitable for walking use during the windiest season, one category windier than the recommended criteria for their intended use. These represent a **Minor Adverse (significant)** residual effect.
- 15.54. Wind mitigation measures in the area of locations 54, 80 and 81 would be developed when the detailed design of the northern site, specifically Plots A and B, comes forward. It should be noted that wind conditions in these areas are improved with the introduction of the detailed Block B within the context of cumulative surrounding buildings (Configuration 4) (refer to Chapter 17: Cumulative Effects), such that conditions exceeding the criteria for their intended use persist only at Location 80, along the east facing façade of Plot B. Furthermore, with wind mitigation measures tested as part of the Plot B Reserved Matters Application, conditions in this location became suitable for leisure walking or better.

Entrances

- 15.55. The potential effects on the entrances were **Minor Beneficial (not significant)** to **Negligible (not significant)** and this remains the case with mitigation measures in place.

Ground Level Amenity Spaces

- 15.56. The potential effects on the ground level amenity spaces were **Negligible (not significant)** and this remains the case with mitigation measures in place. Podium Roof Terraces.

Podium Roof Terraces

- 15.57. With the introduction of wind mitigation measures, wind conditions at the majority of podium and roof terrace amenity spaces on Plots E and F remain suitable for their intended sitting use during the windiest season. This represents a **Negligible (not significant)** residual effect.
- 15.58. Wind conditions are improved at two of the four locations which were identified to be one category windier than desired on the terraces on Plot E (locations 173 and 174) such that they become suitable for sitting use during the summer season. However, wind conditions at the remaining two locations on the southern terrace of the middle block of Plot E (locations 167 and 168) remain windier than desired. This represents a **Minor Adverse (significant)** residual effect.
- 15.59. The remaining areas where conditions are windier than desired are anticipated to become suitable for their intended use with the introduction of the landscape proposals on the roof terraces, which were not included on the wind tunnel model.

Balconies

- 15.60. The potential effects on the balconies were **Negligible (not significant)** and this remains the case with mitigation measures in place.

Strong Winds

- 15.61. In Configuration 3, there are five occurrences of strong winds exceeding the pedestrian safety criteria. These conditions persist from the un-mitigated scenario (Configuration 2). Areas where the pedestrian safety criteria are exceeded are located within the northern part of the Site (location 51, 54, 80, 81 and 89). These would require further mitigation in order to be made safe for pedestrian use. These wind mitigation measures should be developed when the detailed design of the northern part of the Site come forward. These conditions thus represent an **Adverse (significant)** residual effect at these locations.
- 15.62. Wind conditions in this area are improved with the introduction of cumulative surrounding buildings including the detailed design of Plot B (Configuration 4) (refer to Chapter 17: Cumulative Effects). As such, with the introduction of the detailed design of Plot B with cumulative surrounding buildings, there are no exceedances of the pedestrian safety criteria in or around the Site.

Summary

Table 15:4 Summary of Potential Effects, Mitigation Measures and Residual Wind Effects

Issue	Potential Effect	Mitigation	Residual Effect
Demolition and Construction			
Thoroughfares in and around the Site during demolition and construction	Negligible	N/A	Negligible
Completed Development			
Existing Streets	Negligible to minor adverse	Location 51 was shown to be windier than desired without mitigation in place. Mitigation measures for	Negligible to minor adverse

Issue	Potential Effect	Mitigation	Residual Effect
Demolition and Construction			
		Location 51 will be developed with the detailed design of Plot A. .	
Proposed Thoroughfares on Site	Moderate Beneficial to Minor Adverse	Locations 54, 80 and 81 within the northern part of the Site are windier than desired in Configuration 2 (Proposed Development without mitigation). However, conditions at location 81 where conditions marginally exceeded the criteria become suitable for the intended use in Configuration 3. These can be associated to the experimental procedure and expected error margins and therefore remain minor adverse. Mitigation for Location 54, 80 and 81 will be developed with the detailed design of the northern area of the Site. Note: conditions at locations 54 and 81 improve with the introduction of Plot B detailed design (refer to Chapter 17: Cumulative Effects).	Moderate Beneficial to Minor Adverse
Entrances	Minor Beneficial to Negligible	N/A	Minor beneficial to negligible
Ground Level Amenity Spaces	Negligible	N/A	Negligible
Podium Roof Terraces	Negligible to Minor Adverse	Porous screens, 50% porous and approximately 1.2m tall on terraces; Shrubs, approximately 1.2m tall on terraces. With these mitigation measures in place, wind conditions improve at locations 173 and 174. However, conditions at locations 167 & 168 on Plot E remain one category windier than desired. These conditions are anticipated to be alleviated with the introduction of the	Negligible to Minor Adverse

Issue	Potential Effect	Mitigation	Residual Effect
Demolition and Construction			
		landscape proposals which were not included on the wind tunnel models.	
Balconies	Negligible	N/A	Negligible
Strong Winds (location 51, 54, 80, 81 and 89).	Adverse	Wind mitigation measures will be developed for these locations with the detailed design of the northern site, including Block A. Furthermore, wind conditions in these areas become suitable, in terms of pedestrian safety, for use by the general public with the introduction of the detailed Plot B within the context of cumulative surrounding buildings (Configuration 4) (refer to Chapter 17: Cumulative Effects).	Adverse

Comparison of Effects between this ES Addendum and the 2015 ES

- 15.63. The wind conditions in and around the Site during the 2019 assessment are comparable to the 2015 assessment. Localised differences were noted as a result of the detailed design of Plots E and F. However, the intended use of the spaces in and around the proposed Development largely remain suitable for their intended uses consistent with the conclusions of the 2015 assessment.

References

- ¹ Ministry of Housing, Communities & Local Government, Revised National Planning Policy Framework, July 2018
- ² Ministry of Housing, Communities & Local Government, Planning Practice Guidance, 2018
- ³ Reading Borough Council, Local Plan, Submission Draft (Regulation 22 of the Town and Country Planning (Local Planning) (England) Regulations 2012), March 2018
- ⁴ T. Lawson (2001) Building Aerodynamics

16. Daylight, Sunlight and Overshadowing

Introduction

- 16.1. This Chapter has been prepared by GIA and provides an update to the assessment of the effects of the Development on daylight, sunlight and overshadowing within neighbouring properties and amenity areas as presented in Chapter 16 of the 2015 ES. The Chapter is supported by the following documents which can be found in **Technical Appendices 16.1 to 16.4**:
- Technical Appendix 16.1 - Drawings of the Baseline, Proposed Development and Cumulative Scenario;
 - Technical Appendix 16.2 - Daylight and Sunlight Results for all scenarios;
 - Technical Appendix 16.3 - Daylight and Sunlight Results for Proposed Development;
 - Technical Appendix 16.4 - Overshadowing Assessment.
- 16.2. A stand-alone report entitled '*Daylight, Sunlight and Overshadowing Amenity within the Site*' has been prepared by GIA to review the daylight and sunlight amenity within the proposed Development in more detail. A summary of the assessment results is provided within this Chapter.

Legislation, Planning Policy and Guidance

- 16.3. The following sections provide a review of legislation and guidance together with national, regional and local planning policy relevant to daylight, sunlight and overshadowing where this has been revised since the 2015 ES.

National Legislation and Policy

Revised National Planning Policy Framework, 2018

- 16.4. Paragraph 123, part C of the Revised National Planning Policy Framework¹ stipulates that, "...*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.*"

Planning Practice Guidance

- 16.5. The national Planning Practice Guidance² (PPG) was launched in March 2014 and provides a web-based resource in support of the NPPF. The PPG is subject to regular reviews and rolling updates to reflect current guidance and best practice. There is no mention of daylight, sunlight, overshadowing, solar glare or light pollution within the Planning Practice Guidance as accessed in December 2018.

Local Policy

Reading Borough Local Plan, Submission Draft (March 2018)

- 16.6. RBC is currently working on producing a new Local Plan³ which will replace the current development plans (the Core Strategy, Reading Central Area Action Plan and Sites and Detailed Policies Document). The new plan will set out how Reading will develop up to 2036. The emerging plan defines the amount of development that will take place within the borough, the areas and sites

where development is expected to be accommodated, and where it will be restricted, and sets out policies for how planning applications will be decided.

16.7. The priorities of the plan are as follows:

- *“Safeguarding and protecting those that are most vulnerable;*
- *Providing the best help through education, early help and healthy living;*
- *Providing homes for those most in need;*
- *Keeping the town clean, safe, green and active;*
- *Providing infrastructure to support the economy; and*
- *Remaining financially sustainable to deliver these service priorities.”*

16.8. In relation to daylight, sunlight and overshadowing, Policy CC8: Safeguarding Amenity states:

“Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

...Access to sunlight and daylight;.....Visual dominance and overbearing effects of a development;... Noise and disturbance;.... Vibration;... Dust and fumes... Wind, where the proposals involve new development of more than 8 storeys.”

Guidance

16.9. No revisions have been made to the guidance described within Chapter 16 of the 2015 ES Chapter.

Assessment Methodology and Significance Criteria

Assessment Methodology

- 16.10. The methodology and significance criteria employed in the assessment of daylight, sunlight and overshadowing effects upon existing sensitive receptors remains the same as described in Chapter 16 of the 2015 ES. As with the 2015 ES, the principal document upon which the assessment has been based is the Building Research Establishment (BRE) Guidelines ‘Site Layout Planning for Daylight and Sunlight 2011: A Guide to Good Practice’, Second Edition (hereafter the BRE Guidelines)⁴.
- 16.11. Paragraph 16.52 of the 2015 ES made reference to the sequential approach in terms of VSC and NSL criteria. However, this was not applied in the assessment of properties in the 2015 ES and has not been applied in the assessment within this Chapter. VSC and NSL effects have been given equal weight and a receptor is considered to experience a potential effect should an alteration be seen in VSC or NSL.
- 16.12. However, given that the Future Baseline Schemes considered in the 2015 ES have now been constructed and the baseline conditions prevailing on the Site itself have changed as described further below, this Chapter considers the effect of the Development against the existing baseline conditions – that is the conditions currently prevailing on and surrounding the Site.
- 16.13. An assessment has also been undertaken of the effect of the Development with surrounding consented schemes in place (the cumulative assessment) and assuming that occupants of these surrounding consented schemes would become future sensitive receptors. This assessment of

both the effects of the Development with surrounding consented schemes in place and of the Development on future sensitive receptors has been included in Chapter 17: Cumulative Effects.

- 16.14. In addition, as room layouts for Plots E & F, and three of the four neighbouring consented schemes are known, Average Daylight Factor (ADF) has been used to assess the daylight within these buildings as opposed to Vertical Sky Component (VSC). The ADF methodology is described in more detail below. VSC was used to assess daylight within the proposed Development and neighbouring consented schemes in the 2015 ES when room layouts were not known.
- 16.15. As with existing neighbours, the No Sky Line (NSL) has also been used to assess daylight distribution within these buildings where room layouts are known.

Average Daylight Factor (ADF)

- 16.16. The BRE Guidelines state the following in Appendix C:
- “If a predominantly day lit appearance is required, then ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These additional recommendations are minimum values of Average Daylight Factor, and should be attained even if a predominantly day lit appearance is not achievable.”*
- 16.17. This method of assessment takes into account the total glazed area to the room, the visible light transmittance of the glazing proposed, the total area of the room surfaces including ceilings and floors, and the internal average reflectance for the room being assessed. The method also takes into account the VSC and the quantum of reflected light.
- 16.18. This is, therefore, a significantly more detailed method of assessment than the VSC method.
- 16.19. The BRE Guidelines state that this method of assessment for daylight should be applied to new developments rather than existing neighbouring buildings, unless the internal subdivision of the properties is known; whereby the ADF may be used to inform the light potential.
- 16.20. The ADF gives a more detailed assessment of the daylight within a room and takes into account the highest number of factors in establishing a quantitative output.

Limitations and Assumptions

- 16.21. For ADF assessments, if window materials are not known, double glazing is assumed with a direct transmittance value of 75% (representative of Pilkington K Glass (Low-E) 4/16/4 Argon filled 90%). Maintenance and framing factors are then applied in line with BS: 8206-2 depending on the window's location and inclination. The reflectance values chosen are also based on guidance from BS:8206-2 and the full details for both transmittance and reflectance values used are available in Appendix 16.2.

Scenarios Assessed

- 16.22. The following scenarios have been assessed and are reported within this Chapter of the ES:
- Existing Baseline;
 - Proposed Development; and
 - 2016 Consented Scheme vs Proposed Development (qualitative assessment only).
- 16.23. These scenarios are described in more detail below.

- 16.24. The Cumulative Scenario has also been assessed and the results are presented in Chapter 17: Cumulative Effects.

Existing Baseline

- 16.25. The conditions prevailing at the Site have changed since preparation of the 2015 ES Chapter, with the demolition of the following buildings:
- Friars Walk Shopping Mall;
 - Western Tower;
 - Retail Parade;
 - Former Mecca Bingo Hall & Bus Station; and
 - Xafinity House (partial demolition).
- 16.26. The Existing Baseline scenario therefore reflects the current baseline conditions.
- 16.27. In addition, Chatham Place, 21 Caversham Road, Energis House, Thames Tower and Aldwych House, which were previously considered within the Future Baseline Scenario in the 2015 ES have now been implemented and therefore exist in the Existing Baseline Scenario. A Future Baseline Scenario therefore no longer needs to be considered.
- 16.28. The Existing Baseline scenario is depicted on drawing numbers 5847/57/01/01 (**Technical Appendix 16.1**).

Proposed Development

- 16.29. This scenario considers the proposed Development comprising the Reserved Matters details for Plots E and F with the remaining Station Hill Development (Plots A, B, C, D and G) as maximum parameters.
- 16.30. This scenario is depicted on drawings numbers 5847/57/01/04 (**Technical Appendix 16.1**).

2016 Consented Scheme vs Proposed Development

- 16.31. The effects of the proposed Development have been qualitatively assessed against the effects of the 2016 Consented Scheme. This comprises a comparison of the effects of the 2016 Consented Maximum Parameter Scheme versus the effects of the Reserved Matters details for Plots E and F with the remaining Station Hill Development as maximum parameters.
- 16.32. This scenario is depicted in (**Technical Appendix 16.1**).

Baseline Conditions

Daylight and Sunlight

- 16.33. The Existing Baseline is depicted on drawings numbers 5847/57/01/01 (**Technical Appendix 16.1**).
- 16.34. The 2015 ES Chapter assessed the following neighbouring properties within the future baseline as they were subject to planning consents where residential uses applied. As these consents are yet to be implemented and existing nature of these properties is commercial uses, they have been excluded from assessment. The three properties now excluded from the Baseline are:

- 30-31 Friar Street;
 - 136-137 Friar Street; and
 - 29-35 Station Road.
- 16.35. As described above, 30-31 Friar Street and 136 -137 Friar Street are subject to planning consents which, once constructed, would result in them being residential receptors. These have therefore been considered in the Cumulative Scenario (refer to Chapter 17). 29 to 35 Station Road is currently offices and the planning application for this Site is for redevelopment as a hotel and offices (previously planning applications for this Site were for redevelopment as residential uses). Therefore, an assessment of the Daylight and Sunlight effects of the Development on this property is no longer required.
- 16.36. Where additional room layouts for neighbouring properties have been obtained since preparation of the 2015 ES Chapter, these have been incorporated within the model to provide the most accurate analysis. Where detailed room layouts have now been assessed where they were assumed layouts in the 2015 ES Chapter, this has been noted with 'detailed layouts' below. The additional layouts have also seen the exclusion of ground floor commercial uses to some properties.
- 16.37. There is a total of 21 properties surrounding the Site, as listed below, which are understood to be residential in use. These properties have been assessed for daylight:
- 32 Friar Street;
 - 33 Friar Street;
 - 34 Friar Street;
 - 1-45 Projection West;
 - 1-29 Projection East;
 - 1-41 Icon House;
 - 30 Garrard Street (Ground Floor – Level 04) (new);
 - 5 Vachel Road;
 - The Gateway Public House, 31 Greyfriars Road;
 - 53 Greyfriars Road;
 - 144 Friar Street;
 - 127 Friar Street (detailed layouts);
 - 125 Friar Street (detailed layouts);
 - Bridewell and Samuel House, 60-61 Friar Street;
 - 9-11 Stanshawe Road (detailed layouts);
 - 13 Stanshawe Road (detailed layouts);
 - 15 Stanshawe Road (detailed layouts);
 - 17 Stanshawe Road (detailed layouts);
 - 19 Stanshawe Road;
 - Summit House 49-51 Greyfriars Road (new); and
 - 7-11 Station Road (new).

- 16.38. The properties in the above list noted as 'new' have been implemented following the 2015 ES Chapter and are now considered as an existing sensitive receptor. These were assessed within the Future Baseline of the 2015 ES Chapter.
- 16.39. Only properties with windows facing south have been assessed for sunlight as these properties would have an expectation of sunlight. Therefore, the following 10 properties have been assessed for sunlight:
- 32 Friar Street;
 - 33 Friar Street;
 - 1-45 Projection West;
 - 1-29 Projection East;
 - 1-41 Icon House;
 - 30 Garrard Street (Ground Floor – Level 04);
 - The Gateway Public House, 31 Greyfriars Road;
 - 53 Greyfriars Road;
 - 125 Friar Street;
 - 9-11 Stanshawe Road; and
 - 7-11 Station Road.

Amenity Areas

- 16.40. The Temporary Flexible Events Space and Station Hill Square have been implemented since the 2015 ES and have therefore been assessed in terms of overshadowing. The Temporary Flexible Event Space is however temporary and will be replaced by the proposed Development itself. As such, this space would only exist in the Existing Baseline.
- 16.41. The rear gardens on Stanshawe Road (Northside even numbers, Southside odd numbers), which were not included in the 2015 ES, have been assessed in this ES Addendum for completeness.
- 16.42. The proposed Development includes seven amenity areas that have been assessed:
- Central Square (Area 1);
 - Friars Walk;
 - Plot E Courtyards (three total);
 - Plot E Roof Terrace; and
 - Plot F Roof Terrace.

Existing Baseline

- 16.43. A total of 719 windows serving 426 rooms within the 21 surrounding residential properties have been assessed for daylight. 270 windows have been assessed in regard to sunlight.
- 16.44. **Table 16.1** below sets out a summary of the results of the baseline daylight and sunlight assessment. Full details of the baseline daylight and sunlight assessment results are provided in **Technical Appendix 16.2**.
- 16.45. The results of the baseline assessment indicate that out of the 719 windows assessed, 170 (24%) have an existing VSC of 27% or more.

- 16.46. In regard to NSL, 214 (50%) out of the 426 rooms assessed have a daylight distribution of at least 80% of the total room area.
- 16.47. The results of the sunlight assessment indicate 115 (43%) out of the 270 windows assessed, have a baseline annual APSH of at least 25% with at least 5% in the winter period.

Table 16.1: Existing Baseline Daylight and Sunlight Results

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that receive NSL in excess of 80%		Total no. of windows that meet APSH criteria	
	Pass	Total	Pass	Total	Pass	Total
125 Friar Street	28	7	3	3	0	0
127 Friar Street	6	3	5	4	0	0
1-29 Projection East	94	24	66	26	15	0
13 Stanshawe Road	3	2	2	2	0	0
1-41 Icon House	54	10	38	13	16	0
144 Friar Street	2	0	2	0	0	0
1-45 Projection West	138	53	110	73	102	62
7-11 Station Road	57	0	24	0	36	0
15 Stanshawe Road	3	2	2	2	0	0
17 Stanshawe Road	3	2	2	2	0	0
19 Stanshawe Road	3	3	3	2	0	0
30 Garrard Street	183	13	54	32	54	20
32 Friar Street	7	1	5	0	0	0
33 Friar Street	4	0	4	0	1	0
34 Friar Street	4	0	3	0	0	0
49-51 Greyfriars Road	33	22	24	15	31	23
5 Vachel Road	5	0	5	0	0	0
53 Greyfriars Road	13	6	9	6	6	6
9-11 Stanshawe Road	9	3	8	4	4	3
Bridewell & Samuel House - Student Housing	59	18	50	27	0	0
The Gateway Public House - 31 Greyfriars Road	11	1	7	3	5	1
Total	719	170	426	214	270	115

Potential Effects

Demolition and Construction

- 16.48. The potential demolition and construction effects of the proposed Development on daylight, sunlight and overshadowing remain unchanged from those set out within Chapter 16 of the 2015 ES; that is **negligible** to **temporary, short-term** and of **minor beneficial** significance.

Completed Development

- 16.49. This scenario considers the proposed Development comprising the Reserved Matters details for Plots E and F with the remaining Station Hill Development as Maximum Parameters.

Daylight to Existing Surrounding Properties

- 16.50. The potential daylight impacts on surrounding residential properties arising from the proposed Development have been assessed against the Baseline conditions in regard to VSC and NSL in accordance with the BRE Guidelines. Full details of the results can be found in **Technical Appendix 16.2** and are summarised in **Table 16.2** below.
- 16.51. A total of 719 windows serving 426 rooms have been assessed within the 21 surrounding residential properties in terms of daylight. Owing to additional floor plans being obtained since preparation of the 2015 ES Chapter and changes to the Baseline conditions, these vary from those reported within the 2015 ES Chapter which assessed 846 windows serving 447 rooms within 24 properties.
- 16.52. A total of 323 (45%) windows out of the 719 assessed will meet the BRE Guidelines for VSC. A total of 273 (64%) out of the 426 rooms assessed will meet the BRE Guidelines for NSL.
- 16.53. A total of eight (38%) out of the 21 properties assessed will therefore meet the BRE Guidelines and the effects of the proposed Development on these properties are considered **negligible**. The 2015 ES Chapter reported that eight (33%) of the 24 properties assessed would meet the BRE Guidelines; seven of which are the same properties that would meet the BRE Guidelines in this assessment. The remaining property, 136-137 Friar Street, which met the BRE Guidelines in the 2015 ES has not been assessed in this ES Addendum owing to its commercial nature. One property, 127 Friar Street, now meets the BRE Guidelines whereas it did not in the 2015 ES. This is because the one room impacted within the 2015 ES is now known to be in commercial use.
- 16.54. The remaining properties for which there are potential impacts are discussed below.

Table 16.2: Proposed Development – Summary of Daylight Results (VSC, NSL)

Address	VSC							NSL				
	Total No. of Windows	No. Windows that meet BRE Guidelines	Below BRE Guidelines				Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	Below BRE Guidelines			
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
125 Friar Street	28	28	0	0	0	0	3	3	0	0	0	0
127 Friar Street	6	6	0	0	0	0	5	5	0	0	0	0
1-29 Projection East	94	23	33	21	17	71	66	43	15	4	4	23
13 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
1-41 Icon House	54	40	10	2	2	14	38	28	5	5	0	10
144 Friar Street	2	2	0	0	0	0	2	2	0	0	0	0
1-45 Projection West	138	71	10	19	38	67	110	68	13	12	17	42
7-11 Station Road	57	57	0	0	0	0	24	24	0	0	0	0
15 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
17 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
19 Stanshawe Road	3	3	0	0	0	0	3	3	0	0	0	0
30 Garrard Street	183	24	6	20	133	159	54	30	4	1	19	24
32 Friar Street	7	6	1	0	0	1	5	5	0	0	0	0
33 Friar Street	4	3	1	0	0	1	4	1	0	0	3	3
34 Friar Street	4	4	0	0	0	0	3	0	1	0	2	3
49-51 Greyfriars Road	33	0	0	2	31	33	24	0	0	1	23	24
5 Vachel Road	5	5	0	0	0	0	5	3	1	1	0	2
53 Greyfriars Road	13	6	1	0	6	7	9	4	0	0	5	5
9-11 Stanshawe Road	9	5	2	1	1	4	8	6	1	0	1	2
Bridewell & Samuel House - Student Housing	59	28	17	12	2	31	50	40	4	2	4	10
The Gateway Public House - 31 Greyfriars Road	11	3	1	1	6	8	7	2	0	1	4	5
TOTAL	719	323	82	78	236	396	426	273	44	27	82	153

32 Friar Street

- 16.55. A total of seven windows serving five rooms have been assessed within 32 Friar Street. Six (86%) of the seven windows assessed will meet the BRE Guidelines for VSC. One window experiences a reduction in VSC of 20-30% which is considered a minor adverse effect. This window is to a bedroom which is considered less sensitive in terms of daylight. It also has a low existing VSC level and would experience a low absolute loss of 2.9% which is unlikely to be perceptible to the occupant.
- 16.56. All five rooms assessed will meet the BRE Guidelines for NSL. As all rooms would comply with the BRE Guidelines in terms of NSL and the one window that experiences a reduction in VSC is a bedroom with low existing levels of daylight, the overall effect of the proposed Development upon this building is considered **negligible**.
- 16.57. The potential effect on this property reported within Chapter 16 of the 2015 ES was moderate adverse. As such, the potential effects of the proposed Development on daylight within this property improve from those set out within Chapter 16 of the 2015 ES.

33 Friar Street

- 16.58. A total of four windows serving four rooms have been assessed within 33 Friar Street. Three (75%) of the four windows assessed will meet the BRE Guidelines for VSC. The remaining window experiences an alteration to VSC of 20-30% which is considered a minor adverse effect. This window has a low existing VSC level of 9.5% and sees a low absolute loss of 2.1% which is unlikely to be perceptible to the occupant. The low existing level has led to a disproportionate percentage change to VSC.
- 16.59. One (25%) of the four rooms assessed will meet the BRE Guidelines for NSL. The three remaining rooms experience an alteration over 40% which is considered a substantial adverse effect. All three rooms see low existing levels of NSL between 17.5% and 45.4%, where even a small alteration would lead to disproportionate percentage change.
- 16.60. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

34 Friar Street

- 16.61. A total four windows serving three rooms have been assessed within 34 Friar Street. All four windows assessed will meet the BRE Guidelines for VSC. However, all three rooms assessed will fall short of the BRE Guidelines for NSL. Of these, one room experiences a reduction in NSL of 20-30% which is considered a minor adverse effect and two rooms experience a reduction of over 40% which is considered a substantial adverse effect. The one room experiencing a minor adverse effect would have a retained NSL of 55% which is considered commensurate with the urban location, whilst the two rooms that experience a substantial adverse effect have low existing levels of NSL between 14.7% and 38.5%, where even a small alteration would lead to disproportionate percentage change.
- 16.62. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

1-45 Projection West

- 16.63. A total 138 windows serving 110 rooms have been assessed within 1-45 Projection West. 71 (51%) of the 138 windows assessed will meet the BRE Guidelines for VSC. Of the 67 windows that don't meet the BRE Guidelines, ten windows experience an alteration to VSC of 20-30% which is considered a minor adverse effect, 19 windows experience an alteration of 30-40% which is considered a moderate adverse effect and 38 windows experience an alteration over 40% which is considered a substantial adverse effect. Many of the windows that are below the BRE Guidelines have projecting balconies above and below. This severely restricts visibility of the sky dome meaning even modest increases in massing can result in a disproportionate percentage change.
- 16.64. Three of the ten windows experiencing a minor adverse effect and 11 of the 38 windows experiencing a substantial adverse effect see low existing levels of VSC, below 10%, where even a small alteration would lead to disproportionate percentage change. Seven of these windows also see small absolute losses of less than 3% VSC which is unlikely to be perceptible to the occupant.
- 16.65. Two windows experiencing a minor adverse effect, 15 of the 18 windows that experience a moderate adverse effect and five of the windows experiencing a substantial adverse effect retain VSC levels of 15% or greater and are therefore considered commensurate with the urban location.
- 16.66. 68 (62%) of the 110 rooms assessed will meet the BRE Guidelines for NSL. Of the 42 rooms that don't meet the BRE Guidelines, 13 experience an alteration in NSL of 20-30% which is considered a minor adverse effect, 12 rooms experience an alteration of 30-40% which is considered a moderate adverse effect and 17 rooms experience an alteration over 40% which is considered a substantial adverse effect. A number of these rooms have balconies located above and below the window apertures. This severely restricts visibility of the sky dome meaning even modest increases in massing can result in a disproportionate percentage change.
- 16.67. 12 of the 13 rooms experiencing a minor adverse effect, nine of the 12 rooms experiencing a moderate adverse effect and two of the rooms experiencing a substantial adverse effect retain an NSL in excess of 50% and are therefore considered commensurate with the urban location.
- 16.68. One of the rooms experiencing a minor adverse effect, two experiencing a moderate adverse effect and five experiencing a substantial adverse effect see low existing NSL levels owing to the urban location. Within these rooms, even a small alteration would lead to disproportionate percentage change.
- 16.69. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**, with a number of **substantial** reductions in daylight. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

1-29 Projection East

- 16.70. A total 94 windows serving 66 rooms have been assessed within 1-29 Projection East. 23 (25%) of the 94 windows assessed will meet the BRE Guidelines for VSC. Of the 71 windows that don't meet the BRE Guidelines, 33 experience an alteration to VSC of 20-30% which is considered a minor adverse effect, 21 windows experience an alteration between 30-40% which is considered a moderate adverse effect and 17 windows experience an alteration over 40% which is considered a substantial adverse effect.
- 16.71. A number of windows that are below the BRE Guidelines in the proposed Development scenario have projecting balconies above and below which severely restricts visibility of the sky dome, meaning even modest increases in massing can result in a disproportionate percentage change.

- 16.72. Six of the windows experiencing minor adverse alterations and five experiencing substantial adverse alterations see low existing levels of VSC, less than 10%, where even a small alteration would lead to disproportionate percentage change.
- 16.73. 24 of the windows experiencing a minor adverse effect, nine windows that experience a moderate adverse effect and one of the windows experiencing a substantial adverse effect retain VSC levels of 15% or greater and are therefore considered commensurate with the urban location.
- 16.74. 43 (65%) of the 66 rooms assessed will meet the BRE Guidelines for NSL. Of the 23 rooms that don't meet the BRE Guidelines, 15 experience an alteration in NSL of 20-30% which is considered a minor adverse effect, four rooms experience an alteration of 30-40% which is considered a moderate adverse effect and four rooms experience an alteration over 40% which is considered a substantial adverse effect.
- 16.75. Many of the rooms that are below the BRE Guidelines in the proposed Development Scenario have balconies located above and below the window apertures which severely restricts visibility of the sky dome, meaning even modest increases in massing can result in a disproportionate percentage change.
- 16.76. Eight rooms experiencing a minor adverse effect and two rooms experiencing a moderate adverse effect retain an NSL in excess of 50% and are therefore considered commensurate with the urban location.
- 16.77. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

1-41 Icon House

- 16.78. A total of 54 windows serving 38 rooms have been assessed within 1-41 Icon House. 40 (74%) of the 54 windows assessed will meet the BRE Guidelines for VSC. Of the 14 windows that don't meet the BRE Guidelines, ten windows experience an alteration to VSC of 20-30% which is considered a minor adverse effect, two windows experience an alteration between 30-40% which is considered a moderate adverse effect and two window experiences an alteration greater than 40% which is considered a substantial adverse effect.
- 16.79. Many of the windows that are below the BRE Guidelines in the proposed Development Scenario have projecting balconies above and below which severely restricts visibility of the sky dome, meaning even modest increases in massing can result in a disproportionate percentage change.
- 16.80. The nine windows experiencing a minor adverse effect and one window that experiences a moderate adverse effect retain VSC levels of 15% or greater and are therefore considered commensurate with the urban location.
- 16.81. 28 (74%) of the 38 rooms assessed will meet the BRE Guidelines for NSL. Of the 10 rooms that don't meet the BRE Guidelines, five rooms experience an alteration in NSL of 20-30% which is considered a minor adverse effect and five rooms experience an alteration of 30-40% which is considered a moderate adverse effect.
- 16.82. A number of rooms that are below the BRE Guidelines in the proposed Development Scenario have balconies located above and below the window apertures. This severely restricts visibility of the sky dome meaning even modest increases in massing can result in a disproportionate percentage change.

- 16.83. Three rooms experiencing a minor adverse alteration and three rooms experiencing a moderate adverse alteration retain an NSL in excess of 50% and are therefore considered commensurate with the urban location.
- 16.84. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

30 Garrard Street

- 16.85. A total of 183 windows serving 54 rooms have been assessed within 30 Garrard Street. 24 (13%) of the 183 windows assessed will meet the BRE Guidelines for VSC. Of the windows that don't meet the BRE Guidelines, six windows experience an alteration to VSC of 20-30% which is considered a minor adverse effect, 20 windows experience an alteration of 30-40% which is considered a moderate adverse effect and 133 windows experience an alteration greater than 40% which is considered a substantial adverse effect.
- 16.86. Two windows experiencing a minor adverse effect, 15 windows that experience a moderate adverse effect and 39 windows that experience a substantial adverse effect see low existing levels, less than 10%, of VSC where even a small alteration would lead to disproportionate percentage change. 29 of these windows see an absolute loss of less than 3% which is unlikely to be perceptible to the occupant.
- 16.87. 30 (56%) of the 54 rooms assessed will meet the BRE Guidelines for NSL. Of the rooms that don't meet the BRE Guidelines, four rooms experience an alteration in NSL of 20-30% which is considered a minor adverse effect, one room experiences an alteration of 30-40% which is considered a moderate adverse effect and 19 rooms experience an alteration greater than 40% which is considered a substantial adverse effect.
- 16.88. Two rooms experiencing a minor adverse effect, one room experiencing a moderate adverse effect and four experiencing a substantial adverse effect retain an NSL in excess of 50% and are therefore considered commensurate with the urban location.
- 16.89. This property was converted from office space to residential following the various Station Hill planning consents. As such, this property has been implemented with the knowledge that a large-scale development would occur directly opposite that would lead to substantial alterations in daylight.
- 16.90. Owing to the location of this property, the majority of affected rooms and windows overlook Plots C and G which remain unchanged from the consented maximum parameters, assessed in Chapter 16 of the 2015 ES.
- 16.91. In consideration of the above, the overall effect to this building is assessed as **moderate adverse**, with a number of **substantial** reductions in daylight. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

5 Vachel Road

- 16.92. A total of five windows serving five rooms have been assessed within 5 Vachel Road. All five windows assessed will meet the BRE Guidelines for VSC. Three (60%) of the five rooms assessed will meet the BRE Guidelines for NSL. One of the two remaining rooms experiences an alteration in NSL of 20-30% which is considered a minor adverse effect and one room experiences an alteration of 30-40% which is considered a moderate adverse effect.

- 16.93. In consideration of the above, the overall effect of the proposed Development upon this building is considered **minor adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

The Gateway Public House, 31 Greyfriars Road

- 16.94. A total of 11 windows serving seven rooms have been assessed within The Gateway Public House, 31 Greyfriars Road. Three (27%) of the 11 windows assessed will meet the BRE Guidelines for VSC. Of the 8 windows that don't meet the BRE Guidelines, one window experiences an alteration to VSC of 20-30% which is considered a minor adverse effect, one window experiences an alteration to VSC of 30-40% which is considered a moderate adverse effect and six windows experience an alteration greater than 40% which is considered a substantial adverse effect.
- 16.95. Two (29%) of the seven rooms assessed will meet the BRE Guidelines for NSL. Of the seven rooms that don't meet the BRE Guidelines, one room experiences an alteration in NSL of 30-40% which is considered a moderate adverse effect and four rooms experience an alteration greater than 40% which is considered a substantial adverse effect.
- 16.96. The overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

53 Greyfriars Road

- 16.97. A total 13 windows serving nine rooms have been assessed within 53 Greyfriars Road. Six (46%) of the 13 windows assessed will meet the BRE Guidelines for VSC. Of the seven windows that don't meet the BRE Guidelines, one window experiences an alteration to VSC of 20-30% which is considered a minor adverse effect and six windows experience an alteration greater than 40% which is considered a substantial adverse effect.
- 16.98. One of the windows that experiences a minor adverse effect and one of the windows that experiences a substantial adverse effect retain a VSC of over 15% which is considered commensurate with the urban location.
- 16.99. Four (44%) of the nine rooms assessed will meet the BRE Guidelines for NSL. The remaining five rooms experience an alteration greater than 40% which is considered a substantial adverse effect.
- 16.100. One room that experiences a substantial adverse effect in NSL retains a 51.5% view the sky which is considered commensurate with the urban location.
- 16.101. The overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

Bridewell and Samuel House, 60-61 Friar Street (Student Accommodation)

- 16.102. A total 59 windows serving 50 rooms have been assessed within Bidwell and Samuel House, 60-61 Friar Street. 28 (48%) of the 59 windows assessed will meet the BRE Guidelines for VSC. Of the 31 windows that don't meet the BRE Guidelines, 17 windows experience an alteration to VSC of 20-30% which is considered a minor adverse effect, 12 windows experience an alteration of 30-40% which is considered a moderate adverse effect and two window experiences an alteration greater than 40% which is considered a substantial adverse effect.

- 16.103. Ten windows experiencing minor adverse effects and three experiencing moderate adverse effects retain VSC levels of 15% or greater which is considered commensurate with the urban location.
- 16.104. Six windows also experience low existing levels of daylight at less than 10% VSC owing to the urban location and courtyard configuration, where even a small absolute loss will lead to disproportionate percentage change.
- 16.105. 40 (80%) of the 50 rooms assessed will meet the BRE Guidelines for NSL. Of the 10 rooms that don't meet the BRE Guidelines, four rooms experience an alteration in NSL of 20-30% which is considered a minor adverse effect, two rooms experience an alteration of 30-40% which is considered a moderate adverse effect and four rooms experience an alteration over 40% which is considered a substantial adverse effect.
- 16.106. Three rooms that experience a minor adverse effect and one that experiences a moderate adverse effect retain an NSL in excess of 50% which is considered commensurate with the urban location.
- 16.107. This property is student accommodation which has a transient population and thus may be considered less sensitive from a daylight perspective.
- 16.108. In consideration of the above, the overall effect to this building is assessed as **moderate adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

9-11 Stanshawe Road

- 16.109. A total nine windows serving eight rooms have been assessed within 9-11 Stanshawe Road. Five (56%) of the nine windows assessed will meet the BRE Guidelines for VSC. Of the four windows that don't meet the BRE Guidelines, two windows experience an alteration to VSC of 20-30% which is considered a minor adverse effect, one window experiences an alteration of 30-40% which is considered a moderate adverse effect and one experiences an alteration greater than 40% which is considered a substantial adverse effect.
- 16.110. The two windows that experience moderate and substantial adverse effects have low existing levels of VSC of 6.9% and 7.9%, which lead to a disproportionate percentage change.
- 16.111. The two windows that experience minor adverse effects retain in excess of 18% VSC which is considered commensurate with the urban location.
- 16.112. Six (75%) of the eight rooms assessed will meet the BRE Guidelines for NSL. Of the remaining two rooms, one room experiences an alteration in NSL of 20-30% which is considered a minor adverse effect and one room experiences an alteration greater 40% which is considered a substantial adverse effect.
- 16.113. The overall effect of the proposed Development upon this building is considered **minor adverse**. As such, the overall potential effects of the proposed Development on daylight remain unchanged from those set out within Chapter 16 of the 2015 ES.

Summit House, 49-51 Greyfriars Road

- 16.114. A total of 33 windows serving 24 rooms have been assessed within Summit House, 49-51 Greyfriars Road. Of the 33 windows assessed, two windows experience an alteration to VSC of 30-40% which is considered a moderate adverse effect and 31 windows experience an alteration greater than 40% which is considered a substantial adverse effect.

- 16.115. Five of the 31 rooms experiencing substantial adverse effects retain over 15% VSC and are therefore considered commensurate with the urban location.
- 16.116. Of the 24 rooms assessed, one room experiences an alteration in NSL of 30-40% which is considered a moderate adverse effect and 23 rooms experience an alteration greater than 40% which is considered a substantial adverse effect. Two rooms retain an NSL in excess of 50% which is considered commensurate with the urban location.
- 16.117. This property was converted from office space to residential following the previous Station Hill planning consents. As such, this property has been converted to residential use with the knowledge that a large-scale Development would occur directly opposite that would lead to substantial alterations in daylight.
- 16.118. In consideration of the above, the overall effect to this building is assessed as **substantial adverse**. This is a greater magnitude of effect than presented in the 2015 ES (moderate adverse) because, although the alterations in VSC remain unchanged compared with those set out in the 2015 ES, detailed room layouts have now been modelled and greater information is known about this property.

Sunlight to Existing Surrounding Properties

- 16.119. The potential sunlight impacts of the proposed Development have been assessed against the Baseline conditions in regard to Annual Probable Sunlight Hours (APSH) in accordance with the BRE Guidelines. Full details of the results can be found in **Technical Appendix 16.2** and are summarised in **Table 16.3** below.

Table 16.3: Proposed Development – Summary of Sunlight Results

Address	Total No. of Windows	No. Windows that meet BRE Guidelines	Total APSH			Winter APSH		
			Below BRE Guidelines			Below BRE Guidelines		
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction
1-29 Projection East	15	7	0	0	8	0	0	0
1-41 Icon House	16	6	1	3	4	0	0	10
1-45 Projection West	102	93	1	6	2	0	0	0
7-11 Station Road	36	36	0	0	0	0	0	0
30 Garrard Street	54	25	1	3	25	0	1	13
33 Friar Street	1	1	0	0	0	0	0	0
49-51 Greyfriars Road	31	0	0	0	31	0	0	31
53 Greyfriars Road	6	0	0	0	6	0	0	6
9-11 Stanshawe Road	4	2	1	0	1	0	0	0
The Gateway Public House - 31 Greyfriars Road	5	0	1	3	1	1	0	4
TOTAL	270	170	5	15	78	1	1	64

- 16.120. A total of 270 windows serving 191 rooms have been assessed within the 10 surrounding residential properties in terms of sunlight. Owing to additional room uses having been identified since the 2015 ES and changes to the Baseline conditions, these vary from those reported within Chapter 16 of the 2015 ES chapter which assessed 846 windows within 24 properties. In addition, to align with industry convention, north facing windows have now been excluded.
- 16.121. A total of 170 (63%) windows out of the 270 assessed will meet the BRE Guidelines for APSH.
- 16.122. A total of two (20%) out of the 10 properties assessed will meet the BRE Guidelines for annual and winter APSH and the effect of the proposed Development on these properties is therefore considered **negligible**. The remaining properties for which there are potential impacts are discussed below.

1-45 Projection West

- 16.123. A total 102 windows serving 83 rooms have been assessed within 1-45 Projection West. 93 (91%) of the 102 windows assessed will meet the BRE Guidelines for annual and winter APSH. Of the remaining nine windows, one windows experience an alteration to annual APSH of 20-30% which is considered a minor adverse effect, six windows experience an alteration of 30-40% which is considered a moderate adverse effect and two windows experience an alteration over 40% which is considered a substantial adverse effect. However, these nine windows meet the BRE Guidelines in regard to winter sunlight.
- 16.124. Many of the windows that fall below the annual BRE Guidelines have balconies located above and below, which substantially reduces the ability of the sun to reach the windows.
- 16.125. Considering the dense urban context of the site, the inherent architectural design of this building, the overall level of compliance with the BRE Guidelines and the retained levels of APSH, the overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on sunlight remain unchanged from those set out within Chapter 16 of the 2015 ES.

1-29 Projection East

- 16.126. A total 15 windows serving 15 rooms have been assessed within 1-29 Projection East. Seven (47%) of the 15 windows assessed will meet the BRE Guidelines for APSH. All of the remaining eight windows experience an alteration to annual APSH of over 40% which is considered a substantial adverse effect. However, these eight windows meet the BRE Guidelines in regard to winter sunlight.
- 16.127. All eight windows have low levels of existing annual APSH owing to their almost due west orientation and the building's urban context. As such, any alterations could result in a disproportionate percentage change.
- 16.128. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on sunlight remain unchanged from those set out within Chapter 16 of the 2015 ES.

1-41 Icon House

- 16.129. A total 16 windows serving 16 rooms have been assessed within 1-41 Icon House. Six (38%) of the 16 windows assessed will meet the BRE Guidelines for annual and winter APSH. Of the remaining ten windows, one window experiences an alteration to annual APSH of 20-30% which is

considered a minor adverse effect, three windows experience an alteration of 30-40% which is considered a moderate adverse effect and four windows experience an alteration of greater than 40% which is considered a substantial adverse effect.

- 16.130. Ten windows experience an alteration in winter APSH of greater than 40% which is considered a substantial adverse effect. All ten windows experience low existing winter APSH owing to their urban location, which leads to disproportionate percentage change. All ten windows also face almost due west, where even a modest development would intercept the low angle afternoon sunlight.
- 16.131. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on sunlight remain unchanged from those set out within Chapter 16 of the 2015 ES.

30 Garrard Street

- 16.132. A total 54 windows serving 21 rooms have been assessed within 30 Garrard Street. 25 (46%) of the 54 windows assessed will meet the BRE Guidelines for annual and winter APSH. Of the remaining 29 windows, one window experiences an alteration in annual APSH of 20-30% which is considered a minor adverse effect, three windows experience an alteration of 30-40% which is considered a moderate adverse effect and 25 windows experience an alteration of greater than 40% which is considered a substantial adverse effect.
- 16.133. One window experiences an alteration to winter APSH of 30-40% which is considered a moderate adverse effect and 13 windows experience an alteration of greater than 40% which is considered a substantial adverse effect. 27 windows face almost due west, where even a modest development would intercept the low angle afternoon sunlight.
- 16.134. This property was converted from office space to residential uses following the previous Station Hill planning consents. As such, this conversion has been implemented with the knowledge that a large-scale development would occur directly opposite that would lead to substantial alterations in daylight.
- 16.135. However, the overall effect of the proposed Development upon this building is considered **substantial adverse**. Whilst the magnitude of effect to the individual windows assessed has not changed from that set out within Chapter 16 of the 2015 ES, the overall effect has been upgraded from moderate adverse to substantial adverse now that all north facing windows have been excluded. It is worth noting that these effects would have been understood and deemed acceptable when the conversion of this property was permitted.

The Gateway Public House, 31 Greyfriars Road

- 16.136. A total five windows serving four rooms have been assessed within The Gateway Public House, 31 Greyfriars Road. One (20%) of the five windows assessed will meet the BRE Guidelines for annual and winter APSH. Of the remaining four windows, one window experiences an alteration to annual APSH of 20-30% which is considered a minor adverse effect, two windows experience an alteration of 30-40% which is considered a moderate adverse effect and one window experiences an alteration of greater than 40% which is considered a substantial adverse effect.
- 16.137. One window experiences an alteration to winter APSH of 20-30% which is considered a minor adverse effect and three windows experience an alteration greater than 40% which is considered a substantial adverse effect. All windows face almost due east, where even a modest development would intercept the low angle morning sunlight.

16.138. The overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on sunlight remain unchanged from those set out within Chapter 16 of the 2015 ES.

53 Greyfriars Road

16.139. A total six windows serving six rooms have been assessed within 53 Greyfriars Road. All six windows experience an alteration to both annual and winter APSH of greater than 40% which is considered a substantial adverse effect. All windows face almost due east, where even a modest development would intercept the low angle morning sunlight.

16.140. In consideration of the above, the overall effect of the proposed Development upon this building is considered **substantial adverse**. Whilst the magnitude of effect to the individual windows assessed has not changed from that set out within Chapter 16 of the 2015 ES, the overall effect has been upgraded from moderate adverse to substantial adverse now that the north facing windows have been excluded from assessment.

9-11 Stanshawe Road

16.141. A total four windows serving three rooms have been assessed within 9-11 Stanshawe Road. Two (50%) of the four windows assessed will meet the BRE Guidelines for annual and winter APSH. Of the remaining two windows, one experiences an alteration to annual APSH of 20-30% which is considered a minor adverse effect and one experiences an alteration greater than 40% which is considered a substantial adverse effect. However, both windows meet the BRE Guidelines in regard to winter sunlight.

16.142. The overall effect of the proposed Development upon this building is considered **moderate adverse**. As such, the overall potential effects of the proposed Development on sunlight remain unchanged from those set out within Chapter 16 of the 2015 ES.

Summit House, 49-51 Greyfriars Road

16.143. A total of 31 windows serving 22 rooms have been assessed within Summit House, 49-51 Greyfriars Road. All 31 windows experience an alteration to both annual and winter APSH greater than 40% which is considered a substantial adverse effect. All windows face almost due east, where even a modest development would intercept the low angle morning sunlight.

16.144. This property was converted from office space to residential use following the Station Hill planning consents. As such, this property has been converted with the knowledge that a large-scale Development would occur directly opposite that would lead to substantial alterations in daylight.

16.145. The overall effect of the proposed Development upon this building is considered **substantial adverse**. Whilst the magnitude of effect to the individual windows assessed has not changed from that set out within Chapter 16 of the 2015 ES, the overall effect has been upgraded from moderate adverse to substantial adverse. It is worth noting that these effects were understood and deemed acceptable when the conversion of this property was permitted.

Overshadowing to Surrounding Amenity Areas

Rear Gardens on Stanshawe Road (Northside even numbers, Southside odd numbers)

21st March (equinox)

- 16.146. The Development would cast an area of additional shadow upon the rear gardens of 26 and 28 Stanshawe Road (even) from approximately 08:00 Greenwich Mean Time (GMT) until 9:00 GMT. From 09:00 GMT to 10:00 GMT, the rear gardens of 18 to 28 Stanshawe Road (even) would be cast under shadow. Between 10:00 GMT and approximately 10:30 GMT, sections of the rear gardens of 10 to 22 Stanshawe Road (even) would be cast under shadow by the Development. For the remainder of the day, the rear gardens on the northside of Stanshawe Road would be unaffected by the Development. These rear gardens would also enjoy uninterrupted sunlight on the vast majority of their area until approximately 15:30 GMT at which point sections of the rear gardens are overshadowed by the houses that they serve.

21st June (summer solstice)

- 16.147. A small area of additional shadow would be cast by the Development upon the eastern edge of the rear gardens associated with 13 and 15 Stanshawe Road (odd) from 06:00 British Summer Time (BST) to 08:00 BST. In addition, sections of the rear gardens of 18 to 28 Stanshawe Road (even) would be cast under shadow by the Development between 08:00 BST and 09:00 GMT. From 09:00 BST to 10:00 BST the rear gardens of 10 to 26 Stanshawe Road would be cast under shadow. It is important to note that from approximately 10:15 BST, all of the rear gardens on Stanshawe road would receive direct sunlight on all their area until approximately 18:00 BST.

21st December (winter solstice)

- 16.148. This area would not be impacted by the Development at this time of year.
- 16.149. Overall, with only minimal additional shadow occurring on 21st March and 21st June, the effect of overshadowing is considered **minor adverse**.

Station Hill Square

- 16.150. Station Hill Square, also known as Station Plaza, is partially within the proposed red line boundary, and is complete and operational. As half the space is outside the red line boundary and given the fact that it would read as one large amenity area, the space has been assessed in its entirety as a surrounding amenity area.

21st March (equinox)

- 16.151. Station Hill Square is unaffected by shadow cast from the Development until approximately 15:00 GMT. From 15:00 GMT shadow from the Development would start to encroach onto the square and by 16:00 GMT the majority of the square would be cast under shadow by the Development until sunset at approximately 18:00 GMT.

21st June (summer solstice)

- 16.152. On June 21st, Station Hill Square would be unaffected by the Development until approximately 15:00 BST thus receiving approximately eight hours of direct sunlight. Between 16:00 BST and 18:30 BST the Development would cast shadow on the majority of the Square. From 18:30 BST

the square would again receive direct sunlight on the majority of its area, until 20:00 BST, at which point shadow from existing buildings would overshadow segments of the Square.

21st December (winter solstice)

- 16.153. On December 21st, due to the extent of existing overshadowing, small segments of Station Hill Square would be cast under shadow as a result of the Development from 14:00 BST to 15:00 BST.
- 16.154. Overall, with only three hours of additional shadow occurring on 21st March, the majority of 21st June being unaffected by shadow and only one hour of additional shadow as a result of the Development on December 21st, the effect of overshadowing is considered **minor adverse**.

Daylight with the Proposed Development

- 16.155. Detailed daylight assessments have been undertaken for the habitable rooms within Plots E and F. A standalone Internal Daylight, Sunlight and Overshadowing report accompanies the reserved matters applications and discusses the assessment results in more detail.
- 16.156. The detailed assessments have been undertaken in the proposed Development Scenario comprising the reserved matters details for Plots E and F and the maximum parameter massing on the remainder of the Site. An additional cumulative assessment was undertaken to assess the quantum of light should neighbouring consented schemes be implemented; this can be found in Chapter 17: Cumulative Effects.
- 16.157. 886 rooms were assessed within Plot E in terms of average daylight factor (ADF), NSL and room depth criterion (RDC). 741 (84%) of the 886 habitable rooms within Plot E meet the BRE Guidelines in terms of ADF, whilst 492 (56%) meet the BRE Guidelines for NSL. All rooms have been designed in accordance with the RDC.
- 16.158. 384 rooms were assessed within Plot F in terms of ADF, NSL and RDC. 292 (76%) of the 384 habitable rooms within Plot F meet the BRE Guidelines in terms of ADF, whilst 204 (53%) meet the BRE Guidelines for NSL. All rooms have been designed in accordance with the RDC.

Sunlight with the Proposed Development

- 16.159. Detailed sunlight assessments have been undertaken for living rooms within Plots E and F served by a window within 90 degrees of due south. A standalone Internal Daylight, Sunlight and Overshadowing report accompanies the reserved matters applications and discusses the assessment results in more detail.
- 16.160. The detailed assessments have been undertaken in the proposed Development Scenario comprising the reserved matters details for Plots E and F and the maximum parameter massing on the remainder of the Site. An additional cumulative assessment was undertaken to assess the quantum of light should neighbouring consented schemes be implemented; this can be found in Chapter 17: Cumulative Effects.
- 16.161. 170 living rooms within Plot E have been assessed in terms of annual and winter APSH. 138 (81%) are compliant with both annual and winter APSH BRE Guidelines. In addition, 11 meet the BRE Guidelines for annual APSH whilst falling short of the BRE Guidelines for winter APSH. A further living room meets the BRE Guidelines in winter whilst falling short of the annual APSH BRE Guidelines. 20 living rooms fall short of BRE Guidelines for both annual and winter APSH.
- 16.162. 106 living rooms within Plot F have been assessed in terms of annual and winter APSH. 77 (73%) are compliant with both annual and winter APSH BRE Guidelines. In addition, three meet the BRE

Guidelines for annual APSH whilst falling short of the BRE Guidelines for winter APSH. A further 17 living rooms meet the BRE Guidelines in winter whilst falling short of the annual APSH BRE Guidelines. Nine living rooms fall short of BRE Guidelines for both annual and winter APSH.

Overshadowing within the Proposed Development

- 16.163. Sun Hours on Ground (SHOG) assessments have been undertaken for all public and communal amenity areas within the proposed Development. A standalone Internal Daylight, Sunlight and Overshadowing report accompanies the reserved matters applications and discusses the assessment results for Plots E and F in more detail.
- 16.164. The proposed Central Square sees less than two hours of direct sunlight within its area on 21st March and therefore does not meet the BRE Guidelines. However, this is consistent with squares in an urban location such as this. The overshadowing of this area remains unchanged from the levels reported within the Chapter 16 of the 2015 ES.
- 16.165. Friar's Walk complies with the BRE Guidelines with 53% of its area seeing two or more hours of direct sunlight on 21st March.
- 16.166. Two of the three communal courtyard amenity areas of Plot E see less than two hours of direct sunlight on 21st March, whilst the third sees two or more hours for 4% of its area. Lower levels of sunlight within courtyards is common and has been mitigated through the introduction of roof terraces to provide the future occupants with a well sunlit amenity area.
- 16.167. The roof terraces of Plots E and F see 100% and 94% of their areas with two or more hours of direct sunlight on 21st March.

Mitigation

Demolition and Construction

- 16.168. The mitigation measures remain unchanged from those set out within Chapter 16 the 2015 ES.

Completed Development

- 16.169. The mitigation measures remain unchanged from those set out within Chapter 16 the 2015 ES. Measures including massing alterations were implemented during the design process of Plots E and F to minimise the impacts on daylight to surrounding sensitive receptors as much as possible while still ensuring the provision of a viable scheme.

Residual Effects

Demolition and Construction - Wider Development

- 16.170. No mitigation is required for the demolition and construction of the proposed Development in relation to daylight, sunlight and overshadowing. Accordingly, the likely residual effects would remain as the potential effects, that is, **negligible** to **temporary**, **short-term** and of **minor beneficial** significance.

Completed Development

Daylight - Surrounding Properties

- 16.171. Overall, in the proposed Development Scenario, 45% (325 of 719) residential windows around the Site meet the BRE Guidelines in terms of VSC. Of the remaining 55% (396) of the windows that do not meet the BRE Guidelines, many are those with low existing levels of VSC or NSL for which some reduction below the BRE Guidelines is inevitable. Many others are located below overhanging balconies, which greatly restricts visibility of the sky dome meaning even modest increases in massing can result in a disproportionate percentage change. A number also retain levels of VSC and NSL that are commensurate with the urban context.
- 16.172. The overall effect of the proposed Development on daylight to the surrounding residential properties is considered to be **long term, local** and of **minor to moderate adverse** significance. The residual effects of the proposed Development remain unchanged from those set out within Chapter 16 of the 2015 ES.

Sunlight - Surrounding Properties

- 16.173. In relation to sunlight, in the proposed Development Scenario 63% (171 out of 270) of the residential windows around the Site meet the BRE Guidelines. The majority of the 99 windows that fail to meet the BRE Guidelines have existing levels of sunlight below the recommended levels or are influenced by the presence of balconies, so some reduction below the BRE Guidelines is likely to be inevitable for any new massing on the Site beyond the existing profiles.
- 16.174. The overall effect of the proposed Development on sunlight to the surrounding residential properties is considered to be **long term, local** and of **moderate adverse** significance. The residual effects of the proposed Development remain unchanged from those set out within Chapter 16 of the 2015 ES.

Overshadowing - Surrounding Amenity Areas

- 16.175. The transient overshadowing assessment for the proposed Development indicates that the effect to overshadowing on the surrounding amenity areas is likely to be **minor adverse**. Minor additional overshadowing beyond that experienced in the Baseline Scenario will occur within 12 rear gardens along Stanshawe Road in the mornings on 21st March and 21st June. Station Hill Square experiences minor additional shadow in the afternoons throughout the year. The overall effect of the proposed Development on sunlight to the surrounding amenity areas is considered to be **long term, local** and of **minor adverse** significance. The residual effects of the proposed Development remain unchanged from those set out within Chapter 16 of the 2015 ES.

Summary and Conclusions

Summary of Effects

Table 16.4: Summary of effects

Issue	Potential Effects	Mitigation	Residual Effect
Demolition and Construction - Wider Development			
Daylight levels in neighbouring properties	Negligible to short term, local, minor beneficial	None required	Negligible to temporary, short-term effect of minor beneficial significance
Sunlight levels in neighbouring properties	Negligible to short term, local, minor beneficial	None required	Negligible to temporary, short term effect of minor beneficial significance
Proposed Development			
Daylight levels in neighbouring properties	2 properties experience a minor adverse impact, 7 properties experience a moderate adverse impact, 2 properties experience a moderate adverse impact with a number of substantial reductions in daylight and 1 property experiences a substantial adverse impact.	Mitigation inherent in design.	Long term, local, adverse effect of minor to substantial significance
Sunlight levels in neighbouring properties	5 properties experience a moderate adverse impact and 3 properties experience substantial adverse effects.	Mitigation inherent in design.	Long term, local adverse effect of moderate to substantial significance
Transient overshadowing of surrounding area	Minor adverse	Mitigation inherent in design.	Long term, local, adverse effects of minor adverse significance.

Comparison of Effects between this ES Addendum and the 2015 ES

16.176. The effects to the following properties have changed in comparison to the 2015 ES:

- 127 Friar Street – Improvement to daylight from minor adverse to negligible now that one room has been removed owing to its commercial use.
- 32 Friars Street – Improvement to daylight from moderate adverse to negligible, due to the Proposed Amendments.

- Summit House, 49-51 Greyfriars Road – Change in the effect of the proposed Development on daylight and sunlight from moderate to substantial adverse due to greater understanding of room uses.
- Garrard House, 30 Garrard Street – Change in the effect of the proposed Development on sunlight from moderate to substantial adverse. This is due to all north facing windows having been removed from analysis.
- 53 Greyfriars Road – Change in the effect of the proposed Development on sunlight from moderate to substantial adverse. This is as a result of all north facing windows having been removed from analysis.

¹ Ministry of Housing, Communities & Local Government, Revised National Planning Policy Framework, July 2018

² Ministry of Housing, Communities & Local Government, Planning Practice Guidance, 2018

³ Reading Borough Council, Local Plan, Submission Draft (Regulation 22 of the Town and Country Planning (Local Planning) (England) Regulations 2012), March 2018

⁴ BRE, Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice (BR 209) Second Edition, BRE Press, September 2011.

17. Cumulative Effects

- 17.1. Given the time that has elapsed since preparation of the 2015 ES, the list of 'consented and reasonably foreseeable schemes' requiring consideration in conjunction with the proposed Development has been updated to reflect the current position.
- 17.2. The Chapter has been prepared by Waterman Infrastructure and Environment Ltd (Waterman) with input from each of the technical specialists who have contributed to the EIA and this ES Addendum.

Assessment Methodology

- 17.3. The methodology employed in the Cumulative Assessment remains the same as described in the 2015 ES. As with the 2015 ES, consideration has been given to two types of cumulative effects:
- **Type 1 Cumulative Effects:** Combined effects of a number of individual effects (for example noise, dust and visual intrusion) from the construction of the Development (in isolation) on a particular receptor; and
 - **Type 2 Cumulative Effects:** Combined effects of the proposed Development with other schemes, which individually might be insignificant, but when considered together could cause a significant cumulative effect.
- 17.4. The schemes assessed as part of the Type 2 Cumulative assessment have been updated as detailed in **Table 17.1** and shown on **Figure 17.1**. This updates Table 17.1 and Figure 17.1 of the 2015 ES.

Table 17.1 Schemes considered within the Type 2 Cumulative Assessment

Site	Application Reference	Proposal	Decision / Date	Distance and direction from the Site (at its closest point)
Former Sorting Office Caversham Road/ Vastern Road Reading RG1 1AA	11/00276/OUT	Outline planning application with all matters reserved with the exception of means of access, for the demolition of existing buildings; site preparation; and redevelopment of the application site for a mix of uses from amongst employment and business uses (use class B1) and residential accommodation (C3); Hotel (C1), retail floor space (A1), food and drink uses (A3, A4 and A5), leisure uses (D2), car parking, public and private open space, landscaping works, highways, access and associated works.	Approved 26/03/2012	150m north
Building B, Station Hill 3	151543	Reserved Matters application for Building B of Station Hill 3	Approved 02/08/16	Within the Site

Site	Application Reference	Proposal	Decision / Date	Distance and direction from the Site (at its closest point)
29-35 Station Road, Reading, RG1 1LG	181753	Demolition of existing building and the erection of a 22 storey building (at 121m AOD) for hotel accommodation, office accommodation and ground floor retail uses. No parking is proposed on site although servicing will be provided for to the rear of the site accessed from Garrard Street. As agreed with Reading Borough Council, given that, at the time of the assessments being undertaken, the application had not yet been validated, model information has been taken from a previously approved application on this site for a scheme of a similar height (Application ref: 04/01395/FUL).	N/A	45m south-east
Garrard House 30 Garrard Street Reading RG1 1NR	160328	Extension to include part new fourth floor and new fifth and sixth floors to provide 18 residential units.	Approved 21/06/16	Immediately adjacent to the east of the Site.
52 to 55 Friar Street and 12 Greyfriars Road, Reading RG1 1DX	162210	Demolition of existing building and structures (Class A1) and erection of 3 new buildings ranging between 6 - 12 (and basement) storeys in height to provide 135 (1xstudio, 54x1, 73x2 & 7x3-bed) residential units (Class C3), a flexible Class A1-A5 use at ground floor level fronting onto Friar St, a flexible Class A1-5, B1(a) or D2 (gym only) use at ground floor level fronting onto Greyfriars Rd, with associated access, parking, servicing, landscaping and engineering works (amended description).	Approved 20/03/18	Immediately adjacent to the west of the Site.
Bristol and West Arcade, Market Place	180358	Demolition of vacant former Bristol & West Arcade (173 – 175 Friar Street) and erection of an eight storey mixed-use	Resolution to Grant July 2018	300m to the east.

Site	Application Reference	Proposal	Decision / Date	Distance and direction from the Site (at its closest point)
		building (plus basement) to provide 35 residential units, 4,212 sqm of B1 office floorspace, and 5 retail units (A1/A2/A3), demolition of rear parts of 29 – 31 and 32 Market Place, the change of use of the retained units at 27 – 28, 29 - 31 Market Place at first, second and third floors to provide 8 residential units, change of use at ground and basement level of 32 Market Place from A2 to flexible retail use (A1/A2/A3), retention of 260.4 sqm of A4 use at ground and basement at 29-31 Market Place, change of use at ground and basement of 27 - 28 Market Place to flexible retail use (A1/A2/A3), and associated internal and external works to the Listed Buildings, landscaping, refuse, plant, cycle stores and substation at basement level.		
Land between Weldale Street and Chatham Street	170326	Demolition of all existing buildings (including 3 retail units) and structures, and erection of new buildings ranging between lower ground & 4 storeys to lower ground & 11 storeys in height, providing 427 (233x1, 182x2 & 12x3-bed) residential units (Class C3) and 1 flexible ground floor retail shop (Class A1) or restaurant and cafe (Class A3) unit, together with new public realm, landscaping, accesses, parking and associated works (amended description).	Approved 15 March 2018	180m to the west of the Site.
Former Coopers BMW site, Napier Road / Kings Meadow Road Reading RG1 8BN	162166	Erection of a part 12 storey, part 23 storey building comprising 315 apartments in a mix of studio, one-bedroom, two-bedroom and 3-bedroom units; residents' lounges, tech-hub, dining room, and	Approved 23 November 2017	600m to the north east of the Site

Site	Application Reference	Proposal	Decision / Date	Distance and direction from the Site (at its closest point)
		cinema room, various rooftop outdoor amenity spaces, concierge/reception with coffee meeting area, residents' storage facilities, postroom, ancillary back-of-house facilities, 315 secure cycle parking spaces, 49 car parking spaces, landscaping, and associated works. Demolition of existing multi-storey car park.		
Kings Point, 120 Kings Road	162087	Demolition of existing building and the erection of a part seven, part nine, part eleven, part twelve and part seventeen storey building comprising 103 residential units and 351.5 sqm GIA of commercial (A1/A3) floorspace at ground and mezzanine floor level together with parking and associated landscaping (without complying with conditions 2, 7, 8, 9, 18, 19, 28 of planning permission 150019) to allow the removal of sub-basement, enlargement of basement level and internal and external alterations at the basement, ground and mezzanine levels (amended description).	Approved 9 February 2017	900m to the east of the Site

Type 1 Cumulative Effect Assessment

- 17.5. Although there have been some minor amendments to the scale of effects in certain topic areas assessed, these are not considered to affect the Type 1 Cumulative Effect Assessment set out in the 2015 ES. This has therefore not been reproduced in this ES Addendum.

Type 2 Cumulative Effect Assessment.

Socio - Economics and Health

Demolition and Construction

- 17.6. The implementation of the Development along with the eight cumulative schemes (Building B has been excluded as it lies within the Site and has therefore already been assessed) would bring about additional construction-related employment. The scale of the construction employment generated cannot be readily quantified on the basis of the information available for each scheme as this information is commercially sensitive.
- 17.7. Despite the above, due to the nature of the construction industry, construction-related employment is relatively mobile and therefore it is not considered appropriate to assess construction employment at the local level. It is therefore expected that the Development along with the cumulative schemes would have **negligible** effect on construction-related employment. This assessment is consistent with that of the 2015 ES.

Completed Development

- 17.8. The eight cumulative schemes included in this assessment (Building B has been excluded as it lies within the Site and has therefore already been assessed) would bring forward a range of land uses including residential, commercial and leisure floorspace.
- 17.9. The likely type 2 cumulative effect on employment has been assessed using the same methodology and employment densities used to assess the Development (refer to Chapter 7: Socio-Economics and Health). On this basis, it has been estimated that the cumulative schemes would generate up to approximately 1,180 jobs. Alongside the Development this would generate between 6,130 and 10,280 jobs, resulting in a **substantial beneficial** type 2 cumulative effect in the **long-term** and at the **district level**.
- 17.10. The cumulative schemes would deliver in the region of 1,140 residential units. Accordingly, the cumulative schemes and the Development (a combined total of 1,690 max) would contribute towards housing delivery and meeting RBC's housing targets. The overall likely type 2 cumulative effect on housing is therefore considered to be **long-term, district** and of **moderate beneficial** significance. This assessment is consistent with that of the 2015 ES.
- 17.11. The cumulative provision of homes can be reasonably expected to bring more people to the area. This could increase demand for community facilities such as education and healthcare facilities. The extent of additional demand expected to be generated by the cumulative schemes for social infrastructure depends on the number of additional residents. Population assumptions have been made for this assessment of cumulative effects using the same methodology used to assess the Development (refer to Chapter 7: Socio-Economics). This results in an estimate that the cumulative schemes would accommodate approximately 2,280 residents. The cumulative schemes would also give rise to additional children requiring school places although it is not possible to estimate this based on the information available for each cumulative scheme.
- 17.12. It is expected that the applicant of each of the cumulative schemes would have undertaken the required assessment on demand for social infrastructure and should any mitigation have been

required, this would have been agreed with RBC for each application and delivered through Section 106 or Community Infrastructure Levy. It is therefore assumed the likely type 2 cumulative effect upon community facilities would be **negligible**. This assessment is consistent with that of the 2015 ES.

Flood Risk and Drainage

Demolition and Construction

- 17.13. Given all the cumulative schemes are on brownfield land, the demolition may lead to a potential decrease in hardstanding and associated increase in permeability and reduction in runoff. However, the likely type 2 cumulative effect should some or all of the cumulative schemes be constructed simultaneously with the Development, would be **negligible**. This assessment is consistent with that presented in the 2015 ES.

Completed Development

- 17.14. With regards to flood risk, it is reasonable to assume that the drainage strategy for each cumulative scheme has been (or would be) approved by the Environment Agency and RBC. By definition, this would mean that each scheme in isolation and therefore together, should not result in an increase in flood-risk at each site or elsewhere. Similarly, in line with planning policy, it has been assumed that each cumulative scheme would make adequate provision for surface water attenuation and run-off rates which are an improvement on the existing situation and acceptable to the Environment Agency or Lead Local Flood Authority. The overall type 2 cumulative effect on surface water runoff, the capacity of surface water sewers and resulting flood risk can therefore be assumed as **negligible**. This assessment is consistent with that of the 2015 ES.
- 17.15. The cumulative schemes would increase the demand for potable water, foul drainage and sewerage treatment as a result in the increased resident population and occupants of commercial uses. Upgrades to infrastructure would be subject to site-specific discussions with Thames Water to ensure adequate supply and capacity is available for each cumulative scheme. Assuming upgrades to service infrastructure are undertaken as necessary, it can be assumed that the likely type 2 cumulative effect would be **negligible**. This assessment is consistent with that of the 2016 Consented Scheme presented in the 2015 ES.

Wind

Demolition and Construction

- 17.16. The likely type 2 cumulative wind effects during demolition and construction have not been directly assessed by the wind tunnel tests. However, professional judgement has been used to consider these effects.
- 17.17. During demolition and construction, the presence of surrounding off-site cumulative schemes (namely 29-35 Station Road; the Former Sorting Office at Caversham Road and a two storey extension to Garrard House, Garrard Street) would potentially provide a small amount of additional shelter to the Site and nearby area; however, effects are expected to be **negligible**.

- 17.18. If the nearby cumulative schemes were demolished concurrently with the proposed Development, this potentially creates a more 'open' scenario where wind speeds at street level (particularly in vicinity of Thames Tower) could be higher than at present. Site hoarding around the cleared sites (2 – 3m in height) would be expected to provide sufficient localised shelter to pedestrians using the thoroughfares around the sites in this scenario.
- 17.19. Once construction of the Development begins and progresses, the local wind conditions on the Site would adjust to those reported in the latter sections of this Chapter. However, it is anticipated that the likely effect of the construction works on the wind microclimate of the Site and immediate surrounding area would be **negligible**. The demolition and construction assessment is consistent with that of the 2015 ES.

Completed Development

- 17.20. Configuration 4 was tested with the proposed Development in place, comprising the reserved matters details for Plots E and F with the remaining Station Hill Development as maximum parameters except Plot B which was shown in detail in accordance with the Reserved Matters Consent for that plot, plus Cumulative Surrounds. No mitigation measures such as landscaping was included. Wind conditions are shown in **Figure 17.2** at ground level during the windiest season, and **Figures 17.3 and 17.4** at ground and terrace levels respectively during the summer season.

Existing Surrounding Streets

- 17.21. Wind conditions across all existing streets are suitable for their intended strolling use or calmer during the windiest season. These represent a **Negligible (not significant)** cumulative effect.

Proposed Thoroughfares

- 17.22. Wind conditions at the majority of thoroughfares within the proposed Development Site are suitable for their intended strolling use during the windiest season. These conditions are suitable for their intended use and therefore represent cumulative effects ranging from **Moderate Beneficial (not significant)** to **Negligible (not significant)**.
- 17.23. There is however a single thoroughfare location across the northern part of the Site where conditions are one category windier than recommended for their intended use (location 80). This is the same as for Configuration 2 (Proposed Development without Mitigation) and represents a **Minor Adverse (significant)** cumulative effect. However, it should be noted that with wind mitigation measures tested as part of the Plot B Reserved Matters Application, conditions in this location became suitable for leisure walking or better.

Entrances

- 17.24. Wind conditions at entrance locations to the proposed Development and the surrounding buildings are suitable for standing use or calmer during the windiest season. These conditions are therefore suitable for their intended use and thus represent cumulative effects ranging from **Minor Beneficial (not significant)** to **Negligible (not significant)** for both on- and off-site locations tested.

Ground Level Amenity Spaces

- 17.25. Wind conditions at ground level amenity spaces are suitable for their intended sitting use during the summer season. This represents a **Negligible (not significant)** cumulative effect.

Podium Roof Terraces

- 17.26. Wind conditions at the majority of podium and roof terrace amenity spaces on Plots E and F are suitable for their intended sitting use during the windiest season. This represents a **Negligible (not significant)** cumulative effect.
- 17.27. There are however, three areas on the roof terrace (locations 167, 168 and 173) where conditions are suitable for standing use during the summer season, one category above the recommended criteria for their intended use. This represents a **Minor Adverse (significant)** cumulative effect in these locations. Location 174 which was one category windier than desired in Configuration 2 (Proposed Development without Mitigation) is suitable for the proposed use in the Cumulative Scenario. Wind conditions that were marginally windier than desired in Configuration 2 become suitable for sitting use with the introduction of the cumulative surrounding buildings to the west of the proposed Development.

Balconies

- 17.28. Wind conditions across all balconies on Plots E and F are suitable for their intended sitting use during the summer season in the cumulative scenario. This represents a **Negligible (not significant)** cumulative effect.

Strong Winds

- 17.29. In Configuration 4, there are no occurrences of strong winds exceeding the pedestrian safety criteria.

Comparison of Cumulative Effects between this ES Addendum and the 2015 ES

- 17.30. With the introduction of the cumulative surrounding buildings, wind conditions in and around the Site remain comparable to the 2015 assessment. There are localised areas where wind speeds differ, as a result of the detailed design of Plots E & F. However, despite these discrepancies, wind conditions generally remain consistent with the 2015 assessment.

Daylight, Sunlight and Overshadowing

- 17.31. This scenario considers the proposed Development plus cumulative schemes, which includes applications for planning permission in the surrounding area that have been submitted or proposed but are not yet under construction. This enables the potential for cumulative effects to the daylight, sunlight and overshadowing amenity to existing neighbouring buildings to be considered.
- 17.32. In addition, this scenario considers the effects of the proposed Development on new future sensitive receptors arising from the surrounding cumulative schemes.
- 17.33. The Reserved Matters Consent details for Plot B have been used in the cumulative scenario only.
- 17.34. The list of cumulative schemes relevant to this assessment is as follows:

- Former Sorting Office Caversham Road/Vastern Road;
 - Building B Station Hill (Reserved Matters Consent);
 - 29-35 Station Road (22 storey tower);
 - Garrard House 30 Garrard Street (2 storey extension); and
 - 52-55 Friar Street.
- 17.35. The remaining cumulative schemes are considered to be too far away from the proposed Development to result in cumulative daylight, sunlight and overshadowing effects.
- 17.36. Future sensitive receptors that have been assessed in this scenario comprise:
- 52-55 Friar Street and 12 Greyfriars Road;
 - Garrard House 30 Garrard Street (2 storey extension)
 - 30-31 Friar Street;
 - 136-137 Friar Street.
- 17.37. The cumulative scenario is depicted in drawings 5847/521-523 within **Technical Appendix 16.1**.

Demolition and Construction

- 17.38. The demolition of the cumulative schemes would lead to some temporary improvements in daylight availability at surrounding properties, and reduced overshadowing. However, given the short-term, temporary nature of the effect which would rapidly change as construction of the relevant cumulative schemes progresses, the likely type 2 cumulative effect is considered to be **negligible**.

Daylight to Existing Surrounding Properties

- 17.39. The full daylight assessment for the cumulative scenario can be found within **Technical Appendix 16.2** and is summarised in **Table 17.2**.
- 17.40. Overall, of the 719 windows assessed for Vertical Sky Component (VSC) 258 (36%) would meet the BRE Guidelines in the cumulative scenario. Of the 426 rooms assessed for No sky line (NSL), 218 (51%) would meet the BRE Guidelines in the cumulative scenario.
- 17.41. In comparison to the assessment of the proposed Development in the absence of the relevant cumulative schemes, the cumulative VSC and NSL results indicate that there would be either no, or only marginal, changes in the daylight received by the majority of surrounding residential properties, which are not considered to be perceptible to the occupant. The results of the proposed Development scenario can be seen in Table 16.2 and the results of the cumulative scenario can be seen in Table 17.2. The detailed results can be found in Appendix 16.2
- 17.42. The results in Table 17.2 demonstrate that the majority of properties assessed would see no change in VSC and NSL as a result of the implementation of relevant cumulative schemes when compared to the results for the assessment of the proposed Development in isolation. Furthermore, where there are alterations, they are for the most part minor in nature when compared against results for the Development in isolation, with only a number of small alterations to a very limited number of windows/rooms. The significance of the cumulative effects therefore remain as set out in Chapter 16: Daylight, Sunlight and Overshadowing. The eight properties highlighted in grey in

Table 17.2 would experience no or little alteration (below 20% change in VSC) in the cumulative scenario, and the effect on daylight to these properties would therefore be **negligible**. The remaining affected properties that differ from the proposed Development scenario, are discussed in detail below.

Table 17.2: Cumulative Scenario – Summary of Daylight Results

Address	VSC						NSL					
	Total No. of Windows	No. Windows that meet BRE Guidelines	Below BRE Guidelines			Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	Below BRE Guidelines			Total
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction				20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	
125 Friar Street	28	28	0	0	0	0	3	3	0	0	0	0
127 Friar Street	6	6	0	0	0	0	5	5	0	0	0	0
1-29 Projection East	94	19	13	45	17	75	66	33	17	11	5	33
13 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
1-41 Icon House	54	5	9	17	23	49	38	9	5	4	20	29
144 Friar Street	2	2	0	0	0	0	2	2	0	0	0	0
1-45 Projection West	138	70	10	18	40	68	110	66	11	8	25	44
7-11 Station Road	57	57	0	0	0	0	24	24	0	0	0	0
15 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
17 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
19 Stanshawe Road	3	3	0	0	0	0	3	3	0	0	0	0
30 Garrard Street	183	15	9	20	139	168	54	28	4	3	19	26
32 Friar Street	7	6	1	0	0	1	5	5	0	0	0	0
33 Friar Street	4	3	1	0	0	1	4	1	0	0	3	3
34 Friar Street	4	4	0	0	0	0	3	0	1	0	2	3
49-51 Greyfriars Road	33	0	0	2	31	33	24	0	0	1	23	24
5 Vachel Road	5	5	0	0	0	0	5	3	2	0	0	2
53 Greyfriars Road	13	6	1	0	6	7	9	4	0	0	5	5
9-11 Stanshawe Road	9	5	2	1	1	4	8	6	1	0	1	2
Bridewell & Samuel House - Student Housing	59	12	9	16	22	47	50	18	8	6	18	32
The Gateway Public House - 31 Greyfriars Road	11	3	1	1	6	8	7	2	0	1	4	5
TOTAL	719	258	56	120	285	461	426	218	49	34	125	208

1-29 Projection East

- 17.43. A total of 94 windows serving 66 rooms were assessed for daylight within this building. For VSC, 19 of the 94 (21%) windows assessed would meet BRE Guidelines and are therefore considered to experience a negligible effect. Of the 75 windows that don't meet the BRE Guidelines, 13 would experience an alteration in VSC of 20-30% which is considered a minor adverse effect, 45 would experience an alteration of 30-40% which is considered a moderate adverse effect and the remaining 17 windows would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.44. For NSL, 33 of the 66 (50%) rooms fully comply with BRE Guidelines and are therefore considered to experience a negligible effect. Of the remaining 33 rooms, 17 would experience an alteration of 20-30% which is considered a minor adverse effect, 1 would experience an alteration of 30-40% which is considered a moderate adverse effect and five would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.45. The additional VSC and NSL effects are attributed to the increased massing of 30 Garrard Street and 29-35 Station Road in conjunction with the proposed Development.
- 17.46. Overall and based on professional judgement, the effect to daylight within this building would be **moderate adverse**. As such, the overall potential effects of the proposed Development and cumulative schemes on daylight remain unchanged from those set out within Chapter 17 of the 2015 ES.

1-41 Icon House

- 17.47. A total of 54 windows serving 38 rooms were assessed for daylight within this building. Five of the 54 (9%) windows assessed would meet the BRE Guideline for VSC. Of the 49 affected windows, nine would experience an alteration in VSC of 20-30% which is considered a minor adverse effect, 17 would experience an alteration of 30-40% which is considered a moderate adverse effect and 23 windows would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.48. For NSL, nine of the 38 (24%) rooms fully comply with BRE Guidelines and are therefore considered to experience a negligible effect. Of the remaining 28 rooms, five would experience an alteration of 20-30% which is considered a minor adverse effect, four would experience an alteration of 30-40% which is considered a moderate adverse effect and 20 would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.49. The additional effects from those of the proposed Development Scenario are likely a result of the additional massing at 30 Garrard Street and 29-35 Station Road.
- 17.50. Overall and based on professional judgement, the effect to daylight within this building would be **moderate adverse** with a number of substantial reductions in daylight. As such, the overall potential effects of the proposed Development and cumulative schemes on daylight remain unchanged from those set out within Chapter 17 of the 2015 ES.

1-45 Projection West

- 17.51. A total of 138 windows serving 110 rooms were assessed for daylight within this building. 70 of the 138 (51%) windows assessed would meet the BRE Guidelines for VSC. Of the 68 windows that don't meet the Guidelines, 10 would experience an alteration in VSC of 20-30% which is considered a minor adverse effect, 18 would experience an alteration of 30-40% which is considered a moderate adverse effect and 40 windows would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.52. For NSL, 66 of the 110 (60%) rooms fully comply with BRE Guidelines and are therefore considered to experience a negligible effect. Of the remaining 44 rooms, 11 would experience an alteration of 20-30% which is considered a minor adverse effect, eight would experience an alteration of 30-40% which is considered a moderate adverse effect and 25 would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.53. The additional effects from those of the proposed Development Scenario are likely a result of the additional massing at 30 Garrard Street.
- 17.54. Overall and based on professional judgement, the effect to daylight within this building is considered **moderate adverse**, with a number of **substantial** reductions in daylight. As such, the overall potential effects of the proposed Development and cumulative schemes on daylight remain unchanged from those set out within Chapter 17 of the 2015 ES.

30 Garrard Street

- 17.55. A total of 183 windows serving 54 rooms were assessed for daylight within this building. 15 of the 183 (8%) windows assessed would meet the BRE Guidelines for VSC. Of the 167 windows that do not meet the BRE Guidelines, nine would experience an alteration in VSC of 20-30% which is considered a minor adverse effect, 20 would experience an alteration between 30-40% which is considered a moderate adverse effect and 139 windows would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.56. For NSL, 28 of the 54 (51%) rooms fully comply with BRE Guidelines and are therefore considered to experience a negligible effect. Of the remaining 26 rooms, four would experience an alteration of 20-30% which is considered a minor adverse effect, three would experience an alteration between 30-40% which is considered a moderate adverse effect and 19 would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.57. This property was converted from office space to residential following the Station Hill Development planning approvals. As such, this property has been converted with the knowledge that a large-scale Development would occur directly opposite that would lead to substantial alterations in daylight.
- 17.58. The additional effects from those of the proposed Development Scenario are likely a result of the additional massing at 29-35 Station Road.
- 17.59. Overall and based on professional judgement, the effect to daylight within this building would be **moderate adverse** with a number of **substantial** reductions in daylight. As such, the overall potential effects of the proposed Development and cumulative schemes on daylight remain unchanged from those set out within Chapter 17 of the 2015 ES.

Bridewell and Samuel House, 60-61 Friar Street (Student Accommodation)

- 17.60. A total of 59 windows serving 50 rooms were assessed for daylight within this building. 12 of the 59 (20%) windows assessed would meet the BRE Guidelines for VSC. Of the 47 windows that do not meet the BRE Guidelines, nine would experience an alteration in VSC of 20-30% which is considered a minor adverse effect, 16 would experience an alteration between 30-40% which is considered a moderate adverse effect and 22 windows would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.61. For NSL, 18 of the 50 (36%) rooms fully comply with BRE Guidelines and are therefore considered to experience a negligible effect. Of the remaining 32 rooms, eight would experience an alteration of 20-30% which is considered a minor adverse effect, six would experience an alteration of 30-40% which is considered a moderate adverse effect and 18 would experience an alteration in excess of 40% which is considered a substantial adverse effect.
- 17.62. The additional effects from those of the proposed Development Scenario are likely a result of the additional massing at 52-55 Friar Street and 12 Greyfriars Road, which forms a courtyard with 60-61 Friar Street.
- 17.63. Overall and based on professional judgement, the effect to daylight within this building would be **moderate adverse** in relation to daylight. As such, the overall potential effects of the proposed Development and cumulative schemes on daylight remain unchanged from those set out within Chapter 17 of the 2015 ES.

Sunlight to Existing Surrounding Properties

- 17.64. The full sunlight assessment can be found in **Appendix 16.2** in of this ES Addendum and the summary results are presented in **Table 17.3**.
- 17.65. Of the 270 rooms assessed for sunlight, 170 (63%) would meet the BRE Guidelines for both total and winter Annual Probable Sunlight Hours (APSH) which is considered a negligible effect.
- 17.66. In comparison to the assessment of the proposed Development in the absence of the relevant cumulative schemes, the cumulative APSH results indicate that there would be no changes in sunlight received by all surrounding residential properties. The results of the proposed Development scenario can be seen in Table 16.3 and the results of the cumulative scenario can be seen in Table 17.3
- 17.67. The buildings highlighted in grey in Table 17.3 experience little or no change in sunlight levels with the cumulative scenario in place resulting in a **negligible** effect.
- 17.68. The results in Table 17.3 demonstrate that all remaining properties would see no change in APSH as a result of the implementation of relevant cumulative schemes when compared to the results for the assessment of the proposed Development in isolation. As such, they have not been discussed further in this Chapter. The significance of cumulative effects remain as set out in Chapter 16: Daylight, Sunlight and Overshadowing.

Table 17.3: Cumulative scenario – Summary of Sunlight Results

Address	Total No. of Windows	No. Windows that meet BRE Guidelines		Total APSH			Winter APSH	
				Below BRE Guidelines			Below BRE Guidelines	
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction
1-29 Projection East	15	7	0	0	8	0	0	0
1-41 Icon House	16	6	1	3	4	0	0	10
1-45 Projection West	102	93	1	6	2	0	0	0
7-11 Station Road	36	36	0	0	0	0	0	0
30 Garrard Street	54	25	1	3	25	0	1	13
33 Friar Street	1	1	0	0	0	0	0	0
49-51 Greyfriars Road	31	0	0	0	31	0	0	31
53 Greyfriars Road	6	0	0	0	6	0	0	6
9-11 Stanshawe Road	4	2	1	0	1	0	0	0
The Gateway Public House - 31 Greyfriars Road	5	0	1	3	1	1	0	4
Total	270	170	5	15	78	1	1	64

Daylight to Future Surrounding Properties

- 17.69. The assessment of potential Daylight and Sunlight effects on future sensitive receptors has been undertaken by comparing the conditions these properties would experience with all neighbouring consented schemes in place and either the existing Site baseline or the proposed Development in place. As these developments are yet to be implemented and would therefore not have occupants to experience changes in light, the retained levels are assessed against the BRE Guidelines.

136-137 Friar Street

- 17.70. Detailed room layouts were obtained for this future receptor; therefore, this scheme has been assessed in terms of Average Daylight Factor (ADF) and NSL.
- 17.71. A total of four rooms have been assessed within 136-137 Friar Street. This comprises two living rooms and two bedrooms. Two (50%) of the four rooms within this future property would comply with the BRE Guidelines in both the existing and proposed Development scenarios. The two bedrooms are BRE compliant whilst two living rooms both see 1.3% ADF in the existing scenario.
- 17.72. Two of the four rooms (50%) meet the BRE Guidelines for NSL in the proposed scenario. Of the remaining two rooms, one retains an NSL of 71% and the other retains an NSL of 49.9%. These levels are considered acceptable given the urban location.
- 17.73. Whilst the proposed Development leads to an alteration in NSL to two rooms within this this future residential property, the alterations will be consistent with those of the 2016 Consented Scheme; therefore, the levels of light would have been understood when permission was granted for this scheme.
- 17.74. Given the two rooms falling short of the BRE Guidelines for ADF see no alteration in ADF with or without the Development present and three of the four rooms see acceptable levels of NSL, the overall effect of the proposed Development in the existing and proposed scenarios is considered **minor adverse**.

30-31 Friar Street

- 17.75. No detailed room layouts were submitted for this permitted development; therefore, this scheme has been assessed in terms of retained VSC levels.
- 17.76. A total of 213 windows have been assessed within 30-31 Friar Street. All windows assessed fall short of the BRE Guidelines of 27% VSC in the proposed Development scenario whilst 101 of the 213 windows see over 27% in the scenario. 103 of the 213 windows would however retain VSC levels in excess of 15% which is considered commensurate with the urban location.
- 17.77. The absolute alterations in VSC to 23 of the remaining 110 windows is less than 3% VSC, therefore the lower levels of VSC experienced by these windows are a function of the urban location rather than the proposed Development.
- 17.78. Whilst the proposed Development leads to alterations in VSC to this future residential property, the alterations are consistent with those of the 2016 Consented Scheme, therefore the levels of light would have been understood when permission was granted.

- 17.79. In consideration of the above, the overall effect of the proposed Development is considered **moderate adverse**.

52-55 Friar Street and 12 Greyfriars Road

- 17.80. Detailed room layouts were obtained for this future receptor; therefore, this scheme has been assessed in terms of ADF and NSL.
- 17.81. A total of 53 rooms have been assessed within 52-55 Friar Street and 12 Greyfriars Road. This comprises 18 living/kitchen/diners and 35 bedrooms. 18 (34%) of the 53 rooms within this future property would comply with the BRE Guidelines in the proposed Development scenario.
- 17.82. Four of the 18 living/kitchen/diners meet the BRE Guidelines of 2% ADF for rooms with a kitchen. Of the 14 that do not achieve 2% ADF, four see no alteration compared with the existing scenario, five see an alteration of 0.1% ADF, three see an alteration of 0.2% ADF and the final two living/kitchen/diners sees an alteration of 0.3% ADF.
- 17.83. 14 of the 35 bedrooms retain an ADF of 1% or greater and therefore comply with the BRE Guidelines. Ten of the bedrooms fall marginally short of BRE Guidelines with 0.8% of 0.9% in both the existing scenario and the proposed Development scenario. The levels of light within these rooms is commensurate with the urban location. Nine of the remaining bedrooms see no alteration from the future Baseline scenario and the final two bedrooms see an alteration of 0.1% ADF in the proposed Development scenario.
- 17.84. 12 of the 53 rooms (23%) meet the BRE Guidelines for NSL in the proposed Development scenario. Five of the 41 rooms retain an NSL in excess of 50% which is considered acceptable given the urban location. 28 would experience alterations of less than 20% which is not considered noticeable and the remaining eight are living/kitchen/diners look into the courtyard with a balcony overhead. These eight living/kitchen/diners see NSL levels between 22% and 37% in the proposed Development scenario, the NSL levels in the future Baseline were between 49% and 58%.
- 17.85. Owing to the courtyard nature and urban location of this development, it is not uncommon to experience lower levels of NSL, particularly in living/kitchen/diners.
- 17.86. Whilst the proposed Development leads to small alterations in ADF and NSL to this future residential property, the alterations will be consistent with those of the 2016 Consented Scheme; therefore, the levels of light would have been understood when permission was granted for this scheme.
- 17.87. Given the low magnitude of the majority of the alterations in ADF and NSL, the urban location of this consented scheme and the few significant alterations being largely attributed to the rooms having balconies overhead meaning that even modest increases in massing can result in a disproportionate percentage change in NSL, the overall effect of the proposed Development is considered **moderate adverse**.

30 Garrard Street

- 17.88. Detailed room layouts were obtained for this future receptor; therefore, this scheme has been assessed in terms of ADF and NSL.

- 17.89. A total of 49 rooms have been assessed within the 30 Garrard Street extension. This comprises 17 living/kitchen/diners and 31 bedrooms. 24 (49%) of the 49 rooms within this future property would comply with the BRE Guidelines in the proposed Development scenario.
- 17.90. One of the 17 living/kitchen/diners meet the BRE Guidelines of 2% ADF for rooms with a kitchen. Of the 16 that do not achieve 2% ADF, four see an alteration of 0.1% ADF, two see an alteration of 0.3% ADF and the remaining ten see an alteration of 0.4% ADF or greater.
- 17.91. 23 of the 31 bedrooms retain an ADF of 1% or greater and therefore comply with the BRE Guidelines. Three of the bedrooms fall marginally short of BRE Guidelines with 0.8% or 0.9% in the proposed Development scenario. The levels of light within these rooms is commensurate with the urban location. Three of the remaining bedrooms see an alteration of 0.1% ADF in the proposed Development scenario, one sees an alteration of 0.3% ADF and one sees an alteration of 0.4% ADF.
- 17.92. 24 of the 49 rooms (49%) meet the BRE Guidelines for NSL in the proposed Development scenario. 12 of the remaining 37 rooms retain an NSL in excess of 50% which is considered commensurate with the urban location.
- 17.93. Owing to the dense urban location of this development, it is not uncommon to experience lower levels of NSL, particularly in living/kitchen/diners.
- 17.94. Whilst the proposed Development leads to alterations in ADF and NSL to this future residential property, the alterations will be consistent with those of the 2016 Consented Scheme; therefore, the levels of light would have been understood when permission was granted for this scheme.
- 17.95. Owing to the ADF alterations experienced within a number of the living/kitchen/diners and this property's urban location, the overall effect of the proposed Development is considered **moderate adverse**.

Sunlight to Future Surrounding Properties

136-137 Friar Street

- 17.96. One window has been assessed within 136-137 Friar Street in terms of APSH. This window falls slightly short of the BRE Guidelines for annual APSH (with 22%), however it exceeds the BRE Guidelines for winter APSH (with 10%). No alteration is experienced between the existing and proposed scenarios. As such, the overall effect of the proposed Development upon this building is considered **negligible**.

30-31 Friar Street

- 17.97. A total of 133 windows have been assessed within 30-31 Friar Street in terms of annual and winter APSH. 77 (58%) of the 133 windows assessed are compliant with the BRE Guidelines in terms of annual and winter APSH in the proposed Development scenario.
- 17.98. 32 windows fall short of the BRE Guidelines for annual and winter APSH. Eight windows that fall short of the BRE Guidelines for annual APSH meet the BRE Guidelines for winter APSH whilst 16 windows that fall short of the BRE Guidelines for winter APSH meet the BRE Guidelines for annual APSH.

- 17.99. 25 of the windows retain an annual APSH of 15% or greater, given their westerly orientation and the density of the site, this is considered commensurate with the urban location.
- 17.100. Room uses for this property are unknown and therefore windows serving bedrooms have also been considered in this assessment.
- 17.101. Whilst the proposed Development leads to alterations in APSH to this future residential property, the alterations will be consistent with those of the 2016 Consented Scheme; therefore, the levels of light would have been understood when permission was granted for this scheme.
- 17.102. In consideration of the above, the overall effect of the proposed Development upon this building is considered **moderate adverse**.

52-55 Friar Street and 12 Greyfriars Road

- 17.103. A total of two living rooms have been assessed within 52-55 Friar Street and 12 Greyfriars Road in terms of APSH. Both living/kitchen/diners are compliant with BRE Guidelines for annual and winter APSH. Therefore, the overall effect of the proposed Development upon this building is considered **negligible**.

30 Garrard Street

- 17.104. A total of six living room windows have been assessed within the extension of 30 Garrard Street in terms of annual and winter APSH. Three (50%) of the six windows assessed are compliant with the BRE Guidelines for annual and winter APSH in the proposed Development scenario. All three windows that fall short of the BRE Guidelines for annual APSH meet the BRE Guidelines for winter APSH.
- 17.105. Whilst the proposed Development leads to alterations in APSH to this future residential property, the alterations will be commensurate with those of the 2016 Consented Scheme; therefore, the levels of light would have been understood when permission was granted for this scheme.
- 17.106. In consideration of the above, the overall effect of the proposed Development is considered **moderate adverse**.

Daylight within the Proposed Development

- 17.107. Detailed daylight assessments have been undertaken for the habitable rooms within Plots E and F. A standalone Internal Daylight, Sunlight and Overshadowing report accompanies the application and discusses the assessment results in more detail.
- 17.108. The detailed assessments have been undertaken in the cumulative scenario to assess the quantum of light should neighbouring consented schemes be implemented.
- 17.109. 886 rooms were assessed within Plot E in terms of ADF, NSL and Room Depth Criteria (RDC). 714 (81%) of the 886 habitable rooms within Plot E meet the BRE Guidelines in terms of ADF, whilst 442 (50%) meet the BRE Guidelines for NSL. All rooms have been designed in accordance with the RDC.

- 17.110. 384 rooms were assessed within Plot F in terms of ADF, NSL and RDC. 290 (76%) of the 384 habitable rooms within Plot F meet the BRE Guidelines in terms of ADF, whilst 203 (53%) meet the BRE Guidelines for NSL. All rooms have been designed in accordance with the RDC.

Sunlight within the Proposed Development

- 17.111. Detailed sunlight assessments have been undertaken for living rooms served by a window within 90 degrees of due south within Plots E and F. A standalone Internal Daylight, Sunlight and Overshadowing report accompanies the application and discusses the assessment results in more detail.
- 17.112. The cumulative assessment was undertaken to assess the quantum of light should neighbouring consented schemes be implemented.
- 17.113. 170 living rooms within Plot E have been assessed in terms of annual and winter APSH. 113 (67%) meet the BRE Guidelines for both annual and winter APSH. In addition, 12 meet the BRE Guidelines for annual APSH whilst falling short of the guidelines for winter APSH. A further three living rooms meet the BRE Guidelines in winter whilst falling short of the BRE Guidelines for annual APSH. 42 living rooms fall short of BRE Guidelines for both annual and winter APSH.
- 17.114. 106 living rooms within Plot F have been assessed in terms of annual and winter APSH. 77 (73%) meet the BRE Guidelines for both annual and winter APSH. In addition, three meet the BRE Guidelines for annual APSH whilst falling short of the BRE Guidelines for winter APSH. A further 17 living rooms meet the BRE Guidelines in winter whilst falling short of the annual APSH BRE Guidelines. Nine living rooms fall short of BRE Guidelines for both annual and winter APSH.

Overshadowing within the Proposed Development

- 17.115. Sun Hours on Ground (SHOG) assessments have been undertaken for all public and communal amenity areas within the proposed Development. A standalone Internal Daylight, Sunlight and Overshadowing report accompanies the application and discusses the assessment results for Plots E and F in more detail.
- 17.116. The proposed Central Square sees less than two hours of direct sunlight within its area on 21st March. This area remains unchanged from the levels of the proposed Development and those reported within the Chapter 16 of the 2015 ES.
- 17.117. Friar's Walk is compliant with the BRE Guidelines with 53% of its area seeing two or more hours of direct sunlight on 21st March. The assessment remains unchanged from the proposed Development Scenario.
- 17.118. Two of the three courtyard communal amenity areas of Plot E see less than two hours of direct sunlight on 21st March, whilst the third sees two or more hours for 4% of its area. Lower levels of sunlight within courtyard schemes is common and has been mitigated through the introduction of roof terraces to provide future occupant a well sunlit amenity area. The effects to all courtyard spaces remain unchanged from the levels of the proposed Development scenario.
- 17.119. The roof terraces of Plots E and F see 100% and 94% of their areas with two or more hours of direct sunlight on 21st March. These areas remain unchanged from the levels of the proposed Development.

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