STATION HILL NORTH

READING

ENVIRONMENTAL STATEMENT
VOLUME 1 - MAIN DOCUMENT

DECEMBER 2019

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Comments

Comments

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Glossary of Terms

A1 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for shops (For example hairdressers, travel and ticket agencies, post offices and showrooms).
A2 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for Financial services such as banks and building societies, professional services (other than health and medical services) and including estate and employment agencies. It does not include betting offices or pay day loan shops - these are now classed as “sui generis” uses.
A3 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for restaurants and cafés, i.e. places where the primary purpose is the sale and consumption of food and light refreshments on the premises.
A4 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for drinking establishments, i.e. public houses, wine bars, or other drinking establishments where the primary purpose is the sale and consumption of alcoholic drinks on the premises.
A5 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for hot food take-aways (for example premises where the primary purpose is the sale of hot food to take-away).
Above Ordnance Datum (AOD)	Land levels in the UK are measured relative to the average sea level at Newlyn in Cornwall. This average level is referred to as ‘Ordnance Datum’. Benchmarks, spot heights and contours on Ordnance Survey maps of the UK show heights above Ordnance Datum in metres.
Active Electric Car Changing Points	Active charging points are fully wired, ready to use charging facilities.
Aquifer	A below ground, water-bearing layer of soil or rock.
Archaeology	The scientific study of ancient or historic physical remains of human activity, both above and below ground.
B1 Class Use	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for Offices (other than financial and professional services providing for the visiting members of the public).
Baseline	Existing environmental conditions present on, or near a site, against which future changes may be measured or predicted.
C3 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for dwelling houses, whether or not as a sole or main residence, by a single person or people living together as a family, or by not more than six residents living together as a single household (including a household where care is provided for residents).
Cladding	A protective material that covers the surface of something.
Conservation Area	An area designated under Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance
Conservation (for heritage policy)	The process of maintaining and managing change to a heritage asset in a way that sustains and, where appropriate, enhances its significance.

Glossary of Terms

Contaminated Land	"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that a. significant harm is being caused or there is a significant possibility of such harm being caused; or b. pollution of controlled waters is being, or is likely to be caused;….." as defined by section 78A(2) Part IIA of the Environmental Protection Act 1990
Contamination	Contamination is the addition, or the result of addition, or presence of a material or materials to, or in, another substance to such a degree as to render it unfit for its intended purpose
Cumulative Effects	Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions
dB	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard.
dB(a)	The unit of noise measurement (measured on a logarithmic scale), which expresses the loudness in terms of decibel (dB) scale and the frequency factor (A).
Designated Heritage Asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Directive	European Commission (EC) Directives impose legal obligations on European Member States. They are binding as to the results to be achieved, but allow individual states the right to decide the form and methods used to achieve the results.
Dust	Fine particles of solid materials ranging in size from 1 to 75 um diameter (see British Standard 3405) capable of being re-suspended in air and settling only slowly under the influence of gravity where it may cause nuisance.
EIA Development	Development that falls under the Schedule 1 or 2 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 as requiring an EIA
Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.
Environmental Effect	The total effect of any operation on the surrounding environment.
Environmental Impact Assessment (EIA)	A technique for ensuring that the likely effects of new development on the environment are fully understood and taken into account before the development is allowed to go ahead. It provides a focus for public scrutiny of the project and enables the importance of the predicted effects, and the scope for modifying or mitigating them, to be properly evaluated by the decision-making authority.
2013 ES	The ES submitted in support of the 'SH3 Scheme'
2015 ES	This ES was a full update of the 2013 ES to support the application for the '2016 Consented Scheme' and includes a letter setting out the EIA implications of the design amendments.
2019 ES Addendum	An ES Addendum submitted in support of the '2019 Section 73 Applications' in March 2019.
Façade	Generally one side of the exterior of a building, especially the front, but also sometimes the sides and rear.
Footprint	Perimeter of building's ground floor plan.
Gross	The sum total, without deduction
Groundwater	Water associated with soil or rocks below the ground surface but is usually taken to mean water in the saturated zone

Glossary of Terms

Heritage Asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).
Historic Environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
Historic Environment Record	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
Impact significance	Opinions from a relevant planning authority at an initial stage as to what are the nature and potential scale of the environmental impacts arising from the proposed development, and assessing what further studies are required to establish their significance
In situ	In the natural, original or appropriate position
LA_{10}	The noise level exceeded for 10% of the measurement time
LA_{90}	The A weighted noise level exceeded for 90% of the specified measurement period, which following BS4142: 1990 is typically used to define background noise level
LAeq	The Equivalent Continuous A-weighted Sound Pressure Level. The sound pressure level of a steady sound that, over the same time as the measurement period, contains the same total acoustic energy as the sound field being measured. This takes into account the level and duration of noise events and is considered the indicator of the Ambient Noise Level
LA_{max}	The single highest noise level recorded during a measurement period
Listed Building	A building included in a statutory list produced by the Secretary of State for Culture, Media and Sport. It comprises buildings and other structures that are of special architectural or historic interest and are protected under the terms of the Planning (Listed Buildings and Conservation Areas) Act 1990
Mitigating factor	A matter to be taken into account as a benefit to offset any perceived or demonstrable harmful impact
Mitigation (measure)	The measures put forward to prevent, reduce and where possible, offset any adverse effects on the environment
Multiplier	Figure used to calculate the number of induced and indirect jobs created
Net	After all deductions have been made.
Non-Designated Heritage	Buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting consideration in planning decisions but which are not formally designated heritage assets.
Non-Technical Summary (NTS)	A summary of the Environmental Statement in non-technical language providing a concise, yet comprehensive summary of the likely effects of the project on the environment
Particulate matter	Discrete particles in ambient air, sizes ranging between nanometres (nm, billionths of a metre) to tens of micrometres (µm, millionths of a metre)
Passive Electric Car Charging Points	Passive electric car charging points provide the necessary infrastructure to enable future simple installation and activation of a charging point.
Pedestrian level wind speed	Mean or gust wind speed measured at 1.5m above ground level.
Permeability	The extent to which an environment allows a variety of access routes through it. A permeable environment is one where there is ease of movement and where people have a choice in the routes they may use.

Glossary of Terms

Pile	A timber, steel or concrete post that is driven, jacked or cast (bored) into the ground to carry vertical or horizontal loads.
PM_{10}	Particulate Matter with a mean aerodynamic diameter of 10µm.
(Sensitive) Receptor	A component of the natural, created or built environment such as human being, water, air, a building, or a plant that is affected by an impact.
Residual impacts	Those impacts of the development that cannot be mitigated following implementation of mitigation proposals.
Risk assessment	An assessment of the likelihood and severity of an occurrence.
Schedule 2 (development)	Development project types under the EIA Regulations where EIA is not mandatory in all cases but may be required, depending on the size, nature and scale of the development and the potential for significant environmental effects to arise.
Scheduled Monument	A Scheduled Monument is defined in the *Ancient Monuments and Archaeological Areas Act 1979* and the *National Heritage Act 1983* of the UK Government.
Scoping	An initial stage in determining the nature and potential scale of environmental impacts arising as a result of a development, and an assessment of what further studies are required to establish their significance.
Scoping Study	Preliminary study investigated the potential environmental impacts that could arise from the development, used to identify issues for further investigation in the EIA.
Setting	The context in which a building or area can be appreciated.
Setting of a Heritage Asset	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
Significance (for Heritage Policy)	The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.
Substation	An electrical unit transforming the voltage (power) of electricity from high to low (or the reverse) so as to provide electricity of a suitable strength for a particular use (e.g. domestic or industrial use).
Sustainable Development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.
The 2015 Consented Scheme	The Station Hill Outline Planning Permission 130436 (SH3 Scheme), and; Temporary Flexible Event Space within the north of the Site (Planning Application Reference: 130440/FUL) granted consent in January 2014.
The 2016 Consented Scheme	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 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).
The North Site	Areas to the north of Garrard Street comprising Phases 2 and 3, 1.66ha.
The 'Reserved Matters Applications'	The two RMA applications submitted in March 2019 which provide access, scale, layout, appearance and landscaping details for the proposed Plot E and Plot F buildings. (Refs. 190465 and 190466). Currently pending a decision from RBC.
The '2019 Section 73 Applications'	The two Section 73 applications (which propose minor material amendments to the Outline Planning Permissions for Plots E and F) referenced 190441 and 190442 submitted in March 2019. Currently pending a decision from RBC.
The Site	Includes both the north and south sections of the Station Hill Site. It is 2.56ha.

Glossary of Terms

The South Site	Phase 1 (Plots E and F), comprising land between Friar Street (south) and Garrard Street (north), bisected by Friars Walk 0.9ha
Threshold	The minimum value that will produce a response or specified effect.
Topography	The natural or artificial features, level and surface form of the ground surface.
Wind Comfort Criteria	The so called 'Lawson' criteria which define whether a space is comfortable for business walking, strolling or sitting by a threshold wind speed i.e. the hourly mean wind speed exceeded 5% of the time.

Abbreviations

ADF	Average Daylight Factor
ADMS	Atmospheric Dispersion Modelling System
AOD	Above Ordnance Datum
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
Bgl	Below Ground Level
BGS	British Geological Survey
BRE	Building Research Establishment
BREEAM	Building Research Establishment's Environmental Assessment Methodology
BS	British Standards
CABE	Commission for Architecture and the Built Environment
CDM	Construction Design Management
CMEP	Construction Environmental Management Plan
CO	Carbon Monoxide
CRoW	Countryside Rights of Way Act
CSM	Conceptual Site Model
dB	Decibels (SI unit of noise)
DEFRA	Department of Environment, Food and Rural Affairs
DPD	Development Plan Document
EDG	Employment Density Guidance
EH	English Heritage
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ES	Environmental Statement
FRA	Flood Risk Assessment
FTE	Full Time Employment
GEA	Gross External Area
GIA	Gross Internal Area
HAP	Habitat Action Plan
HER	Historic Environment Record
HGV	Heavy Good Vehicle
LAQM	Local Air Quality Management
LDF	Local Development Framework
LDF	Local Development Framework

Abbreviations

m	Metres
m/s	Metres per Second
NSC	No-Sky Contour
NEET	not in employment, education or training
NIA	Net Internal Area
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxide
NPPF	National Planning Policy Framework
NTS	Non Technical Summary
OD	Ordnance Datum
ODPM	Office of the Deputy Prime Minister
ONS	Office for National Statistics
OS	Ordnance Survey
NSR	Noise Sensitive Receptor
PERA	Preliminary Environmental Risk Assessment
PM_{10}	Particulate Matter with a mean aerodynamic diameter of 10μm
$PM_{2.5}$	Particulate Matter with a mean aerodynamic diameter of 2.5μm
PPE	Personal Protective Equipment
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
PPS	Planning Policy Statement
RBC	Reading Borough Council
RPE	Respiratory Protective Equipment
SAC	Special Conservation Area
SAP	Species Action Plan
SI	Site Investigation
SM	Scheduled monument
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TA	Transport Assessment
UDP	Unitary Development Plan
UDP	Unitary Development Plan
UXO	Unexploded Ordnance

Abbreviations

VSC	Vertical Sky Component
WCA	Wildlife and Countryside Act
µg/m3	Micrograms per Cubic Metre
µm	Micrometre

1. Introduction

1.1. This Environmental Statement has been prepared by Waterman Infrastructure & Environment Limited ('Waterman IE') to assess the environmental effects of a suite of planning applications submitted to Reading Borough Council by SH Reading Master LLP ('the Applicant') for the redevelopment of land to the south of Station Hill, Reading. The redevelopment comprises the demolition of all existing buildings and structures on the site and the construction of a commercial and residential led scheme with ancillary retail and leisure uses.

Scheme Background and Context

1.2. 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 Plots A - D) to the north of Garrard Street and two new primarily residential buildings (referred to as Plots E and F) to the south of Garrard Street. The existing NCP car park (Plot G) would be reconfigured and refurbished.

1.3. 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'.

1.4. 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:

- an application pursuant to section 73 of the Town and Country Planning Act 1990 to amend the 2015 Consented Scheme in order to remove Plot E as consented (planning reference 151427); and
- 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). The development was for demolition of the existing buildings and erection of new buildings / structures to provide residential units and a range of town centre uses including retail and related uses.

1.5. These two applications were granted planning consent in July 2016 and are together referred to as the '2016 Consented Scheme'.

1.6. Following acquisition of the SH3 Site from SDRL in 2018, the Applicant made changes to the 2016 Consented Scheme in respect of Plots E and F (referred to collectively as Phase 1 or the South Site) to respond to a series of design alterations. This was undertaken by way of applications pursuant to section 73 of the Town and Country Planning Act 1990 (hereafter referred to as 'the 2019 Section 73 Applications', planning application references 190441 and 190442). At the same time, reserved matters applications and applications for condition discharge were submitted for approval for Plots E and F (reserved matters application references 190465 and 190466).

1.7. These applications were submitted in March 2019 and Reading Borough Council resolved to grant planning permission in July 2019. The Applicant is currently finalising the Section 106 and the decision notice is expected to be issued in December 2019 (hereafter the South Site Consented Scheme).

1.8. The Applicant is now seeking to make amendments to the 2016 Consented Scheme for the area to the north of Garrard Street (known as the North Site). These amendments include the demolition

of the NCP car park and construction of a new office led building (referred to as Plot G) in its place. Plots A to D of the 2016 Consented Scheme would be reconfigured and would now accommodate primarily commercial and / or residential uses rather than just primarily commercial uses as proposed as part of the 2016 Consented Scheme.

1.9. Given the extent of the changes proposed to this area, the amendments are being sought by means of a new hybrid planning application. The planning application for Plot G, comprising an office building together with the surrounding podium and public realm (which is intended to be Phase 2 of the development), will be submitted in detail. The remaining part of the North Site together with a basement car park (which could also extend under Phase 2), is intended to form Phase 3 of the development and would be submitted in outline. Matters of appearance, landscaping, layout, scale and access will be reserved for the outline element of the application.

1.10. In addition, a non-material amendment application is being submitted for minor changes to Plots E and F (Phase 1) to resolve co-ordination details between the planning applications on the North Site and the planning applications on the South Site. This includes removal of the steps from the south side of Garrard Street as they will now be included within the application for the North Site.

1.11. The North and South Sites are hereafter collectively referred to as the Site, with the suite of planning applications pertaining to the North Site together with the existing South Site Consented Scheme, referred to collectively as the Proposed Development. A plan showing the location of the Site is presented as **Figure 1.1**. A plan showing the boundaries of the North and South Sites and the three phases of the Proposed Development is included as **Figure 1.2**.

Environmental Impact Assessment

1.12. Environmental Impact Assessment (EIA) is a formal process of identifying, predicting, evaluating and mitigating the likely significant environmental effects arising from a project. It is a requirement of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017[1], as amended[2] (the 'EIA Regulations') for developments of a certain size and scale. EIA is an iterative process, allowing for the evolution of the most practicable environmentally sustainable design and ensures that, if deemed necessary, measures are considered and implemented at the design stage, where feasible, to prevent, reduce and where possible, offset potentially adverse significant environmental effects. The EIA process also aims to ensure that beneficial effects of redevelopment are maximised.

1.13. The EIA process ensures that decision makers consider the likely environmental effects of new development when determining a planning application. Where an EIA is required, all relevant assessment information must be provided by the Applicant in a document referred to as an Environmental Statement (ES). The ES must accompany the submission of the subject planning application.

EIA History

1.14. In 2013, an EIA was undertaken of the SH3 Scheme and an ES prepared to accompany the outline 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'.

1.15. 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'.

1.16. Due to the amendments to the South Site made in 2019, an ES Addendum was prepared to consider the implications of the amendments on the findings of the 2015 ES. The ES Addendum was submitted with the 2019 Section 73 Applications (planning references: 190441 / 190442).

This EIA

1.17. The EIA reported in this ES has been undertaken for the whole of the Proposed Development (Phases 1, 2 and 3) as shown in **Figure 1.2**. Whilst the ES will be submitted as part of the planning applications pertaining to the North Site only, the South Site is still considered to form part of the overall Station Hill Development, and therefore, the EIA has considered the effects of the entire Station Hill Development (the Proposed Development). This ES is therefore a full update of all previous ESs.

1.18. A plan showing the boundary of the area considered by the EIA (the Site) is shown in **Figure 1.2**.

Format of the Environmental Statement

1.19. The ES is divided into three volumes, comprising the main text of the ES, a set of figures and a series of appendices. A Non-Technical Summary (NTS) of the ES is also provided as a standalone document. The content of these volumes is described below.

Volume 1: Environmental Statement - Main Document

1.20. This volume is the main document of the ES and describes the approach to the EIA, the Proposed Development as assessed by the EIA and the technical chapters detailing the assessments undertaken as part of the EIA.

Volume 2: Environmental Statement - Figures

1.21. This volume provides a set of figures and illustrations in support of the main text of the ES presented in **Volume 1: Main Document**. This volume includes a set of plans of the Proposed Development on which the EIA has been based.

Volume 3: Environmental Statement - Appendices

1.22. A number of appendices are presented and are provided in a separate volume to supplement the main ES text. The appendices are numbered according to the number of the corresponding chapter in **Volume 1: Main Document**.

Environmental Statement - Non-Technical Summary

1.23. This comprises a summary of the ES in 'non-technical language' as required under the EIA Regulations. Its objective is to provide a concise and balanced summary of the ES without excessive technical detail or scientific language so as to be readily understood by consultees and members of the public not familiar with EIA terminology. The Non-Technical Summary (NTS) is produced as a separate document to facilitate wider public distribution.

Project Team

1.24. The ES has been compiled by Waterman IE, in conjunction with the Applicant and a team of specialist consultants. These consultants are outlined 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
SH Reading Master LLP	Applicant
Cast Real Estate and Construction Consultancy	Development Project Managers and Construction Consultant
CRTKL	Masterplanner and Architect of Phase 1 and Phase 3
Cityscape	Visualisations
DP9	Planning consultants
Gensler	Architect of Phase 2
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 and technical assessors in relation to air quality, noise and vibration, ecology, heritage, land quality, flood risk and townscape and visual effects.

Competent Experts

1.25. Regulation 18(5) of the EIA Regulations states that:

In order to ensure the completeness and quality of the environmental statement:

a) The developer must ensure that the environmental statement is prepared by competent experts; and

b) The environmental statement must be accompanied by a statement from the developer outlining the relevant expertise and qualifications of such experts.

1.26. In accordance with 2017 EIA Regulations Part 5(18)(5), SH Reading Master LLP confirms that this ES has been prepared by assessors 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 1.1**.

ES Availability and Comments

1.27. This ES has been prepared for consultation alongside the hybrid planning application. Copies of the Non-Technical Summary of this ES 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

1.28. 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

References

[1] HMSO, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations

[2] HMSO, 2018. The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018

2. Methodology

Introduction

2.1. This chapter sets out the general approach to, and methodology for undertaking the EIA. The chapter describes the legislative framework within which the EIA has been undertaken and identifies key guidance. The EIA scoping process is also described, together with a description of the general methodology applied to assess the likely significant environmental effects. The chapter also sets out the structure of the assessment chapters which form this ES. More specific methodologies are described within the technical chapters (**chapters 7 to 14** inclusive).

General Approach

2.2. This ES has been prepared to comply with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017[1], as amended[2] (the 'EIA Regulations') which implement the European Council Directive No. 2014/52/EU[3]. Reference has also been made to currently available EIA good practice guidance, including Good Practice Guidance from the Institute of Environmental Management and Assessment (IEMA)[4], the UK Government Guidance on Environmental Impact Assessment[5] (updated March 2019) and topic specific guidance, detailed where appropriate in the relevant technical chapters.

2.3. Paragraph 18 of the 2017 Regulations sets out the requirements of an ES for the purposes of the EIA Regulations. Schedule 4 details the information for inclusion in ES. 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.**

2.4. The EIA has considered the likely significant environmental effects of the Proposed Development, utilising current knowledge of the Site and the surrounding environment.

2.5. Based on the findings of the studies undertaken as part of the EIA, methods of avoiding, reducing, or offsetting likely significant adverse effects (collectively known as 'mitigation measures') have been identified. Such mitigation measures are set out in each relevant technical chapter of this ES. Measures to enhance the environmental effects of the Proposed Development have also been identified, where appropriate.

2.6. In line with best practice guidance, a scoping study was undertaken at the start of the assessment process to identify the key environmental issues to be addressed in the ES. This was submitted in request of a Scoping Opinion from Reading Borough Council (RBC). Further details of this study and RBC's Scoping Opinion are provided later in this chapter.

2.7. Detailed technical studies have been on-going throughout the design process, providing information about environmental issues and constraints that may affect the Proposed Development. In addition, reference has been made to studies undertaken to support previous planning applications at the Site. The Applicant and the design team have therefore taken these environmental issues and constraints into account during the design evolution and sought to 'design out' potentially adverse effects where possible. Further details are provided in **Chapter 4: Alternatives**.

2.8. The EIA has considered both likely significant beneficial and adverse effects of the Proposed Development during the demolition and construction works and once the Proposed Development is complete and occupied. In line with legislative and best practice requirements, direct, indirect, cumulative, short-term, medium-term, long-term, permanent, beneficial and adverse effects have been addressed where applicable. The approach taken in the assessment of cumulative effects is set out within **Chapter 15: Cumulative Effects**.

Approach to Assessment of the Planning Applications

2.9. As described in **Chapter 1: Introduction**, a hybrid planning application is being submitted for the North Site at Station Hill. Plot G, comprising a commercial building together with the surrounding podium and public realm (which is intended to be Phase 2 of the Proposed Development) is being submitted in detail. The remaining part of the North Site and a basement car park, (which could extend under Phase 2) is intended to form Phase 3 of the Proposed Development, and would be submitted in outline. Matters of appearance, landscaping, layout, scale and access will be reserved for the outline element of the application.

2.10. Phase 1 has already been granted planning consent and reserved matters details have been submitted for this phase of the Proposed Development.

Approach to Assessment of Detailed Application

2.11. The assessment of the phases of the Proposed Development which have been or will be submitted in detail (Phases 1 and 2) is based on a set of planning application drawings which set out the footprint and height of the proposed buildings, the internal arrangement of the buildings at each level, the façade details and landscaping design.

Approach to Assessment of Outline Application

2.12. For the outline element of the Proposed Development (Phase 3), Regulation 3 of the EIA Regulations prohibits local planning authorities (LPAs) from granting planning permission without having first taken the environmental information into consideration. In accordance with the minimum requirements of the Town and Country Planning (Development Management Procedure) (England) Order 2015 (DMPO)[6], and to provide sufficient information such that the likely significant effects of the Proposed Development can be identified whilst providing the Applicant with sufficient flexibility to enable a high quality and viable redevelopment, a series of 'parameters' were defined for this phase of the Proposed Development. These parameters are set out on Parameter Plans, with additional commitments set out in a written Development Specification and Design Code.

2.13. The Development Specification defines and describes the principal components of the hybrid planning application, including the form and content of the planning application as well as the parameters which future reserved matters applications must comply with in respect of the outline elements. Compliance with the Development Specification would be secured by means of a suitably worded planning condition.

2.14. The Design Code sets out supplementary information on the design and appearance of the outline elements of the Proposed Development including materials and texture. The Design Code is anticipated to be secured by planning condition or obligation.

2.15. The Parameter Plans together with the Development Specification and Design Code have therefore formed the basis of the EIA reported within this ES for the outline element of the planning application.

2.16. The majority of the technical assessments in this ES have assessed the 'maximum' parameters of the built form for the outline elements of the Proposed Development, as these typically represent the 'worst case' scale and magnitude of effects. Where this is not the case, such as for the assessment of employment effects, the assessment of effects also considers 'minimum' parameters in order to represent the 'worst case scenario'.

2.17. In addition, in the case of the wind assessment, the maximum parameters may not represent the worst case scenario because wind may blow within and around the pedestrian walkways proposed

between the buildings, for example, which are not defined by the maximum parameters. This is because, whilst the minimum width of the pedestrian walkways between the buildings is defined on Parameter Plans, there is flexibility in the location and maximum extent of these gaps. This flexibility may impact on the wind conditions on and surrounding the Site. As a result, the wind assessment has assessed three possible Development Options in addition to the maximum parameters. These Development Options represent three possible ways in which the elements of the Proposed Development submitted in outline, could be brought forward. These Development Options are described further in **Chapter 5: Description of the Proposed Development**.

2.18. A list of the plans on which this EIA has been based and a full description of the Proposed Development is provided in **Chapter 5: Description of the Proposed Development**.

Baseline and Future Baseline

2.19. It is recognised that, as part of a vibrant city, the baseline conditions both on and surrounding the Site are constantly evolving. However, for the purposes of the EIA, it is necessary to determine the baseline conditions against which the Proposed Development will be assessed. For the purposes of the EIA, these baseline conditions as set out in the EIA Scoping Report of May 2019 are defined as follows:

- The Site as existing in April 2019 comprising Telecom House, Friars Walk Shopping Centre and Xafinity House which are vacant, together with the NCP car park and the Temporary Events Space which are both currently in use. The existing undeveloped land behind construction hoardings within the central northern area of the Site is also to be considered as part of the existing baseline;
- The existing surrounding baseline conditions with the exception of the following scheme which has consent and is in the process of being implemented:
  - Former Coopers BMW site, Napier Road / Kings Meadow Road Reading RG1 8BN (planning reference 162166) – construction of a part 12 storey, part 23 storey building comprising 315 residential units, located approximately 310m north-east of the Site. This scheme is assumed to be completed as part of the baseline scenario.

2.20. For the air quality and noise assessments, the baseline year is the same as the last full year of air quality monitoring data (2018) to allow comparison with monitoring data.

Development Scenarios

2.21. The Proposed Development will be undertaken in phases. As there may be a pause in the implementation of the Proposed Development following completion of Phase 2 and prior to construction of Phase 3, the EIA considers the effects of an 'Interim Development Scenario' comprising Phases 1 and 2 of the Proposed Development as well as a Completed Development Scenario with all three Phases complete.

2.22. In summary, the following scenarios have been assessed as part of the EIA:

- The Baseline Scenario;
- An Interim Development Scenario comprising Phases 1 and 2 of the Proposed Development. Xafinity House is assumed to have been demolished in this scenario as it is proposed to demolish this building either during or immediately following completion of Phase 2;
- A Completed Development Scenario comprising Phases 1, 2 and 3. As described above, the Wind assessment also considers three possible Development Options for Phase 3; and

- A Cumulative Scenario comprising the Completed Development plus cumulative schemes (as described in **Chapter 15**).

Comparison with the 2016 Consented Scheme

2.23. In order to enable RBC, Statutory Consultees and other interested parties to identify differences between the effects of the Proposed Development and those of the 2016 Consented Scheme as amended by the 2019 Section 73 Applications, a comparison of effects is provided within each technical Chapter of the ES. These comparisons are either qualitative or a quantitative depending upon the technical study, and compare the effects reported in the 2015 ES, as updated via the 2019 ES Addendum, with those reported in this ES. The 2019 ES Addendum included updated assessments in relation to Socio Economics, Townscape and Visual, Daylight, Sunlight & Overshadowing and Wind only and therefore these chapters have compared the effects with those of the 2015 ES as amended by the 2019 ES Addendum. The remaining technical chapters have referred to the assessments included in the 2015 ES as these were the latest assessments undertaken.

Scoping the EIA

2.24. 'Scoping' is an important component of the EIA process, and involves focusing the study (and hence the ES) on those issues of greatest potential significance. It is also important in identifying all of the potentially significant effects of the Proposed Development during demolition and construction works and once the Proposed Development is complete, to ensure that appropriate mitigation options are considered.

2.25. A scoping study was undertaken by Waterman IE, informed by inputs from the relevant technical specialists, in relation to the Proposed Development. Based on this study, an EIA Scoping Report was prepared and submitted to RBC in May 2019 together with a request for a formal Scoping Opinion on the issues to be included within the ES in accordance with Regulation 15 of the EIA Regulations.

2.26. The Scoping Report set out the overall approach to the EIA and identified the likely significant environmental effects that may arise from the Proposed Development. The proposed scope of the assessments was guided by the outcomes of the EIA undertaken of the 2016 Consented Scheme. The Scoping Report is included as **Technical Appendix 2.2**.

2.27. A Scoping Opinion was received from RBC on 24 July 2019 and is included as **Technical Appendix 2.3**. Following consultation with statutory consultees, the Scoping Report and Scoping Opinion confirmed that the following key environmental issues should be addressed as part of the EIA:

- Socio-Economics and Health (Chapter 7);
- Townscape and Visual Impact (Chapter 8);
- Historic Environment (Chapter 9);
- Air Quality (Chapter 10);
- Noise and Vibration (Chapter 11);
- Ground Conditions and Contamination (Chapter 12);
- Wind (Chapter 13);
- Daylight, Sunlight and Overshadowing (Chapter 14); and
- Cumulative Effects (Chapter 15).

2.28. As described in the Scoping Report, and summarised below, Greenhouse Gases and Climate Change are signposted in the ES. Ecology, Flood Risk and Transport, which were previously included as technical chapters within the 2015 ES, have been scoped out of further consideration as part of this EIA because the studies included in the 2015 ES, or undertaken subsequently, identified that there would be no significant impacts on these topic areas. To support these findings, a series of technical reports have been prepared and are appended to this ES. These reports are as follows:

- Preliminary Ecology Appraisal (PEA), dated October 2018 – included within **Technical Appendix 2.2** (as Appendix B);
- Bat Survey Report, dated 2018 – included within **Technical Appendix 2.2** (as Appendix C);
- Black Redstart Survey, dated 2019 – included as **Technical Appendix 2.4**;
- Ecology Briefing Note (to cover an additional area of the Site not covered by the 2018 PEA), dated October 2019 – included as **Technical Appendix 2.5**;
- Flood Risk Assessment incorporating a Drainage Strategy – included as **Technical Appendix 2.6**.

2.29. A Transport Assessment and Framework Travel Plan have been included within the suite of documents submitted as part of the hybrid planning application. In addition, the transport consultants (Peter Brett Associates, part of Stantec) have provided traffic data for use in the Noise and Air Quality Assessments.

2.30. Table 2.1 summarises the key environmental issues that were identified within the Scoping Opinion and indicates how these issues have been addressed within the ES.

Table 2.1: Key Issues Raised in the Scoping Opinion of July 2019

Topic	Key Issues Raised in the Scoping Response	Response
Socio-economics and Health	The socio-economic effects of the increase in residential floorspace and the reduction in Class B1 floorspace should be addressed. The impacts of different options or permutations under the proposed Outline should be included. Impacts should be assessed in terms of their impact on the Borough as a whole.	Addressed in ES Chapter 7: Socio-Economics.
Townscape and Visual	It would be advisable to confirm that proposed "View 6 Junction of Mount Pleasant and Southampton Street" is equivalent to Draft Policy EN5 "2. View northwards down Southampton St from Whitley St towards St Giles Church, St Mary's Church and Greyfriars Church"; or to adjust accordingly.	VP6 has been adjusted to represent Draft Policy EN5 2. Refer to ES Chapter 8: Townscape and Visual Impact Assessment

Topic	Key Issues Raised in the Scoping Response	Response
Historic Environment	Section (5.7) on the 'Historic Environment' sets out a brief archaeological background to the application area, noting previous archaeological investigations within the redline boundary, including a recent archaeological watching brief on ground investigations within the south part of the site. The report notes that this work has identified '*archaeological finds dating to the prehistoric period, although detailed analysis of found features has not yet been completed*'. The ES assessment should draw together the results of all these investigations to provide an overview of the archaeological potential of areas of the site. This overview is likely to need to be tested by exploratory archaeological trial trenching, which will become possible now that the existing structures between Garrard Street and Friar Street are being demolished. As per Berkshire Archaeology advice.	ES Chapter 9: Historic Environment considers all archaeological investigations undertaken to date. Ongoing liaison is being undertaken with Berkshire Archaeology regarding post demolition archaeological evaluation.
Transport & Access / Public Health	The role of walking and cycling in terms of public health, air quality and sustainable transport should be included. Including opportunities for improvement.	Walking and cycling is discussed in Chapter 4: Alternatives, Chapter 5: Development Description and the Health Impact Assessment included as Technical Appendix 7.1. In addition, a separate standalone Transport Assessment and Site Wide Framework Travel Plan have been prepared which also address these issues.
Air Quality	An air quality assessment and/or mitigation measures should be provided as part of the application. Reading Borough Council's Air Quality Policy DM19 requires that developments have regard to the need to improve air quality and reduce the effects of poor air quality through design, mitigation. The existing NCP car park is being demolished and a large number of new car parking spaces are being proposed – presumably for residents and officer users. Therefore, there will be a significant net increase in parking as the previous users of the NCP car park will be displaced elsewhere in the town centre. An assessment and/or mitigation measures should be provided as part of the application. A scheme should be submitted which specifies the provisions to be made for the control of noise and dust emanating from the site during the demolition and construction phase There should be no burning of waste on the site.	Refer to ES Chapter 10: Air Quality and the separate Transport Assessment and Framework Travel Plan.

Topic	Key Issues Raised in the Scoping Response	Response
Odour	The Environmental Health Officer responded to the scoping report and requested an assessment of the likelihood of odours based on the proposed cuisine and a statement of how the proposals will ensure that odour nuisance will be prevented. Reference must be made to the Defra Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (January 2005) – or updated version.	As details of the future occupants of the retail uses are not currently known, it is anticipated that a planning condition would be applied to any future planning consent requiring '*Provision of appropriate ventilation/ extraction to ensure that no nuisance, disturbance or loss of amenity is caused by odour or fumes to nearby properties as a result of the commercial kitchen, as set out in the Defra Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (January 2005).*'
Noise and Vibration	A noise assessment should be undertaken using the recommendations for internal noise levels within dwellings and external noise levels within gardens / balconies in accordance with BS 8233:2014 and WHO guidelines for Community Noise. To minimise the disturbance by noise of future residential occupiers of the flats and its effect on neighbouring residents, residential accommodation must be designed and constructed or converted so as to achieve the insulation requirements set out in Building Regulations Approved Document E. Information on proposed servicing locations and timings should be submitted including the potential for noise disturbance due to deliveries and waste collections from the commercial units on occupants of nearby residential properties. Applications which include noise generating plant when there are nearby noise sensitive receptors should be accompanied by an acoustic assessment carried out in accordance with BS4142:2014 methodology. A scheme should be submitted which specifies the provisions to be made for the control of noise and dust emanating from the site during the demolition and construction phase	Refer to ES Chapter 11: Noise and Vibration and associated technical appendices
Ground Conditions and Contamination	Ideally a 'phase 1' desk study should be submitted with applications for developments on sites with potentially contamination to give an indication as to the likely risks and to determine whether further investigation is necessary.	Refer to ES Chapter 12: Ground Conditions and Contamination and associated technical appendices.

Topic	Key Issues Raised in the Scoping Response	Response
Ecology	The submitted Scoping Report states that an updated Preliminary Ecological Appraisal was carried out in 2018. It also states that the development site will be subject to "*further surveys for this species [black redstarts] would be carried out between April and July 2019 to confirm if birds are on Site and how they are utilising it.*" This will be adequate to assess the likely ecological impact of the proposals and the survey reports should be submitted in the ES with the application.	Refer to **Technical Appendix 2.4**: Black Restart Survey. Ecological enhancement would be agreed as part of a future Ecological Management Plan which is anticipated to be required by condition on any future planning consent.
Climate Change	The energy strategy is subject to ongoing detailed pre-application discussions. The detailed approach will need to be set out in the ES once this has been clarified. A detailed assessment will also be required at planning application stage. A decentralised approach to energy is expected.	The energy strategy options are described in ES Chapter 4: Alternatives and the final strategy described in ES Chapter 5: Description of the Proposed Development. A standalone Energy Strategy has been submitted as part of the suite of planning application documents.
Wind	Detailed assessment of the actual building design where known will be required, and 'worst-case' impacts based on proposed parameters for the Outline element will be required. Specialist advice and third-party verification will be required.	The wind assessment considers the detailed building design for Plots E, F and G as these are known, and the maximum parameters for Plots A to D which are in outline. The wind assessment also tests three possible building layouts (referred to as Development Options) within the maximum parameters given that wind conditions can be sensitive to different building layouts. Refer to ES Chapter 13: Wind. Further testing would be undertaken at the reserved matters stage in relation to Plots A, B, C and D.
Daylight, Sunlight and Overshadowing (DSO)	Detailed assessment of the actual building design where known will be required, and 'worst-case' impacts based on proposed parameters for the Outline element will be required. Specialist advice and third-party verification will be required.	The assessment considers the detailed building design for Plots E, F and G as these are known, and the maximum parameters for Plots A to D which are in outline. Refer to ES Chapter 14: Daylight, Sunlight and Overshadowing. Further testing would be undertaken in relation to Plots A, B, C and D at the reserved matters stage. Separately from the ES, an internal DSO assessment considers different possible building layouts within the maximum parameters to provide some design guidelines in relation to daylight / sunlight conditions for future on-Site occupiers.

Topic	Key Issues Raised in the Scoping Response	Response
Cumulative	In addition to the list of cumulative schemes in Table 17.1 you are advised to include: • Permission 162166 Former Coopers BMW site, Napier Road – should be included due to the height of the approved building (currently under construction). • Permission 162087, 120 Kings Road (completed).	The former Coopers BMW site, Napier Road / Kings Meadow Road Reading RG1 8BN (Planning reference: 162166) has been considered as a future baseline scheme rather than a cumulative scheme. This is because it is currently under construction and is therefore likely to be in existence by the time Phase 1 and Phase 2 are constructed. As 120 Kings Road (ref 162087) is completed it forms part of the existing baseline rather than being a cumulative scheme.

Signposting of Greenhouse Gases and Climate Change in the ES

2.31. Greenhouse Gases and Climate Change substantially overlap with other proposed ES chapters and documents to be submitted in support of the planning application. As a result, it was agreed with RBC that this environmental topic would not have its own chapter but would rather be considered within **Chapter 4: Alternatives** and **Chapter 5: Development Description** of the ES as well as being discussed in further detail in the standalone Energy Strategies submitted in support of the planning applications. This enables a comparison to be made of the carbon emissions from various energy supply options to be considered and provides an explanation for the strategy chosen.

Evaluation of Significance

2.32. The EIA process aims to focus attention on the topics which are likely to give rise to significant effects on the environment. The purpose of the EIA is to identify and mitigate the likely significant adverse effects of a project.

2.33. Environmental effects have been predicted with reference to definitive standards and legislation, where available. Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on available knowledge and professional judgement. Where uncertainty exists, this has been noted in the relevant assessment chapter.

2.34. The significance of predicted effects has been determined with reference to assessment criteria for each environmental topic considered. These criteria apply a common EIA approach of classifying effects according to whether they are of substantial, moderate or minor significance, as well as identifying whether the effects are adverse, negligible or beneficial.

2.35. Specific criteria for each environmental topic have been developed, giving due regard to the following:

- Extent and magnitude of the effect;
- Duration of the effect (whether short, medium or long term);
- Nature of the effect (whether direct or indirect, reversible or irreversible);
- Whether the effect occurs in isolation, is cumulative or interactive;
- Performance against environmental quality standards or other relevant pollution control thresholds;

- Sensitivity of the receptor; and
- Compatibility with environmental policies.

2.36. For issues where definitive quality standards do not exist, significance has been based on the:

- Local, district, regional or national scale of value of the resource and/or receptor affected;
- Number of receptors affected;
- Sensitivity of those receptors; and
- Duration of the effect.

2.37. In order to provide a consistent approach to expressing the outcomes of the various studies undertaken as part of the EIA, and thereby enable comparison between effects upon different environmental resources or receptors, consistent terminology has been used throughout the ES. Effects have been expressed as:

- **Adverse:** Detrimental or negative effect to an environmental resource or receptor;
- **Negligible:** No significant effect to an environmental resource or receptor; and
- **Beneficial:** Advantageous or positive effect to an environmental resource or receptor.

2.38. Where adverse or beneficial effects have been identified, these have generally been assessed against the following scale:

- **Minor:** Slight, limited duration and frequency or highly localised effect/ limited numbers of receptors affected;
- **Moderate:** Limited effect (by extent, duration or magnitude) which may be considered significant; and
- **Major:** Considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

2.39. Each of the technical chapters provides the specific criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this has been based upon quantitative and accepted criteria for example, the air quality standards contained in the National Air Quality Strategy (NAQS) or noise assessment guidelines set out by the National Planning Policy Framework (NPPF) and World Health Organisation (WHO) guidelines, together with the use of value judgements and expert interpretations to establish to what extent an effect is environmentally significant.

2.40. In the context of the Proposed Development, the following definitions have been applied:

- Short term / temporary effects - those that last less than 7 years and therefore primarily comprise those associated with demolition and construction;
- Medium term effects – those that last 5 years after completion of construction;
- Long-term / permanent effects - those lasting more than 5 years after completion of construction;
- Local effects - those affecting receptors within and in proximity to the Site;
- District level effects – those affecting receptors within the wider Reading Borough boundary;
- Sub-regional effects - those affecting adjacent boroughs;
- Regional effects – those affecting the south-east of England;
- National effects - effects upon different parts of the country, or England as a whole;

- International effects - effects across national boundaries.

2.41. No National or International effects have been identified within this ES.

Other Developments and Cumulative Effects

2.42. Effects that result from incremental changes caused by other, present or reasonably foreseeable schemes together with the Proposed Development are known as cumulative effects. The EIA therefore takes account of the Proposed Development together with other developments in the area.

2.43. Cumulative effects can also arise when multiple effects from one development collectively affect the same receptor or group of receptors.

2.44. The assessment of cumulative effects deals with two types of effects:

- **Type 1 Effects:** The combination of individual effects, for example noise and dust, from the Proposed Development on a particular receptor; and
- **Type 2 Effects:** Effects from several developments (i.e. the Proposed Development and one or more of the reasonably foreseeable schemes identified within the vicinity), which individually might be insignificant, but when considered together could result in a significant cumulative effect.

2.45. Both types of effects are considered within **Chapter 15: Cumulative Effects**. Type 1 effects have been assessed using the findings of all technical assessment included within this ES and professional judgement. The developments considered as part of the Type 2 effects were agreed with RBC as part of the Scoping process and these developments were included in the technical assessments where appropriate. Further details pertaining to the Cumulative schemes and the results of the cumulative assessment are presented in **Chapter 15: Cumulative Effects**.

Structure of Technical Chapters

2.46. Through the EIA process, the likely significant environmental effects of the Proposed Development have been assessed. Each environmental issue has been assigned a separate chapter in the ES (**Chapters 7 – 14**), and within each of these chapters the assessment has been structured in the following way:

Introduction

2.47. The Introduction provides a brief summary of what issues are considered in the chapter, states the author and highlights relevant appendices which accompany the chapter.

Assessment Methodology and Significance Criteria

2.48. The methods used in undertaking the technical study, together with an explanation of the approach to defining the significance of likely environmental effects are outlined in this section, with reference to published standards, guidelines, best practice and relevant significance criteria. The limitations and / or uncertainties applicable to the technical assessment are also defined in this section of each chapter.

2.49. In addition, where relevant this section of each chapter describes the basis of the assessment of the outline planning application with reference to the use of minimum and maximum parameters.

Baseline Conditions

2.50. In order to assess the effects of the Proposed Development, it is necessary to determine the environmental conditions that exist on the Site, in the absence of development. These are known as baseline conditions. For the purposes of this ES, the baseline conditions have been agreed with RBC as stated earlier in this chapter (refer to 'Baseline and Future Baseline' section).

2.51. A summary of the baseline conditions relevant to each assessment is provided within each technical chapter.

Potential Effects

2.52. This section identifies the likely significant effects of the Proposed Development and considers the effects of demolition and construction, the Interim Development Scenario, and the Completed Development Scenario.

Mitigation

2.53. One of the main aims of the EIA is to develop mitigation measures to prevent, reduce and where possible, offset any significant adverse effects of a development. An iterative approach has been adopted towards the design of the Proposed Development, which has evolved alongside the EIA process. This has enabled many mitigation measures to be effectively designed into the Proposed Development, thereby reducing the need for further mitigation. Mitigation measures can relate to design, construction or the activities associated with the completed Proposed Development. Examples include:

- **Design:** Inherent mitigation such as the position or orientation of buildings within the Site. These have been incorporated into the Proposed Development as it has evolved and are therefore described in **Chapter 4: Alternatives**;
- **Construction:** Commitment to undertake the construction works in a specific way, for example the use of particular plant, phasing of the works, regular monitoring and implementation of a Construction Environmental Management Plan (CEMP); and
- **Completed Development:** Inclusion of specific features such as water, waste and energy efficient design of buildings.

2.54. Where significant adverse environmental effects have been identified, the Applicant has committed to implement the mitigation measures as set out in the relevant technical chapter. For those elements of the Proposed Development submitted in outline form, many of the mitigation measures would need to be incorporated into the detailed design.

Residual Effects

2.55. This section summarises the residual effects of the Proposed Development assuming implementation of the proposed mitigation measures. It includes an assessment of the significance of those effects in accordance with the criteria set out in the earlier sections of the technical chapter.

Summary and Conclusions

This section provides a brief summary of the chapter findings and includes a comparison of the effects of the Proposed Development with those described in the 2015 ES as amended by the 2019 ES Addendum.

Assumptions and Limitations

2.56. The principal assumptions that have been made, and any limitations that have been identified in undertaking the EIA, are set out below. Assumptions specifically relevant to each topic have been set out in each chapter:

- The assessments contained within each of the technical chapters for the outline elements of the scheme are based upon the Parameter Plans, Development Specification and Design Code submitted as part of the planning application;
- The assessments of demolition and construction effects are based upon the indicative demolition and construction timetable, phasing and methodologies as provided by the project team and agreed by the Applicant (refer to **Chapter 6: Development Programme Demolition and Construction**);
- Baseline conditions have been established from a variety of sources, including Site surveys and historical data, but due to the dynamic nature of certain aspects of the environment, conditions may change during the construction and operation of the Proposed Development;
- Future baseline conditions surrounding the Site assume that the consented future baseline scheme currently under construction would be constructed in accordance with the relevant planning consents, and be completed and operational prior to or at the same time as that of the Proposed Development;
- All of the principal existing land uses adjoining the Site remain substantially unaltered, with the exception of the future baseline and cumulative schemes as described above and in the Cumulative Effects chapter;
- Information received from third parties is accurate, complete and up to date;
- The design, construction and operation of the completed Proposed Development will satisfy environmental standards consistent with contemporary legislation, practice and knowledge as a minimum;
- A Construction Environmental Management Plan (CEMP) will be discussed and agreed with RBC after the planning application is determined, to control subsequent construction activities. This CEMP will be enforced and monitored during all key stages of the works. The key elements of the CEMP are set out in **Chapter 6: Development Programme Demolition and Construction**;
- For the purposes of the Interim Development Scenario, it has been assumed that Xafinity House would be demolished during or immediately after construction of Phase 2 and therefore this is not included in the assessments of the Interim Development Scenario. This is in order to ensure assessment of the worst case as it is likely that this building represents a slight barrier to wind flows across the Site; and
- For the purposes of the ES, the Interim Development Scenario is assumed to be complete by 2022 and the Completed Development Scenario is assumed to be complete by 2026.

References

[1] HMSO, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations

[2] HMSO, 2018. The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018

[3] HMSO, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations

[4] Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment Guide to Delivering Quality Development

[5] Ministry of Housing, Communities & Local Government, Guidance, Environmental Impact Assessment (Explains requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Updated March 2019

[6] OPSI ,2015, Town and Country Planning (Development Management Procedure) (England) Order 2015. Statutory Instrument 2015 No.595.

3. Land Uses and Sensitive Receptors

Introduction

3.1. This chapter provides a summary of the historical, existing and future land uses and activities on the Site and within its surrounds. This includes a summary of designations and environmental conditions, thereby enabling potentially sensitive receptors that could be affected by the Proposed Development to be identified. Future potentially sensitive receptors within the Site and surrounding area are also identified and set out in this chapter.

3.2. A full description of the baseline conditions and sensitive receptors relevant to each technical assessment undertaken as part of the EIA is provided in the respective technical chapters of this ES (**Chapters 7 to 14** inclusive).

3.3. This chapter should be read in conjunction with **Figures 3.1 to 3.5.**

Site Location and Setting

3.4. The Site is centred on National Grid Reference 47137, 17369 and is located within the administrative boundary of Reading Borough Council (RBC). As illustrated in **Figure 1.1**, the Site is located in the northern part of Reading town centre, immediately to the south of Station Hill and Reading Mainline Station, forming an important gateway to Reading town centre.

3.5. The Site occupies an area of approximately 3.08 ha and can be split along Garrard Street into a North and South Site. The North Site is bound by Station Hill to the north, Thames Tower to the east and Greyfriars Road to the west. South of Garrard Street, the South Site is bound to the east and west by retail units and offices. Merchants Place runs parallel to the eastern boundary of the Site and connects Friar Street with Garrard Street. A number of retail units, offices and residential apartments are located on Merchants Place. Friar Street, which is lined by a combination of leisure, office and retail units, forms the southern boundary of the Site.

3.6. Levels across the Site vary from approximately 38m Above Ordnance Datum (AOD) to 46m AOD, and typically the Site rises in a south-easterly direction. Levels in the west of the Site lie at a minimum of 38.35m AOD on Greyfriars Road and along the west of Garrard Street. Along the northern boundary of the Site, the gradient rises west to east to a height of 43.5m AOD in the north-east corner of the Site. In the southern area of the Site, the ground level rises north to south from approximately 38.35m AOD on Garrard Street to a maximum of 45.75m AOD along Friar Street in the south.

Historical Land Uses at the Site

3.7. In the early 19th century, the Site was undeveloped, comprising gardens and / or fields. At this time, Friar Street, which comprises a thoroughfare dating back to medieval times, contained a number of residential properties. However, following the construction of the Great Western Railway and station to the north of the Site in the mid to late 19th century, the Site and surrounding area was intensively developed. By the late 19th century, the south-western corner of the Site was occupied by terrace housing, whilst further housing and a timber yard were constructed on the western boundary of the Site. A large malt-house and coal yard were constructed towards the centre of the Site, whilst livery stables occupied the north-eastern area of the Site. The Telecom House area was occupied by a veterinary infirmary.

3.8. During the early to mid-20th century, the Site had been partially redeveloped to accommodate a large garage and also industrial type buildings. The Site was comprehensively redeveloped

between the 1950s and 1980s, which included the construction of a bus station, commercial premises, including Western Tower, a bingo hall and later a multi-storey car park and Friars Walk Shopping Centre. The Telecom House area was constructed in its current form by the 1960s.

3.9. A detailed description of the historical development of the Site and surrounding area is included in **Chapter 9: Historic Environment**; and **Chapter 12: Ground Conditions and Contamination**.

Existing Land Uses at the Site

3.10. The South Site is currently occupied by Telecom House and Friars Walk Shopping Centre, both of which are vacant and are currently undergoing demolition. The North Site is occupied by Xafinity House, a vacant office building which is currently being used as a construction compound for the contractors undertaking the demolition works on the South Site, the NCP car park which is still in use, and a Temporary Events Space used for market stalls, temporary ice rinks and other similar temporary events. The 'Biscuit Tin' café is a semi-permanent structure within the Temporary Events Space. The central part of the North Site is currently open land behind construction hoardings following the demolition of the Mecca Bingo Hall, Bus Station, Western Tower and the associated retail arcade in 2016. A plan showing the existing layout of the Site is presented as **Figure 3.2**.

3.11. Pedestrian permeability through the Site is currently poor owing to the built form and vacant nature of the Site. Since the closure of Friars Walk Shopping Centre and the associated Friars Walk elevated walkway, there has been limited pedestrian access across the Site between Reading Mainline Station and Reading town centre. However, the Site is recognised by RBC as an important gateway between the two. Consequently, the Site and immediate surrounding area have been identified by RBC as an area for redevelopment in the Local Plan[1], Reading Station Area Framework Supplementary Planning Document (SPD)[2] and Station Hill South Planning and Urban Design Brief[3].

3.12. Pedestrian permeability through the Site in an east - west direction between Station Hill and Greyfriars Road is limited to Garrard Street.

3.13. The main vehicular access to the Site is from Garrard Street, a one-way street, which is accessed from Greyfriars Road to the west of the Site. No vehicle access to the Site is available from Station Hill to the north of the Site, or Friar Street to the south of the Site. Greyfriars Road is accessed from the Inner Distribution Road (IDR) (A329) which circumnavigates Reading town centre.

3.14. There are currently no on-street parking spaces within the Site. However, there are 894 car parking spaces within the Garrard Street NCP Multi Storey Car Park (MSCP). Whilst spaces have historically been available within Friars Walk Shopping Centre (94 spaces), Xafinity House (81 spaces) and Telecom House (58 spaces), these are no longer accessible as these buildings are no longer in use.

3.15. A summary of existing buildings on the Site and their associated use is provided below in Table 3.1, with Site photographs provided in **Figure 3.1**.

Table 3.1: Summary of Existing Site Buildings and Uses

Building	Location Within Site	Description and Land Use
Xafinity House	Located in the north-western part of the Site, along Greyfriars Road.	Xafinity House is a six-storey 'L-shaped' red-brick structure with ground floor parking. This building is now being used as a construction compound for the demolition contractors.
NCP car park	Located in the central area of the Site, to the north of Garrard Street, from which access to the car park is gained.	The NCP car park is an eight-storey rectangular concrete structure. It provides 894 public parking spaces.
Friars Walk Shopping Centre	Located between Garrard Street and Friar Street.	Friars Walk Shopping Centre is a 1970s five-storey construction. All units in the shopping centre and the offices located over the units are now disused and the building is currently undergoing demolition.
Telecom House	Located between Garrard Street and Friar Street immediately west of Friars Walk Shopping Centre	Telecom House is a largely vacant 1960s/1970s building with retail uses at ground floor level fronting onto Friar Street and 5 levels of office uses above. All units and the offices are currently vacant and the building is currently undergoing demolition.
Temporary Events Space	Located in the north of the Site between the Garrard Street Car Park and Reading Railway Station.	The Temporary Events Space is used for market stalls, temporary ice rinks and other similar temporary events. A café, known as the Biscuit Tin, is located within the Temporary Events Space.

3.16. The quantum of existing land uses on the Site is shown in Table 3.2. It should be noted that all of the buildings within Phase 1 are vacant and are undergoing demolition whilst Xafinity House in Phase 3, is being used as a construction compound. The Biscuit Tin café and NCP car park in Phase 2 are still currently in use.

Table 3.2: Quantum of Land Uses on the Site including in Vacant Buildings (at April 2019)

Land Use	Gross External Area (m^2 GEA)		
	Phase 1	Phase 2	Phase 3
Office	11,027	0	5,738
Retail & Related Uses (Use Class A1 – A5) and leisure	5,743	98	0
Total Floor Space Area	16,770	98	5,738
Car Parking spaces	58	894	81

Existing Uses Surrounding the Site

3.17. The Site is surrounded by a mix of commercial, retail, residential and leisure uses, including small-scale high street retail units with offices or residential apartments above, restaurants, public houses and hotels along Station Road to the east of the Site and Friar Street to the south of the Site. A supermarket is located adjacent to the south-western part of the Site between Garrard Street and Friar Street, whilst student accommodation, serviced apartments, a public house and a number of office buildings are located along Greyfriars Road, which runs parallel to the western boundary of the Site.

3.18. Modern residential apartment blocks are located immediately to the east of the Site on Garrard Street and Merchants Place with further residential apartments on Station Road beyond. Terraced housing is also located on Stanshawe Road and Vachel Road, approximately 30m west of the nearest point to the Site. Malcolm Place, a modern residential apartment block, is located further afield, approximately 130m west of the Site on Caversham Road (A4155).

3.19. Reading Mainline Station, which forms a major transport interchange, is located approximately 15m north and north-east of the Site. Bus stops and taxi ranks are located both north and south of the station with the main bus and taxi interchange on Station Road.

Sensitive Receptors

3.20. An appraisal has been undertaken to identify the properties and people that should be considered as being sensitive to the construction and operation of the Proposed Development. Potential effects on these 'receptors' have been considered as part of the EIA. Potentially sensitive receptors are listed in Table 3.3 with future sensitive receptors, including receptors within the Site itself, listed in Table 3.4. Both existing and future sensitive receptors are identified on **Figures 3.2 - 3.5**. Further details on sensitive receptors are provided in the baseline conditions section of **Chapters 7 to 14**, inclusive.

Table 3.3: Potentially Sensitive Receptors

Category	Existing Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
Residential Properties (representative properties within 150m of the Site)	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 – serviced apartments	20m west
	53 Greyfriars Road	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
	32-34 Friar Street	35m east
	1st Floor Flat, 125 Friar Street	20m south
	1st Floor Flat, 127 Friar Street	20m south
	136-137 Friar Street	50m south east
	144 Friar Street	80m south-east
	Bridewell House/Samuel House (student accommodation), junction of Friar Street/Greyfriars Road	60m west
	Housing on Stanshawe Road	30m west
	Housing on Vachel Road	30m west
	Housing on Sackville Street	50m west

Category	Existing Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
	3 to 21 Tudor Road	60m west
	Malcolm Place, Caversham Road	120m west
	33 Caversham Road	140m west
	18-29 Regent Court	125m west
Hotels	Malmaison, Station Road	70m east
	Novotel, 25b Friar Street	85m east
	Ibis, 25a 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)	Various
Built Heritage	Reading Abbey Scheduled Monument and Grade I Listed Buildings and associated 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 (views from this area only).	350m south-west
	St Peter's Conservation Area (views from this area only)	850m north
	Grade I listed Greyfriars Church	120m south-west
	Grade I listed Church of St Laurence (views from this area only)	280m east
	Grade II Listed Queen Victoria Jubilee Statue	250m east
	Grade I listed St. Mary's Church in St. Mary Butts (views from this area only)	245m south-west
	Grade II* listed Town Council Chamber and Offices with Clock Tower	280m east
	Grade II listed Municipal Buildings Concert Hall	280m east
	Grade II Listed Municipal Buildings School of Art	280m east
	Grade II* listed Church of St Peter (views from this area only)	950m north
	Grade II listed St Giles' Church (views from this area only)	700m south
	Grade II listed (Three Guineas Public House) Reading General Station, Station Hill	30m north

Category	Existing Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
	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, 47 West Street	125m south-west
	Grade II listed Regent Place	130m 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 Church of St James (views from this area only)	690m east
	Grade II listed 29 & 31 Caversham Road	160m west
	The Grade II Listed Walter Parsons Corn Stores	220m east
	Grade II Listed 55 and 55a St Mary's Butts	225m south
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 together with the buses and the 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
	River Kennet / Kennet and Avon Canal	500m south-east
Habitats and Species	Black Redstart	On-Site
	Peregrine Falcon	On-Site

3.21. Table 3.4 provides a list of future potentially sensitive receptors. These are receptors that are not yet present, but planning applications have been consented for developments surrounding the Site

that would introduce sensitive receptors. This includes future residential uses within the Site itself; these have been considered throughout the EIA since receptors within Phase 1 in particular have the potential to be impacted by the subsequent phases of the Proposed Development.

Table 3.4: Future Potentially Sensitive Receptors

Category	Future Sensitive Receptor/Land Use	Nearest Approximate Distance from the Site Boundary
Residential Properties	Proposed: Residential Uses within the Site itself	On Site
	52-55 Friar Street and 12 Greyfriars Road, Reading (planning application reference 162210) - residential and retail redevelopment	Immediately adjacent to the west of the Site
Note:	Although 136-137 Friar Street Reading RG1 1EX (Planning application reference 150068) and 30-31 Friar Street, Reading (Planning application reference 150829) were identified as future sensitive receptors in the EIA Scoping Report as change of use applications had been submitted for these properties; these applications have now lapsed and they are therefore not considered within this EIA.	

References

1 Reading Borough Council (November 201) Reading Borough Local Plan, Adopted November 2019
2 Reading Borough Council, 2010, Reading Station Area Framework, RBC, Reading
3 Reading Borough Council, 2007, Station Hill South Planning and Urban Design Brief, RBC, Reading

4. Development Context and Alternatives

Introduction

4.1. This chapter, prepared by Waterman Infrastructure & Environment Ltd (Waterman IE), describes the context of the Proposed Development and the main alternatives which have been considered by the Applicant. The design of the Proposed Development has evolved in consultation with Reading Borough Council (RBC) and other consultees, as well as through consideration of environmental constraints and opportunities identified through the various technical studies undertaken to support the Proposed Development.

4.2. The Site is allocated for development within RBC's Local Plan and has also been the subject of previous planning applications. The development context is therefore described before discussing the alternatives considered by the Applicant, including how the design has evolved in consideration of environmental effects.

Development Context

Planning Context

4.3. RBC's Local Plan was published in in November 2019[1]. This incorporates Policy CR11 entitled Station / River Major Opportunity Area. Section c of this policy relates to Station Hill and Friars Walk and states:

> '*CR11c, STATION HILL & FRIARS WALK: This area will be developed for a mix of uses at a high density, including retail and leisure on the ground and lower floors and residential and offices on higher floors. There will be enhanced links through the site, including in a north-south direction into the Station Hill area and through to the station, and a network of streets and spaces. Frontages on key routes through the site should have active uses. The edge of the site nearest to the areas of traditional terracing west of Greyfriars Road will require careful design treatment*.'

4.4. The Local Plan goes on to state in paragraph 5.4.9 that the Station Hill South Planning and Urban Design Brief[2], adopted in 2007, the Station Area Development Framework[3], adopted in 2010, continue to apply. The Planning and Urban Design Brief sets out specific urban design and planning principles for the Site and is adopted as a Supplementary Planning Document (SPD). The Station Area Development Framework sets out design principles for the area.

4.5. A Sustainability Appraisal (SA) of the Local Plan found that, in common with all development, development of the Site would result in negative environmental effects with regard to CO_2 emissions, energy use, waste and pollution, with short-term costs offset by long-term benefits through sustainable design and construction. However, development of this Site at high density and a mix of uses would have significant positive effects on the use of previously developed land, provision of housing and on economic growth. The SA goes on to state that the Site is in one of the most accessible locations in Reading and a major development on the Site would significantly reduce the need to travel. In addition, given that the Site has been partially demolished, development of the vacant Site will have a significant positive impact on the townscape and will bring natural surveillance to public space and transport interchange to the south of Reading mainline station. The impact on the nearby listed buildings was assessed as having the potential to be positive or negative, depending on the quality of the design.

4.6. The SA assessed that, should the Site not be developed, such an accessible and prominent site sitting vacant would have significant negative effects on the preservation of undeveloped land, townscape character, the nearby historic environment and on the overall economic growth prospects. Finally, this option would fail to provide housing.

Previous Planning Applications on the Site

4.7. An outline planning application was submitted in February 2007 (planning application reference 07/00188/OUT) for a mixed-use development located in the area that now comprises the northern area of the Site (between Garrard Street and the Reading Mainline Station and Station Hill). This outline planning application is referred to as 'Station Hill 1' (SH1). However, additional land was subsequently acquired around Friar Street and the application was withdrawn to enable a complete redesign of the scheme.

4.8. In 2009, an outline application (planning application reference 09/01079/OUT) was made for the majority of the Site, excluding Telecom House (referred to as 'Station Hill 2 (SH2)'). RBC granted planning permission for this mixed use scheme in October 2011. The scheme comprised residential development (Use Class C3), offices (Use Class B1a), retail (Use Classes A1-A4), community space (Use Class D1), cultural/leisure space (Use Class D1/D2), bowling alley (D2), and health and fitness (Use D2) and associated car and cycle parking, landscaping, infrastructure and public realm works.

4.9. In light of market conditions, the consented SH2 was not considered deliverable and a new outline planning application for the Site (known as SH3) was prepared by the Applicant and its design team (planning application reference 130436). The revised proposals were for a lower rise, lower density development. This scheme was granted planning permission in January 2015 (the 2015 Consented Scheme).

4.10. As described in **Chapter 1: Introduction**, the 2015 Consented Scheme was subsequently extended and amended in 2015 to incorporate Telcom House (planning application references 151426 and 151427). These applications were approved in 2016 (the 2016 Consented Scheme). Further design amendments to the South Site were made in 2019 (planning application references 190441 and 190442) and RBC resolved to grant planning consent for these applications in July 2019. The Applicant is currently finalising the Section 106 agreement and the decision notice is anticipated to be issued by Reading Borough Council in December 2019.

Site Considerations and Constraints

4.11. A range of considerations and constraints have been identified which have influenced the final design and layout of the Proposed Development. A summary of the main considerations and constraints is provided in Table 4.1.

Table 4.1: Site Considerations and Constraints

Issue	Specific Considerations and Constraints
Surrounding built environment	The Proposed Development has given due consideration to the existing urban grain defined by Station Hill, Station Road, Friar Street and Greyfriars Road. As identified within the Draft Local Plan and extant RCAAP, Reading Station Area Framework SPD[1] and Station Hill South Planning and Urban Design Brief[2], RBC has an aspiration for a cluster of tall buildings at the Site. The relationship of such tall buildings with the surrounding range of urban forms including nearby Conservation Areas and Listed Buildings has been a key consideration in influencing the siting, scale and massing of the Proposed Development.
Surrounding land uses	The commercial land uses surrounding the Site have been considered in identifying a suitable and complementary mix of land uses.
Site levels	The Site presents a steep gradient, sloping upwards from west to east and from the south down to Garrard Street and then up again towards Station Hill. Levels have been considered to ensure inclusive access to all parts of the Site by all users. Addressing the level changes has also been a key driver in the appropriate design of the public realm.
Townscape and views	The Site is not affected by any statutory or non-statutory designated views, however, the design has given due consideration to maintaining and where possible improving the character, quality and context of local, middle and long distance views.
Built heritage	The design of the Proposed Development has carefully considered maintaining and where possible improving the setting, character, quality and context of the Site's surrounding three conservation areas and numerous listed buildings, including the former station ticket office on Station Road (now the Three Guineas Public House) and the statue of King Edward VII.
Archaeology	Archaeological evidence has previously been recorded within the Site, and the assumed line of the Civil War ditch crosses the Site. The southern part of the Site lies within the RBC designated Area of Archaeological Potential. Whilst the Proposed Development proposes excavation for the construction of the lower ground level, appropriate archaeological safeguarding and mitigation would form an integral part of the ground work phase, prior to the construction of the Proposed Development.
Transportation and access	The Site has excellent links to public transport facilities. Maintenance and enhancement of these public transport links have been a key consideration of the design of the Proposed Development. Pedestrian permeability through the Site is considered essential to the Proposed Development's success. This has been considered in the layout of the proposed buildings and the design of the public realm.
Ecology	The Site is currently of low ecological value. However, the protected black redstart (*Phoenicurus ochruros*) has historically been recorded on the Site. The landscape proposals for the Proposed Development have considered opportunities for biodiversity enhancements including providing habitat for black redstarts. As such, several living roofs (brown roof and green roofs) have been included within the final design and bird boxes would be provided.

1 Reading Borough Council, 2010, Reading Station Area Framework, RBC, Reading
2 Reading Borough Council, 2007, Station Hill South Planning and Urban Design Brief, RBC, Reading

Issue	Specific Considerations and Constraints
Wind	The suitability of the local wind environment has been considered in terms of the safety and comfort levels required for particular pedestrian activities in and around the Site. This is of particular relevance to the Proposed Development's provision of public realm and pedestrian routes.
Daylight, sunlight and overshadowing	The dense urban massing of the Proposed Development presents a potential constraint in terms of the daylight, sunlight and overshadowing to neighbouring residential properties and within the Site itself. The massing of the Proposed Development has been carefully considered to minimise such effects, where possible.
Utilities	There are a number of existing services across the Site which pose physical constraints to the Proposed Development. In particular, a mains trunk sewer is located beneath the Site. Utility constraints have been considered in the construction phasing to minimise disruption to existing services.

Alternatives

4.12. Under the EIA Regulations[4], an Environmental Statement (ES) is required to provide *"an outline of the main alternatives studied by the applicant ... and an indication of the main reasons for his choice, taking into account the environmental effects".*

4.13. Schedule 4 of the EIA Regulations identifies the following types of alternatives:

- Alternative locations;
- Alternative designs;
- Alternative sizes and scales; and
- Alternative technologies.

4.14. Given that the Site is allocated in the current and emerging Local Plan for a mixed use development, no alternative locations have been considered by the Applicant. However, the following sections consider alternative designs, sizes and scales and technologies that have been considered in the context of previous planning applications at the Site and considers the associated environmental effects.

4.15. The EIA Regulations also require the ES to provide *"an outline of the likely evolution* [of the baseline] *without implementation of the development*" (also known as the 'do nothing' alternative). Whilst the 'do-nothing' alternative has never been truly considered by the Applicant given the planning context of the Site, the do nothing alternative is discussed below prior to the discussion of the main alternatives considered by the Applicant.

The 'Do-Nothing' Alternative

4.16. The 'Do-Nothing' alternative refers to the option of leaving the Site in its current state. This option would result in a number of negative outcomes. These can be summarised as follows:

- Continued deterioration of the existing Site buildings and general Site environment with time;
- National and local planning objectives not being met in terms of facilitating sustainable development through the intensive regeneration of town and city centre sites;
- The local and regional socio-economic benefits of regeneration in terms of housing provision, employment and other commercial opportunities not being realised;

- A lost opportunity to improve the quantum and quality of public open spaces and pedestrian permeability, and no potential to support the creation of Site vitality and a sense of place and community; and
- The perception of crime at the Site would continue to blight this strategic location.

4.17. In addition to the above, if redevelopment is not taken forward, the existing Site presents little opportunity for natural ecological succession. The Site would simply deteriorate. As a result, the beneficial outcomes of leaving the Site in its current state are limited to:

- Zero costs associated with redevelopment;
- No carbon emissions associated with development during both construction and on completion;
- No generation of waste or pollution associated with redevelopment;
- The absence of disruption to Site neighbours during the demolition and construction works; and
- No potential disruption to finite archaeological resources.

4.18. Overall, it is considered that the negative effects of the do-nothing scenario outweigh the beneficial effects meaning that redevelopment is the preferred option. This is borne out by the Sustainability Appraisal of the emerging Local Plan which states that leaving '*such an accessible and prominent site sitting vacant would have significant negative effects on the preservation of undeveloped land, townscape character, the nearby historic environment and on the overall economic growth prospects. Finally, this option would fail to provide housing.*' The expectation is that given RBC's and the Government's priorities for brownfield redevelopment, and the local policy support provided by the emerging Local Plan, Reading Central Area Action Plan, the Station Hill South SPD[5] and Station Area Framework[6] for the redevelopment of the Site, that the Site would be redeveloped in the medium to longer term, even in the absence of the current Proposed Development.

Alternative Designs, Sizes and Scales

4.19. There have been a number of previous planning applications for the Site as described in the earlier section of this chapter. These have informed the emerging design of the current Proposed Development. During the design of the current Proposed Development, a variety of alternatives have also been considered. The alternatives have been grouped into the following key areas:

- Alternative heights;
- Alternative layouts and areas of public realm;
- Alternative quantum of land uses;
- Alternative means of managing the foul water sewer;
- Provisions for cyclists; and
- Alternative building structures.

Alternative Heights

4.20. The early versions of the design for this Site established the basic design principle of an increase in height of buildings from east to west along Station Hill, rising up from the low rise development on Greyfriars Road and Stanshawe Street to the taller commercial buildings to the east. A step up from south to north was also proposed so that the residential building plots south of Garrard Street could reflect the massing on Friar Street. This change in height created a cluster of buildings to fit within the local townscape and also help identify Reading Mainline Station by creating the tallest buildings adjacent to it.

4.21. The maximum height of the Proposed Development and that of the previously consented SH2 are very similar at approximately 165m above ordnance datum (AOD). The heights of the Proposed Development have been developed through consideration of townscape, wind, daylight, sunlight and overshadowing effects. Illustrative options were assessed by the technical teams to identify the environmental effects of the various options. This has informed the designs for the Proposed Development. For example, Plot G steps up from south to north to minimise daylight and sunlight effects on sensitive properties to the south and a lower building height is proposed on the corner of Greyfriars Road / Garrard Street to minimise daylight, sunlight and overshadowing effects to properties along Greyfriars Road and help improve wind conditions.

Alternative Layouts and Areas of Public Realm

4.22. The layout of the building plots was established from the need to improve permeability through the Site both east-west between Greyfriars Road and Station Road and also north-south between Reading Mainline Railway Station and Reading Town Centre.

4.23. Previous iterations of the scheme proposed the retention and refurbishment of the NCP car park. However, the Proposed Development includes for demolition of this building in order to create a more direct and visible route from the station to Friar Street and Reading Town Centre beyond. It also allows the creation of a greater area of public realm. A similar number of car parking spaces would still be provided by the Proposed Development; these are now proposed in podium levels. Creation of the podium levels will result in a greater level of excavation than previously proposed as part of the 2016 Consented Scheme but will enable level access to be created connecting Station Hill with Friar Street. The 2016 Consented Scheme proposed a fall in levels from the northern boundary down to the Garrard Street level and then ramped or stepped access back up to Friar Street in the south. The 2019 Section 73 Applications for Plots E and F have already applied for level access along the new walkway from Friar Street to Garrard Street (Friars Walk) and it is proposed that the link across Garrard Street would join Friars Walk at the same level.

4.24. Early versions of the designs included for relatively small areas of public realm. The Proposed Development has sought to maximise the area of public realm with provision of over 30% more public spaces when compared with previous schemes; this has been achieved by increasing the height of the buildings and spaces between them. This will include areas for play and informal recreation as well as creating a welcoming environment contributing towards the health and wellbeing of users of, and visitors to the space. It will also enable more daylight penetration (compared to the 2016 Consented Scheme), drawing upon the outcomes of the daylight, sunlight and overshadowing studies carried out in relation to the scheme.

4.25. The Proposed Development has also been designed to incorporate Station Square and Station Hill to ensure a co-ordinated approach to landscaping from the Station right through the Proposed Development to Friar Street.

4.26. The 2016 Consented Scheme proposed residential uses on the South Site and commercial uses on the North Site whilst the Proposed Development would enable residential uses to be provided on both the North and South Sites. If residential uses are constructed on the North Site, they would be located adjacent to Greyfriars Road where residential development is already present. Therefore, provision of residential development in the north western part of the North Site would be consistent with adjacent land uses. However, the outline application for this area of the Site is sufficiently flexible to reflect future land use requirements should these change.

Alternative Quantum of Land Uses

4.27. Station Hill 1 (SH1), proposed six buildings to provide up to 75,504m^2 of new office space, between 577-624 residential units, retail, community, leisure and cultural land uses, together with associated public open space, car parking and public transport improvements.

4.28. The SH2 scheme proposed eight buildings rising up to 26 commercial storeys (168m AOD). This proposed up to 80,579m^2 of office space, 56,585m^2 residential space (723 to 782 units), 18,907m^2 of retail space, 4,050m^2 of leisure and community space and 800 car parking spaces.

4.29. The SH3 scheme proposed seven building plots (A to G) providing up to 122,000m^2 of office space, 13,500m^2 of retail space, 2,200m^2 of leisure, up to 29,500m^2 residential space (up to 300 units) and up to 1,000 car parking spaces. The 2016 Consented Scheme was the same as SH3 except that the residential floor space increased to up to 41,050m^2 (up to 475 units).

4.30. The Proposed Development incorporates seven building plots providing a gross external area of up to approximately: 120,000m^2 of office space; 1,300 residential units (110,000m^2); 8,550m^2 of retail and leisure uses; 26,000m^2 residential institutions (assisted care facility); 26,000m^2 hotel; and 40,000m^2 podium, basement and back of house provision containing up to 1,000 car parking spaces. However, the overall floorspace area of Phases 2 and 3 would not exceed 173,000m^2 of development meaning that the maximum area of development combined with the already consented Phase 1, would be 228,662m^2. The minimum area would be 140,891m^2.

4.31. The maximum parameters of the Proposed Development would therefore maximise the density of development within the Site but seek flexibility to ensure that a viable scheme can be brought forward in future.

Alternative Means of Managing the Foul Water Sewer

4.32. Two alternatives were considered in relation to the existing foul water sewer, either building over it or diverting it. The preferred option is to build over it and seek a build over agreement from Thames Water. A 3m easement zone either side of the sewer is proposed, where no below ground structure would be built.

Provision for Cyclists

4.33. The Applicant recognises the importance of cycling in reducing air pollution and contributing towards a healthy lifestyle and the Applicant's transport consultants, Peter Brett Associates, have held discussions with RBC regarding options for cycling within and around the Site. Whilst the Applicant initially considered prohibiting cycling through the Site to avoid conflicts with pedestrians using the space, it has been agreed with RBC that cycling through the Site would still be possible, although the landscape strategy has been developed to encourage cautious and considerate cycling. As an alternative, cyclists will be encouraged to use RBC's designated on-street cycle ways on Greyfriars Road, Garrard Street, Friar Street and Station Hill.

4.34. Cycle parking for residents and employees will exceed RBC standards and be secure, covered and provided adjacent to the designated cycle routes within plots.

4.35. Options for the designated cycle routes on Greyfriars Road, Garrard Street and Station Hill have been discussed with RBC. These have considered fully segregated cycle ways, advisory lanes, shared carriageways, shared footways and shared space. Through discussion with RBC, it was agreed that a combination of advisory cycle lanes, shared foot/cycleway, on-road cycle markings and the tightening of junction radii to improve cycle safety and access between the town centre and

the subway would be implemented. Further improvements may also be made by RBC in due course.

4.36. In addition, RBC requested that consideration be given to allowing cyclists to use the Reading Station underpass as a traffic-free route from Station Hill to Vastern Road to help strengthen the north-south connection to the River Thames and Caversham. The proposals for Station Square have been designed to achieve this aspiration with provision of a wheeling ramp and assuming shared pedestrian and cycle principles.

Alternative Building Structures

Residential Structure Options

4.37. The three possible material options for the structure of the residential plots are:

- Cross laminated timber;
- Steel framed building with composite floors of concrete poured on metal deck; and
- Reinforced concrete.

4.38. 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.

4.39. The composite steel option is not considered appropriate to the proposed residential uses 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 to provide damping to control floor vibrations and prevent sound flanking between apartments. This would mean a greater structural depth and associated height of the buildings.

4.40. 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.

4.41. 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 and the flat slab form of construction provides future flexibility in terms of fitout and potential future use.

Commercial Structure Options

4.42. The two possible material options for the structure of the commercial plots are:

- Reinforced concrete frame (with post tensioned floor slabs);
- Steel framed building with composite floors of concrete poured on metal deck.

4.43. The composite steel option provides a lightweight solution which can comfortably achieve the long spans desired. However, this structural system usually requires a large amount of additional material to achieve fire performance and durability. Long spans with a low weight floor plate can often lead to vibration issues and thus additional material may need to be added. In comparison, a concrete frame inherently achieves fire protection and durability requirements as well as providing sufficient mass to achieve vibration limits.

4.44. A concrete frame also has other benefits too, such as thermal mass. This leads to smaller fluctuations in the internal temperatures. In the summer, it can absorb the heat during the day and revert it back to the atmosphere during the night. Flat slabs provide the advantage of an unobstructed services zone which provides future flexibility in tenant fitout and the possibility of an exposed soffit. The main advantage of using post tensioning over traditional reinforced concrete, is that it can cover large spans without the need for deep sections, reducing the overall volume of material required, it also generally contains less reinforcement.

Podium Structure Options

4.45. The two possible material options for the structure of the podium are:

- Reinforced concrete frame;
- Steel framed building with composite floors of concrete poured on metal deck.

4.46. Generally, the car park and certain plant areas are unconditioned space and open to the atmosphere. Since reinforced concrete has inherent durability, this material performs better in the external environment than steel in a car park environment. To achieve the same lifespan a steel structure would require continuous maintenance throughout the lifetime of the building.

4.47. In addition, the use of concrete means there is no requirement for the use of intumescent paint as fire protection is provided by appropriate cover provision to reinforcement; the footprint of the podium is significant and would lead to a significant amount of additional material to protect a steel structure.

4.48. The landscaping and proposed usage of the podium will lead to large and potential dynamic loads. In order to meet the desired clear heights and achieve the required acoustic and vibration requirements, concrete is once again the logical choice.

Reduction of the Carbon Footprint of the Building Structure

4.49. 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;
- Taking advantage of the existing levels to create a basement that accommodates a split-level car park. This helps to minimise the cut and fill; and
- Use of post tensioning techniques to reduce the slab depth, minimising the amount of material used.

4.50. 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.

Alternative Technologies

Energy Strategies and Contribution to Climate Change

4.51. Hoare Lea has prepared two Energy Strategies for the Proposed Development; one for the South Site and one for the North Site. The Energy Strategies[7],[8] describe the passive and active design

measures that would be incorporated into the Proposed Development to reduce the energy demand and then consider a range of options for energy supply including renewable energy options. On the basis of this review, the measures considered potentially suitable for implementation on the South Site and North Site of the Proposed Development are described below.

South Site

Passive & Active Design Measures

4.59. Envelope performance targets have been determined for Plots E and F to limit energy demand and carbon dioxide emissions. In addition, use of the following measures to reduce energy demand will be considered as the design progresses:

- Efficient mechanical ventilation systems with heat recovery;
- Enhanced levels of pipework insultation;
- Variable speed pumping; and
- Low energy lighting.

Energy Strategy Options

4.60. The energy options considered for the residential elements of the Proposed Development are:

- 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 (GSHP) and PV;
- Option D – All electric with PV.

4.61. 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).

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

Option A – Gas fired boiler, CHP and PV

4.63. 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. 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 Proposed Development is built or in use. This strategy does not perform as well with the SAP10 carbon factors 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

4.64. In this option, ASHP would be located on the roof to provide heating and hot water demand. This option performs well using either SAP2012 or SAP10. 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. Whilst this option is therefore not proposed for the South Site, it would be considered further for the future residential elements of Phase 3 as part of a decentralised system for the whole North Site (see below).

Option C – Ground source heat pumps and PV

4.65. GSHP use water circulated within underground pipework as the heat source in a refrigeration process. This enables them to produce hot water for space heating in buildings. Due to the relatively constant temperature of the ground at depth, this produces heat more efficiently in winter than an ASHP and usually with lower carbon emissions than a gas fired boiler. GSHPs typically have deep boreholes at 6m centres. In this option, GSHP would be used to provide the heating and hot water demand for the residential aspects of the Proposed Development. This option performs well using either SAP2012 or SAP10. However, supplementary boiler systems may be required to generate suitable hot water temperatures. In addition, due to restrictions on borehole locations and hence potentially having only a partial network, installation of a GSHP is not proposed for the South Site. However, it would be considered further at reserved matters stage for the future residential elements of Phase 3 as part of a decentralised system for the whole North Site (see below).

Option D – All electric strategy and PV

4.66. 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 in carbon emissions compared to a base building. However, the results using SAP10 carbon factors show a reduction in carbon emissions compared to a base building. This is expected to improve further in future as renewable energy supplies an even larger proportion of energy.

4.67. In addition, an all-electric approach would 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 A. This all electric approach combined with PVs is proposed for the South Site.

North Site

Passive and Active Measures

4.68. A detailed façade study into the most appropriate passive measures has been conducted for Plot G with the aim of limiting the amount of solar gain in summer and achieving the required number of BREEAM ENE 01 credits. These studies considered the solid to glass ratio on all façades, a canopy to the south facing terraces, a winter garden to the south facing terraces, internal blinds, external shading devices (including horizontal and vertical shading fins) and solar control glass. Such measures will be used to limit the energy demands and CO_2 emissions for the Proposed Development

4.69. Similar investigations in passive design measures for Phase 3 will take place in the future once the use class has been determined.

4.70. The energy consumption of Phase 2 and 3 would be further reduced by the incorporation of the following active energy efficiency measures in the design of the mechanical and electrical engineering systems:

- Efficient mechanical ventilation systems with heat recovery for domestic and commercial units;
- Enhanced levels of pipework insulation;
- Variable speed pumping;
- Low energy lighting throughout;
- DC fan coil units for the commercial spaces; and
- Sensible zoning of systems in the commercial buildings.

Energy Strategy Options

4.71. Following discussions with RBC, and in line with emerging planning policy, further work has been undertaken following submission of the applications in relation to the South Site regarding provision of a heat network for Phases 2 and 3 of the Proposed Development. The options that could be considered as part of a heat network include:

- Option 1 – Ground Source Heat Pumps (GSHP);
- Option 2 – Biomass boiler;
- Option 3 - Air Source Heat Pumps (ASHP);
- Option 4 – Combined heat and power (CHP) and boiler combination.

4.72. Of the above options, Option 2 and Option 4 were discounted because of their impact on local air quality and given that a biomass boiler would require a substantial amount of fuel storage for a development of this size, which would make for an inefficient use of space. In addition, regular deliveries of fuel, and regular cleaning would be required which would increase the downtime of the boiler, whilst also effecting air quality through the emissions. A CHP Boiler combination is no longer considered as a low carbon technology and, using the latest carbon factors (reflecting the current grid generation), has poor carbon reductions. Options 1 and 3 were therefore investigated further.

4.73. For GSHPs to work efficiently, without influencing ground conditions, a balanced heating and cooling load is required. Given Phase 2 will be implemented in isolation prior to construction of Phase 3 and will be cooling load driven, an ASHP network is proposed with the option of exploring both ASHP and GSHP further for Phase 3 when there will be a more balanced load. Provision will also be made for Phase 3 to connect into the Phase 2 ASHP network in the future. It should also be noted that the scheme would design for the peak loads across the Site and therefore when the system isn't running at peak capacity then there may be an opportunity to export or share on a wider network.

4.74. The Energy Strategy also explored a variety of renewable energy technologies including wind, solar photovoltaics (PV) and solar water heater panels. Wind turbines have potential visual, townscape, noise and vibration effects and also often generate variable outputs in such an urban environment. Solar water heater panels feed directly into the hot water system of a property and are therefore not suitable for a high density development as proposed. As a result, PVs will be located on roofs across both Phase 2 and Phase 3 where feasible.

4.75. On the basis of the above passive and active design measures, proposed heat networks and use of PVs, the domestic regulated carbon emissions for Phase 2 using SAP 10 or SAP2012 carbon

factors are approximately 12% below the Baseline Scheme. For the Phase 3 residential uses, a minimum of 45% improvement over Part Lis targeted, thus exceeding the minimum target of 35% improvement set within RBC's emerging policy.

Summary and Conclusion

4.76. The Proposed Development has resulted from careful consideration of policy objectives for the wider Reading area and the Site, the Applicant's commercial objectives, environmental effects having regard to the studies undertaken as part of the EIA process, and following consultation with RBC, key stakeholders and the public. The Proposed Development has evolved to respond to a range of design, environmental and economic issues as described above.

References

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

[2] Reading Borough Council, 2007, Station Hill South Planning and Urban Design Brief, RBC, Reading

[3] Reading Borough Council, 2010, Reading Station Area Framework, RBC, Reading

[4] HMSO, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations

[5] Reading Borough Council, 2007. Station Hill South Planning and Urban Design Brief, March 2007

[6] Reading Borough Council, 2010. Reading Station Area Framework, Adopted December 2010

[7] Hoare Lea, March 2019, Station Hill, Reading Phase 1 Energy Strategy

[8] Hoare Lea, October 2019, Station Hill North, Reading Energy Strategy

5. Description of the Proposed Development

Introduction

5.1. This chapter, prepared by Waterman Infrastructure & Environment, provides a description of the Proposed Development. As discussed in **Chapter 1: Introduction**, the reserved matters applications for Phase 1 (Plots E & F) have already been approved and a new hybrid application is being submitted for the North Site with Phase 2 (comprising a commercial building, the surrounding podium and public realm collectively known as Plot G) being submitted in detail and Phase 3 (Plots A, B, C and D, podium levels and basement car park) being submitted in outline. The detailed elements of the Proposed Development (Phases 1 and 2) are based on drawings which set out the footprint and height of the proposed buildings, the elevations and sections of each building, the internal arrangement of the buildings at each level and the landscape design. The outline element of the planning application (Phase 3) is defined by a series of Parameter Plans, a Development Specification and Design Code.

5.2. The Development Specification defines and describes the principal components of the hybrid planning application, including the form and content of the planning application as well as the parameters for future reserved matters applications in respect of the outline elements.

5.3. The Design Code sets out design rules and requirements that instruct the physical development of Phase 3 in addition to provision of guidance on design quality, appearance, landscaping and extent of public realm.

5.4. It is proposed that the principles of the Proposed Development being submitted in outline as defined by the Parameter Plans, Development Specification and Design Code would be secured though planning conditions.

5.5. The plans and description of the Proposed Development as assessed within the Environmental Impact Assessment (EIA) is provided in the below sections.

5.6. A description of the anticipated demolition and construction works sequence of activities, together with the likely programme of works are outlined separately within **Chapter 6: Development Programme Demolition and Construction**.

Overview of the Development

5.7. The Proposed Development comprises the demolition of all buildings and structures within the Site and the construction of a mixed use residential and commercial led scheme. The Proposed Development would be constructed in phases with Plots E and F (the South Site) forming Phase 1, Plot G, including public realm enhancements to Station Hill, forming Phase 2 and the remainder of the North Site forming Phase 3.

5.8. An overview of the applications for the South Site and North Site is provided below.

South Site

5.9. The design of the South Site (Plots E and F) would remain in accordance with the 2019 Section 73 and Reserved Matters planning applications for those Plots (Planning Application References: 190441 / 190442 / 190465 / 190466), namely demolition of all buildings and structures within the South Site and construction of two buildings above a basement level providing 538 residential units together with some ground floor retail / leisure uses and 165 car parking spaces. The buildings range in height from a minimum of 50m above ordnance datum (AOD) to a maximum of 85.6m AOD.

North Site

5.10. The planning application for the North Site includes for the demolition of all buildings and structures within the North Site and construction of buildings within five building Plots providing office floor space with some ground floor retail and leisure uses and potentially residential units and / or a hotel and / or senior care accommodation. Car parking would be provided within a podium with a maximum of 835 spaces provided. The buildings range in height from a minimum of 62m AOD to a maximum of 163m AOD and would rise up from the Plaza level. The Plaza level is the principal area of public realm across the North Site providing level access from Reading Mainline Station through to Friar Street. The Plaza level would sit on top of the underlying podium.

5.11. Public realm would be provided in the form of a series of linked public squares. Enhancements to the public realm outside Reading Mainline Station and along Station Hill are also proposed and would include a pocket park and redesign of the existing steps on Station Hill.

Phase 2

5.12. Phase 2 of the Proposed Development, comprising a commercial building, surrounding public realm and podium, known collectively as Plot G, is being submitted as a detailed planning application. The building within Plot G would comprise predominantly offices with some ground floor retail and leisure uses. This building would rise up part 8 / part 17 storeys above the podium which would provide 122 car parking spaces and 3 motorcycle parking spaces.

5.13. The western boundary of Phase 2 would be defined by construction hoarding until Phase 3 (or parts thereof) is complete and operational.

Phase 3

5.14. The application for Phase 3 is being submitted in outline to enable flexibility in uses. Phase 3 is defined by a series of parameters which govern the maximum and minimum building heights, footprints and floor space areas. In order to develop the maximum and minimum parameters, a series of Development Options have been proposed for this area of the Site. These options demonstrate ways in which Phase 3 of the Proposed Development could be built out within the parameters that would be approved on any future outline planning consent. The Development Options are illustrated on drawings SHRN-CRL-PN-ZZ-SK-A-800-142, 143 and 144 included within **Volume 2: Figures** of this ES**.** All of the options incorporate a single building in the north east of this Phase (Plot C) which would be predominantly commercial (use class B1) with additional retail and leisure uses at street and Plaza levels (use classes A1-A5, D1 and D2). The remaining area of Phase 3 could be occupied by an L-shaped building running along Greyfriars Road and Garrard Street or two separate buildings; one on the corner of Station Hill and Greyfriars Road and one running along Garrard Street. These buildings could be occupied by a range of uses at upper levels including commercial (B1), residential (C2 and C3) and hotel (C1) uses whilst the lower levels would also include retail and leisure uses (A1 to A5, D1 and D2). As detailed in the Design Code, Plot C would be the tallest building within Phase 3 and the Proposed Development as a whole rising up approximately 25 storeys above the Plaza level (163m AOD).

5.15. A podium would be created as part of Phase 3 which would connect to the podium created as part of Phase 2. In addition, provision is made within Phase 3 for a basement which could extend across Phase 3 and under the podium constructed as part of Phase 2.

Floor Space Areas

5.16. The Floor Space Areas assessed as part of the EIA during the Interim Development Scenario and Completed Development Scenario are described in Tables 5.1 and 5.2. As there are a series of options for Phase 3, the floorspace and car parking areas are also necessarily flexible within the Completed Development Scenario.

Table 5.1: Proposed Total Floorspace by Land Use during the Interim Development Scenario

Land Use Class	Gross Internal Area (sq m GIA)	Gross External Area (sq m GEA)
Retail and Leisure plus Plaza / ground floor level office in Plot G (Class A1-A5, B1, D1-D2)	3,852	4,043
Residential (Class C3)	43,085	44,805
	(538 units in accordance with the reserved matters submissions)	
Offices (Class B1)	33,189	33,424
Back of House Facilities	1,131	2,044
Podium (Plot G)	6,500	7,200
Car Parking (South Site)	6,616	6,616
	(165 car parking spaces plus 6 motorcycle parking spaces within Phase 1 and 122 car parking spaces plus 3 motorcycle parking spaces within Phase 2)	
Total	**94,373**	**98,132**

Table 5.2: Proposed Total Minimum and Maximum Floorspace by Land Use during the Completed Development Scenario

Land Use Class	Maximum		Minimum	
	GIA (sq. m)	GEA (sq. m)	GIA (sq. m)	GEA (sq. m)
Retail and Leisure plus Plaza / ground floor level office in Plot G (Class A1-A5, B1, D1-D2)*	7,352	8,543	4,302	4,543
Residential (Class C3)*	106,585	109,805	43,085	44,805
	(1,300 units)		(538 units)	
Residential Institutions (Class C2)	23,500	26,000	0	0
	(250 rooms)		(0 rooms)	
Hotel (Class C1)	23,500	26,000	0	0
	(450 keys)		(0 keys)	
Offices (Class B1)	118,789	119,924	58,189	61,424
Back of House Facilities*	1,590	2,303	1,590	2,303
Podium and Basement (North Site)	29,000	30,200	19,500	21,200
Car Parking (South Site)	6,616		6,616	
Car Parking Spaces (whole Site)	Up to 1,000 spaces			
Total	213,868	228,662[#]	133,282	140,891
Notes				
*Areas exclude basement floorspace on the South Site except D2 leisure.				
[#]The maximum total is based on the maximum area of development on the North Site of 173,000m^2 GEA / 161,000m2 GIA plus the approved area of development on the South Site (55,662m^2 GEA / 52,868m^2 GIA). This maximum area of				

Land Use Class	Maximum		Minimum	
	GIA (sq. m)	GEA (sq. m)	GIA (sq. m)	GEA (sq. m)
development on the North Site is less than the sum of the floor space areas of the individual uses listed above and is to control the maximum amount of development permitted.				

Plans Defining the Proposed Development

5.17. As described above, the detailed elements of the Proposed Development are based on drawings which set out the footprint and height of the proposed buildings, the elevations and sections of each building, the internal arrangement of the buildings at each level and the landscape design. The outline elements of the planning application are governed by a series of parameters. These parameters are defined by the Parameter Plans, Development Specification and Design Code.

5.18. For clarity, for the purposes of this ES, a consolidated set of plans have been prepared to cover all three phases of the Proposed Development. These plans show the proposed building heights and footprints as well as vehicular and pedestrian routes. For Phases 1 and 2, these parameters are fixed as part of the detailed design whilst for Phase 3, there is flexibility in heights, layouts and uses.

5.19. In addition, a selection of detailed plans and elevations relating to Phase 1 and Phase 2, which are relevant to the technical assessments undertaken as part of this EIA, have been included within this ES.

5.20. The plans defining the Proposed Development for the purposes of the EIA are listed in Table 5.3.

Table 5.3: Plans Defining the Proposed Development for the Purposes of the EIA

Plan Reference Number	Title	Description
Consolidated Parameter Plans (Site Wide)		
SHRN-CRL-SW-ZZ-PL-A-0250	EIA Boundary	Site boundary for the purposes of the EIA.
SHRN-CRL-SW-ZZ-PL-A-0252	Demolition Plan	Plan of buildings to be demolished across the Site
SHRN-CRL-SW-ZZ-PL-A-0254	Building Plots	Phase 1 and Phase 2: Building heights and layout. Phase 3: Proposed building plots, each building plot's maximum and minimum heights and each building plot's maximum footprint including limits of deviation for Phase 3.
SHRN-CRL-SW-ZZ-PL-A-0256	Public Realm and Pedestrian Access	Proposed location of public realm and amenity for Phase 3.
SHRN-CRL-SW-ZZ-PL-A-0258	Vehicular Access and Servicing Routes	Proposed access points to the car parks and servicing
SHRN-CRL-SW-ZZ-PL-A-0260	Land Uses – Street and Podium (Plaza)	Proposed land uses at street and plaza level.
SHRN-CRL -SW-ZZ-PL-A-0261	Land Uses – Upper Floors	Proposed land uses at upper floor levels.
SHRN-CRL -SW-ZZ-PL-A-0262	Basement Parameters	Proposed outline of basement.
SHRN-CRL -SW-ZZ-PL-A-0726	Phase 3: Outline Planning Application – Parameter Section	Proposed cross sections of Phase 3.
Detailed Plans and Elevations for Phase 1		

Plan Reference Number	Title	Description
SHR-LDA-SB-GF-DR-L-110-102	Plots E and F Ground Floor General Arrangement – Friars Walk and Courtyard	
SHR-CRL-SB-ZZ-PL-A-300-003-P10	Plot E and F Section DD and Section EE	
SHR-CRL-SB-ZZ-PL-A-200-002-P10	Friar Street Elevation	
Detailed Plans and Elevations for Phase 2		
SHRN-LDA-NP-ZZ-PL-L-100-101	General Arrangement Plan	
SHRN-LDA-NP-ZZ-PL-L-400-103	Phase 2 Section C	
SHRN-GEN-BG-ZZ-PL-A-1400	Phase 2 Site Section A-A	
Development Options for Phase 3		
SHRN-CRL-PN-ZZ-SK-A-800-142-C	Development Option 1	
SHRN-CRL-PN-ZZ-SK-A-800-143-C	Development Option 2	
SHRN-CRL-PN-ZZ-SK-A-800-144-C	Development Option 3	

Layout of Built Development

5.21. Consolidated Plan SHRN-CRL-SW-ZZ-PL-A-0254 illustrates the layout of the proposed buildings and each building plot's footprint (subject to limits of deviation for Phase 3 only) and building heights (subject to ranges for Phase 3 only). The Consolidated Plan illustrates that the Proposed Development would comprise seven building plots (A, B, C, D, E, F and G) and associated public realm.

5.22. The Building Plots are defined by Friar Street, Garrard Street, Station Hill and Greyfriars Road together with the following pedestrian desire lines:

- A north-south route to connect Reading Mainline Station to the north with Friar Street to the south;
- A pedestrian route running east-west between Reading Mainline Station and Greyfriars Road to the west of the Site, running parallel with Station Hill; and
- A pedestrian route connecting Station Hill with the public realm in the centre of Phase 3.

5.23. Consolidated Plan SHRN-SW-ZZ-PL-A-0256 shows the public realm areas between the buildings. Within Phase 3, the Plan defines the minimum width between the building plots at Plaza level and therefore the extent of the public realm and amenity areas between buildings.

5.24. The layout of the five building plots on the North Site are as follows:

- Plot A would be located in the north-west of the Site;
- Plot B would be located to the south of Plot A – Plot A and Plot B may be joined at Plaza level and above but a covered walkway would be provided between Plots A and B to provide a connection between Greyfriars Road and the central part of the Site. The covered walkway would have a minimum width of 5m;
- Plot C would be located to the east of Plot A, with a minimum distance of 12m from Plot A if the facing façade is residential and not activated or 18m if the facing façade is activated;

- Plot D would be located, south of Plot C, with a minimum distance of 12m from Plot C if the facing façade is residential and not activated or 18m if the facing façade is activated; and
- Plot G would be located in the east of the Site, to the east of Plot C. The minimum distance between Plot C and Plot G would be 9m as shown on the Consolidated Plan referenced SHRN-SW-ZZ-PL-A-0256.

5.25. The residential building Plots (Plots E and F) would be located on the South Site, immediately south of Garrard Street, either side of Friars Walk. At the southern extent of Plot E and Plot F, a minimum of 8m would separate the buildings at ground level. At the northern extent of Plot E and Plot F, a minimum of 15.4m would separate the buildings.

Building Heights and Massing

5.26. Minimum and maximum building heights are annotated on Consolidated Plan SHRN-CRL-SW-ZZ-PL-A-0254. The Proposed Development would comprise a range of building heights to give variety and visual interest. The taller building elements of the Proposed Development are located towards the north of the Site whilst the lowest building elements are located to the south. Table 5.4 outlines the minimum and maximum building heights.

5.27. For Plots E, F and G, the building heights have been fixed as part of the reserved matters submission / detailed application respectively. The maximum and minimum heights provided in Table 5.4 for these Plots cover the variation in building heights proposed through the architectural detail rather than a range within which the building would be constructed. All three plots step up from south to north with the lowest heights of the buildings in the south and the highest parts of the buildings in the north of the respective Plots.

5.28. The actual heights of Plots A to D would be defined at future reserved matters stage but would fall within the maximum and minimum heights shown. In addition, the Design Code has set out that Plot C must be the tallest building on the Site sitting a minimum of 8m above Plot G and 12m above Plots A, B and D. Future reserved matters submissions for this phase, must conform to these relative heights.

Table 5.4: Maximum and Minimum Building Heights

Parameter Plan Reference Number	Minimum Building Heights (metres Above Ordnance Datum (AOD))	Maximum Building Heights (AOD)
Plot A	+62m	+151.5m
Plot B	+62m	+97.4m
Plot C	+81m	+163m
Plot D	+62m	+116.5m (+72m in southern corner)
Plot E (approved maximum and minimum height)	+50m (81.6m in the north western corner)	+66.5 to 85.6m
Plot F (approved maximum and minimum height)	+81m	+85m
Plot G (fixed, but not approved building height ranges)	+81.9m	+123m [+127m with the building maintenance unit]

Elevational Treatment

5.29. The elevational treatment of Plots E, F and G has been determined for the purposes of the reserved matters / detailed planning application submissions. The elevational treatment of Plots A, B, C and D would be determined at a future reserved matters stage. However, the following key principles in respect of elevational treatment are proposed across the Site as set out in the drawings, Design and Access Statements and Design Code.

Office Uses

5.30. It is proposed that the elevations of buildings on Plots C and G would complement one another through use of predominantly glazed facades.

5.31. Plot G would comprise a double skinned glass façade. The ground floor of the north façade would be set back to create a covered area in front of the office lobby with silver metal columns provided to support the upper levels. The roof of Plot G would be bound by mesh facades to screen the plant.

5.32. The Design Code specifies that where offices are proposed within Phase 3, these would use glass as their primary façade material with a limited palette of finishes for the architectural metalwork elements.

Retail Uses

5.33. Retail uses are provided at street and Plaza level within Phases 1 and 2 and are encouraged at these levels within the Design Code for Phase 3. These will help to activate the Proposed Development. Shop fronts would be designed to offer a high degree of transparency between the public realm and building interior.

Residential Building Plots

5.34. The proposed materials used in Plots E and F comprise predominantly brick with contrasting metal and stone coloured cement based cladding. The courtyard areas would be rendered with a light coloured render.

5.35. The Design Code requires that residential uses within Phase 3 share a common architectural language through the use of similar materials and / or a similar rhythm to the façade and must help to express the predominant use of that building. The materials to be used within the residential units include:

- Rendered panels;
- Teracotta
- Reconstituted or natural stone;
- Concrete;
- Metal panels; and
- Brickwork.

Site Levels

5.36. The Proposed Development has been designed to incorporate direct level pedestrian access to Reading Mainline Station as well as connections through to Garrard Street and Friar Street. The existing 5m level change across the Site would be addressed by creating a Plaza level which would

sit on top of a podium and create level access from the Station through to Friar Street via a pedestrian bridge over Garrard Street. Steps would be provided from the Plaza level down to Station Hill, Greyfriars Road and Garrard Street.

5.37. Levels within the Phase 3 boundary would be confirmed at the reserved matters stage for Phase 3, but levels within the following areas have been set as part of the detailed design / parameter plans as shown on Consolidated Plan SHRN-CRL-SW-ZZ-PL-A-0254:

- 45.7m AOD between Friar Street and the Garrard Street Bridge; and
- 45m AOD on the Plaza level. The southern part of the Plaza on the North Site would slope up to connect with the link bridge at 45.7m AOD whilst the northern part of the Plaza on the North Site would slope down to connect with Station Square and the station entrance.

5.38. The levels above connect into Friar Street in the south which is at 45.7m AOD. On the northern boundary, Station Hill slopes up from 39.1m AOD in the west to 41.4 in the east. The Design Code requires that Plot C connects with Station Hill on the northern boundary of the Site to create activity along the Station Hill frontage of the Site. Plots A, B and D would also extend down to Station Hill, Greyfriars Road and Garrard Street level on the northern, western and southern boundaries of Phase 3 with the corner of Station Hill and Greyfriars Road activated with a lobby or amenity space. A public lift access, stairs and cycle ramp are required by the Design Code from Greyfriars Road up to Plaza level.

5.39. Station Square and the station entrance, on the north eastern boundary of the Site are at 43.9m AOD and levels would slope up gently to the Plaza level at 45m AOD. Access from the Plaza level down to Garrard Street (at approximately 39m AOD) would be via steps and lifts, and a lobby into Plot G would also be provided at Garrard Street level. Retail units within Phase 1 would also front onto Garrard Street to provide activation at this level.

Land Uses

5.40. Phase 1 comprises predominantly residential uses whilst Phase 2 comprises predominantly office uses. Within Phase 3, the precise mix, layout and location of land uses would be subject to market demand at the time of the reserved matters submissions. This would ensure that the Proposed Development is viable and that an appropriate mix of activities is provided to support the population, whilst having due regard to the facilities provided elsewhere within Reading.

Office Use (Class B1)

5.41. The building plots fronting Station Hill in the north of the Site comprising building Plots C and G and potentially A, B and D are proposed for office use to reflect the high visibility from Reading Mainline Station and the busy Station Hill street frontage as well as the excellent public transport accessibility. The office content of the Proposed Development would range between 61,424m^2 and 119,924m^2 GEA and would generally be located in the upper floors the buildings.

Retail and Leisure Uses (Class A1-A5, D1 and D2)

5.42. Between 4,543m^2 and 8,543m^2 GEA of retail and leisure uses would be provided and comprise a mix of shops, financial and professional services, restaurants, cafés, drinking establishments and leisure uses. These would be provided at the Plaza level and below of all building plots so as to complement the uses on the upper floors and provide frontages which activate the public realm at the street and Plaza level. A mix of unit sizes is proposed to cater for a range of tenants.

Residential Uses (Class C2 and C3)

5.43. Residential land uses would be located in Phase 1 and potentially Phase 3. The residential uses would be apartments (Class C3) and / or residential institutions such as elderly care accommodation (Class C2).

5.44. As noted within Table 5.2, the Proposed Development would provide between 44,805m^2 and 109,805m^2 GEA of residential uses which equates to between 538 and 1,300 residential units. Of these, up to 550 units would be provided within Plots E and F with the remainder provided within Plots A, B and D. For C2 uses, between 0m^2 and 26,000m^2 would be provided comprising a maximum of 250 rooms within a residential institution. These uses would replace other residential uses within these plots if provided.

5.45. The unit mix across the Proposed Development is:

- Studios – 10%;
- 1 Bed – 46%;
- 2 Bed – 42%;
- 3+ Bed – 2%.

5.46. A percentage of the total residential floorspace would be allocated to affordable housing and would be subject to discussions with RBC.

Hotel (Class C1)

5.47. The Proposed Development would provide between 0m^2 and 26,000m^2 GEA of hotel uses. The hotel would be located within Plots A, B or D and would replace other residential uses within these plots if provided.

Vehicular Access, Circulation, Parking and Servicing

5.48. Consolidated Plan SHRN-SW-ZZ-PL-A-0258 illustrates the proposed means of vehicular access, servicing and pedestrian circulation within the Proposed Development. The primary vehicle access into the Proposed Development would be from Garrard Street and Greyfriars Road.

5.49. The car park beneath Plots E and F would be accessed from Garrard Street whilst the podium car park beneath the North Site would be accessed from both Greyfriars Road and Garrard Street. Taxi provision would be provided from the existing taxi rank on Station Hill.

Car Parking

5.50. A maximum of 1,000 car parking spaces would be provided within the Proposed Development. A car park would be provided in the lower ground floor levels of Plots E and F providing 165 car parking spaces. Of these, 8 would be disabled, 16 would have active electrical charging facilities and 16 passive charging facilities.

5.51. In the North Site, up to 835 spaces would be provided within the podium levels. Vehicular access would be from Garrard Street and Greyfriars Road with a single egress from Greyfriars Road. Pedestrian access would be via a lift or stairs from Station Hill.

5.52. As part of Phase 2, 122 car and 3 motorcycle parking spaces would be provided within the podium. Of the 122 car parking spaces, 6 would be disabled. Electric vehicle charging points will also be provided with 20% active and 20% passive charging facilities.

5.53. Within Phase 3, car parking would be brought forward in accordance with the allowances set out in Table 5.5. Office car parking will have the ability to be utilised as public parking during evenings and weekends.

Table 5.5: Parking Allocation by Land Use

Land Use	Parking Ratio
Use Class B1a (offices)	1 space per 250m^2
Use Class C3 (residential)	0.3 spaces per unit
Use Class A1 and C1 (retail and hotel)	No allocated parking
Public Car Parking Spaces	Remaining capacity to be available to the public
Provision for Existing Town Centre Occupiers	0-145 spaces*

* Dependent on the final level of car parking delivered

Cycle Access and Parking

5.54. Cycle stores would be distributed across the Proposed Development and within each of the individual building Plots. Routes around the Proposed Development would be provided to facilitate cycle access whilst the landscape design would be designed to facilitate considerate cycling across the podium level.

5.55. Within Phase 1, 386 cycle parking spaces would be provided for the occupants. Cycle stores would be provided on the lower mezzanine level or Friars Walk level. There would be a choice of storage options with stackers, Sheffield stands or individual cycle cages. All cycle parking would be secure and accessible via key fob controlled entry points. An area has also been set aside for residents to undertake cycle cleaning and maintenance. Retail staff cycle parking would be located within a cycle parking area within the ground floor of Plot E, accessible directly from Friar Street and Friars Walk and made up of cycle lockers. An additional 16 cycle parking spaces would be provided in the public realm for visitors.

5.56. Within Phase 2, 300 bicycle spaces would be provided. These would comprise 176 spaces for the office workers and 8 for the retail uses (via stackers) plus 56 Brompton Style Lockers as well as 60 Sheffield Stands within the public realm. The provision for the office and retail uses would be accessible from Garrard Street level. Phase 2 would also provide showers and lockers for use by cyclists and other active transport users.

5.57. Within Phase 3, the level of cycle parking required to meet RBC's adopted standards varies depending on the Development Option. However, the office and retail cycle parking proposed for Phase 3 will be provided at the same level as the Phase 2 proposals and will seek to exceed RBC's standards, with the office meeting BREEAM standards. Residential cycle parking as a minimum will be provided at 0.5 spaces per 1-2 bedroom flat and 1 space per 3+ bedroom flat although this will likely be exceeded. The hotel will provide cycle parking at 1 space per 6 staff members as a minimum. Details of cycle parking will come forward within future reserved matters applications for the outline elements. The cycle parking will be securely located and accessible at street level.

5.58. Cycle parking will also be provided within the public realm to serve visitors. As a minimum this is expected to be a further 30 spaces above that proposed within Phase 2.

Servicing

5.59. A service yard would be provided in the podium levels for Building Plots C and G accessed from a ramp located between Thames Tower and the new building within Plot G and accessed via Garrard Street. On street loading facilities would also be provided on Greyfriars Road, Garrard Street and Friar Street. Two on street loading bays would be provided along Garrard Street; one adjacent to Plots B and D and one adjacent to Plot G. The layby adjacent to Plot G is proposed to be delivered as part of Phase 2 and is off carriageway. This would be used to provide deliveries to the Garrard Street entrance of Plot G (primarily Plot G will be serviced from the adjoining service road and yard).

5.60. The layby at the western end of Garrard Street and on Greyfriars Road are proposed to support the potential hotel and residential uses within Phase 3. The western Garrard Street layby is proposed off carriageway while the Greyfriars Road layby is proposed on-street as was previously the case for Xafinity House. These facilities will serve the adjacent Plots A/B/D and provide a location for servicing, deliveries and refuse collection.

5.61. Plots E and F would be serviced from Garrard Street with a service bay provided at the west end of Plot E. An on street service bay will also be provided on Friar Street for the retail units on this façade.

Pedestrian Access and Circulation

5.62. Consolidated Plan SHRN-SW-ZZ-PL-A-256 defines the pedestrian routes within the Proposed Development. The Proposed Development is designed to maximise links and permeability through the Site and all the spaces between the buildings would be vehicle free public spaces (except for considerate cyclists). The principal pedestrian route would run north-south to connect Reading Mainline Station with Friar Street to the south with a bridge crossing at Garrard Street. This route would be animated by retail land uses and landscaping. This pedestrian route would pass through the proposed Station Square located outside Reading Mainline Station and 'Station Hill Plaza' located centrally within the Site between building Plots D and G.

5.63. Secondary routes would be provided to link with Garrard Street to the south of Plot G and Greyfriars Road to the west of Plots A and B. A pedestrian route would be provided through Plots A and B and through the area of public realm provided between Plots A, B, C and D. The route would be a minimum of 12m wide between building Plots A and C, and between building Plots C and D, and 5m along the covered walkway between Plots A and B.

5.64. The key building entrance points would be located on the street frontages on the periphery of the Site as well as facing Station Square and Station Hill Plaza, thereby providing active frontages throughout the Site.

Open Spaces and Landscape

Public Space

5.65. The principal areas of public realm are shown on Consolidated Plan SHRN-CRL-SW-ZZ-PL-A-0254 and the General Arrangement Plans for Plots E, F and G (references: SHR-LDA-SB-GF-DR-L-110-102 and SHRN-LDA-NP-ZZ-PL-L-100-101). The following areas of public realm would be provided:

- Phase 1 – A total of 2,269m^2, as defined by the reserved matters details for Plots E and F (planning references 190465 & 190466). This area comprises a new public walkway known as Friars Walk as well as small areas of public realm on Garrard Street;

- Phase 2 – A total of approximately 7,400 m^2 of which approximately 4,110m^2 is new public realm across the Plaza level including a new open space known as Station Hill Plaza and approximately 3,290m^2 is the replacement or refurbishment of existing public realm. This includes the replacement of the Temporary Events Space and refurbishment of public realm to the west of Thames Tower (known as the Rest), at Station Square and along Station Hill including the provision of a new Pocket Park;
- Phase 3 – minimum of 1,500m2 public or semi private space comprising open space between Plots A, B, C and D at Plaza level and referred to as Station Hill Gardens.

5.66. Friars Walk, Station Plaza, the Rest, Station Square & the Pocket Park and Station Gardens are described in further detail below.

Friars Walk

5.67. Friars Walk is a new pedestrian walkway through the South Site from Friar Street to the new link bridge over Garrard Street. This walkway would be a minimum of 8m wide in the south adjacent to Friar Street and 15.4m wide in the north adjacent to Garrard Street. The area would predominantly comprise hard paving although soft landscaped areas would be provided along its length. The street would be animated with retail / food and beverage units along its length.

Station Hill Plaza

5.68. A new square, 'Station Hill Plaza', is proposed centrally within the Site between Plots D and G. The key north-south and east-west pedestrian routes converge at Station Hill Plaza. It is therefore envisaged that this space would function as the main pedestrian focal point of the Proposed Development. The space would be supported with multi-level commercial space which would provide active edges and has been designed to facilitate a variety of public uses including public events, installations and cultural celebrations.

The Rest

5.69. Public realm between Thames Tower and Plot G is known as 'The Rest'. This area is intended to be a quiet green courtyard away from the principal pedestrian thoroughfare through Station Square. Curved raised planters and spill out space from café uses within Thames Tower would be provided. A double-sided green wall would be provided marking the edge of the Plaza within this area and masking visibility of the service access into the podium levels below.

Station Square & the Pocket Park

5.70. A new Station Square and Pocket Park would be created to the north of Building G. It is intended that these would co-ordinate with a wider landscape design in front of Reading Mainline Station (although this area is outside of the Applicant's ownership). This new space would provide a gateway from Reading Mainline Station to Reading town centre and would accommodate major pedestrian flows and movements as well as providing areas of seating and waiting areas.

5.71. The entrance into Reading Mainline Station and the new public realm extending into the Proposed Development are approximately 4m higher than the entrance into the subway underneath the Station to the north of the Site. To negotiate these level differences, a pocket park incorporating a sloped landscaped area, new steps and ramps will be created. The sloped area will incorporate play areas, terraces for seating and soft landscaping.

Station Hill Gardens

5.72. The design of Station Gardens would follow that of the detailed application for Phase 2 to ensure connectivity between the spaces. Whilst the landscape details and material palette would be similar to or complimentary to those of Station Plaza, Station Gardens would be quieter and more intimate. The areas would include seating, quiet, semi-private spaces, retail spill out spaces, play areas and integrated lighting.

Private Space

Residential

5.73. Each apartment within the Proposed Development would have access to a shared amenity space and / or private balcony. A minimum of 6m^2 of private or shared amenity space would be provided per residential unit. Shared amenity spaces for residents would be provided at ground floor level and/or roof level.

Commercial

5.74. Roof terraces are proposed on the office buildings to provide amenity space for the office workers. For Building G, a terrace / winter garden would be provided on level 8 / 15. The location of commercial amenity spaces, where provided within Phase 3, would be determined at the reserved matters stage.

Landscaping

Ground Level

5.75. Soft landscaping at ground level would include trees, shrubs and hedges. All trees removed would be replaced and additional trees would be planted. Tree planting would establish a strong identity for the Proposed Development and define the proposed public spaces and circulation routes.

5.76. High quality street furniture including seating, litter and re-cycling bins, cycle racks, signage and wayfinding features, information boards and lighting would be provided in varying materials and colour materials. All street furniture would be located so as not to impede pedestrian flows.

Green and Brown Roofs

5.77. Green and / or brown roofs would be located throughout the Site. The brown roofs would provide ecological enhancement to the Proposed Development through the provision of suitable habitat for the protected bird species, black redstart (*Phoenicurus ochruros*).

Green Walls

5.78. Two green walls would be created as part of the Phase 2 landscape scheme. One double-sided green wall would be created above the entrance to the service yard on the northern side of Garrard Street between Thames Tower and Plot G. The second would be created on the wall adjacent to the steps down from Plaza level to Garrard Street adjacent to the link bridge.

Utilities and Services

5.79. The existing records for utility routes and service provision were obtained from the statutory utility providers by Hoare Lea. A summary is set out in Table 5.6.

Table 5.6: Existing Utility Providers on Site

Company	Utility
Scottish & Southern Electricity PLC	High Voltage (HV) and Low Voltage (LV) electricity supply
Thames Water Services	Potable water
Thames Water Utilities	Foul and surface water drainage
SGN / Squire Energy	Gas
BT Openreach / Cable & Wireless / Energis Communications / Fibrenet / Kingston Communications / Thus / Tanet / Vondafone / Mercury	Telecoms
Reading Borough Council	CCTV and telecoms for signs
Cable TV	Cable TV

5.80. The majority of existing services within the Site are redundant and will be removed. However, there are utilities in the roads within and surrounding the Site that will be protected or diverted as part of the Proposed Development. Further details are summarised in Table 5.7.

Table 5.7: Proposed Utilities Required on the Site

Utility	Requirements
Electricity	Installation of HV and LV distribution infrastructure.
	Provision of new underground HV and LV cables.
Gas	Extension of the existing low pressure underground gas pipework infrastructure. Gas is only proposed to serve the new food and beverage units in all phases of the Proposed Development.
Mains water and sewerage	Connection will be made into the existing water mains. Reinforcement of water mains serving the Site may be required to serve Phase 3.
	Provision of water storage tanks and pumping facilities across the Site.
	Retention of main sewer running east west across the Site. Diversion of smaller 225mm branches connecting to it. The Proposed Development will connect into the existing mains sewerage network. Reinforcement would be required to accommodate the Proposed Development. This would be undertaken by Thames Water.
Telecommunications	Existing telecoms infrastructure available for connection.

5.81. It is proposed the existing primary foul sewer running beneath the Site would be retained and the structural designs would allow for a 3m easement zone either side of the sewer, where no below ground development would take place.

Surface Water Drainage Strategy

5.82. A Flood Risk Assessment and Surface Water Drainage Strategy has been undertaken for the Proposed Development and is included within **Technical Appendix 2.6**. This concludes that in order to limit increases in surface water run-off generation from the Site (accounting for the effects

of climate change), approximately 317m^3 of attenuation storage volume would be required for the South Site to contain a 1 in 100 year 24 hour storm (including a 40% allowance for climate change) and 648m^3 of attenuation storage volume would be required for the North Site to contain a 1 in 100 year 24 hour storm (including a 40% allowance for climate change).

5.83. Within Phase 1, attenuation would be provided through oversized pipes and attenuation tanks beneath Plots E and F. A below ground attenuation tank(s) would be provided for Plot G with the surrounding public realm drained into a permavoid attenuation tank at podium level. This would then discharge into the public sewers around the Site. For Phase 3, attenuation would be provided through a combination of storage tanks (cellular units or similar), blue roofs and a blue podium.

Energy

5.84. Energy Strategies have been prepared by Hoare Lea for Phase 1 and Phases 2 & 3 of the Proposed Development[1],[2]. The Energy Strategy for Phase 1 proposes an all electric heating strategy whilst the Energy Strategy for Phase 2 proposes that Plot G would be heated / cooled using roof top air source heat pumps. These will be capable of providing simultaneous heating and cooling with an excellent level of heat recovery. Domestic hot water would be provided using electric heaters.

5.85. Photovoltaic panels are proposed on the roofs of Plots E, F and G.

5.86. The strategy for Phase 3 would be determined at the reserved matters stage but the ability to connect into a site wide heating system using air source heat pumps would be made as part of Phase 2. The potential for a ground source heat pump system to be adopted within Phase 3 will also be investigated at the reserved matters stage.

5.87. Using SAP 10 Carbon factors, the Energy Strategies for the Site anticipate that Phase 1 residential will achieve a 51% reduction compared with part L baseline. A 45% reduction is targeted for residential buildings in Phase 3. Plot G has been modelled against SAP10 and SAP12 Carbon factors and is anticipated to achieve a 12% reduction compared with a baseline building.

Waste Generation and Management

5.88. Commercial and retail waste would be taken to the servicing areas from where collection would take place. Convenient purpose designed storage space for recycling in commercial areas will be incorporated into all Station Hill commercial buildings in accordance with the BREEAM requirements for offices.

5.89. In the residential blocks residents would either be responsible taking their rubbish to the base of each building core and placing it in the appropriate euro bin for collection or chutes would be provided from each level to the basement storage areas. 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

5.90. The Proposed Development incorporates a number of features to ensure high environmental performance. These features constitute the following:

- The Proposed Development would be built on previously developed land;
- The Proposed Development is within 5 to 10 minute walk of public transport links, community facilities and amenities of Reading town centre;

- The Proposed Development would provide pedestrian linkages throughout the Site, connecting Friar Street and central Reading with the station interchange (bus station and Reading Mainline Station);
- The Proposed Development would provide space for internal and external waste recycling facilities, making it possible to achieve high recycling levels;
- The office spaces within the Proposed Development would be designed to achieve an 'Excellent' rating under BREEAM New Construction 2018 whilst the retail spaces will be designed to achieve a BREEAM New Construction 2018 Very Good rating;
- The Proposed Development would incorporate a range of energy efficiency measures (as discussed above) and including sub-metering of major energy consuming items to help end users reduce consumption where possible;
- The Proposed Development would use of water efficient fittings to minimise potable water demand. A target of 15 litres per person per day (l/pp/pd) is proposed for the office buildings and 125l/pp/pd for the residential buildings;
- Cycle parking facilities within the Proposed Development would meet and likely exceed RBC's Cycle Parking Standards;
- A building user guide will be prepared and provided on hand over. This guide will provide guidance to help building users access, understand and operate the building efficiently and in a manner keeping with the original design intent;
- The Proposed Development would include of green roofs and brown roofs to provide habitat for the black redstart;
- The Proposed Development would provide green walls; and
- Tree-planting would exceed the number and quality of existing trees removed during demolition.

References

[1] Hoare Lea (March 2019) Station Hill– Phase 1, Reading - Energy Strategy
[2] Hoare Lea (December 2019) Station Hill North, Reading –Energy Strategy

6. Demolition and Construction

Introduction

6.64. This chapter describes the anticipated programme and sequence of demolition and construction works for the Proposed Development and the key activities that would be undertaken on the Site during these works. It identifies, in general terms, potential effects associated with demolition and construction activities and outlines proposals for their mitigation. Detailed consideration of demolition and construction related environmental effects relevant to the various technical assessments are provided in each relevant chapter of this ES (refer to Chapters 7-14 inclusive).

6.65. It is proposed that a Construction Environmental Management Plan (CEMP) be implemented during demolition and construction works. This would be discussed and agreed with the relevant planning officers at Reading Borough Council (RBC) following approval of the planning application. An outline of the content of the CEMP is provided in this chapter.

6.66. Planning for demolition and construction is necessarily broad at this stage and may be subject to modification. Specific demolition and construction activities would vary in frequency depending upon the particular stage of works. However, it is considered that sufficient information is available to enable the assessment of all likely and significant environmental effects related to the demolition and construction works.

Programme of Works

6.67. The Proposed Development would be constructed in phases with Plots E and F forming Phase 1, Plot G and the surrounding area of the podium and public realm to link the station with Phase 1 (including public realm enhancements to Station Hill) forming Phase 2 and the remainder of the Proposed Development (Plots A to D) forming Phase 3. Demolition of the buildings within Phase 1 has already commenced and construction of this phase is anticipated to be complete by 2022. Demolition of the NCP Car Park in Phase 2 is programmed to commence in early 2020 (under an existing prior notification for demolition approval) with construction of Plot G programmed to follow thereafter and be complete in late 2022. The programme delivery of Phase 3 is currently uncertain although it is anticipated to commence in 2023 following the completion of Phases 1 and 2. Completion of Phase 3 is programmed for 2026.

6.68. As there is potential for a pause in the construction works between Phases 2 and 3, construction hoarding is proposed to define the edges of the Phase 2 development area and ensure that the buildings and public realm can function independently prior to construction of Phase 3.

6.69. Table 6.1 summarises the main activities to be undertaken during the demolition and construction works and the approximate duration of these activities. 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	Duration (months)
Site Set Up and Surveys	3
Phase 1 Demolition of Friars Walk Shopping Centre and Telecom House Site Preparation	9
Phase 1: Construction	36
Phase 2: demolition of the NCP Car Park and site preparation	8-10

Activity	Duration (months)
Phase 2: Construction	25-30
Phase 3: Demolition of Xafinity House and Site preparation	6-8
Phase 3: Construction	36-42

Sequence of Works

6.7 The proposed sequence includes three phases of demolition and associated construction in the sequence described below:

- Site set up (in Xafinity House) and asbestos surveys;
- Phase 1: Demolition and Site Preparation. This would include:
  - Demolition of Friars Walk Shopping Centre and Telecom House; and
  - Archaeological Investigations.
- Phase 1: Construction including:
  - Installation of piled foundations and creation of a 'basement box' within the areas of Plots E and F;
  - Superstructure construction, cladding and fit-out of buildings within Plots E and F; and
  - Landscaping and external works to Plot E and F courtyards and Friars Walk between Plots E and F.
- Phase 2: Demolition and Site Preparation. This would include:
  - Demolition of the NCP Car Park and removal of the Temporary Events Space; and
  - Archaeological investigations and Site investigations.
- Construction of Phase 2 including:
  - Enabling works and installation of piled foundations;
  - Construction of the podium at Phase 2;
  - Superstructure construction and cladding of Building G; and
  - Landscaping and externals works to create a pedestrian route and public realm through from Reading Mainline Station to Friars Walk constructed in Phase 1 including linking bridge.
- Phase 3: Demolition and Site Preparation. This would include:
  - Demolition of Xafinity House. Note demolition of Xafinity House is assumed to occur during construction of Phase 2 although it forms part of the Phase 3 area; and
  - Archaeological investigations and Site investigations.
- Construction of Phase 3 including:
  - Enabling works and installation of piled foundations;
  - Construction of the podium at Phase 3;
  - Superstructure construction and cladding of Plot C;
  - Superstructure construction, cladding and fit-out of buildings within Plots A, B & D; and
  - Landscaping and creation of public realm within Phase 3.

Description of the Works

Site Set Up and Site Enabling Works

6.8 During demolition and construction of Phase 1 and the podium for Phase 2, the construction compound would be set up in Xafinity House. Once the podium in Phase 2 has been constructed, the construction compound would likely be moved into the podium of Phase 2 to enable demolition of Xafinity House and construction of the buildings within Phase 3.

6.9 Site hoardings have already been erected around part of the North Site; these were installed prior to demolition of the Mecca Bingo Hall, Bus Station and Western Tower in 2015. Hoarding would be erected around other areas of the Site prior to works commencing in these areas. The hoarding would accord with the Health and Safety Executive (HSE) and RBC requirements and be a 2.4m high, solid timber secure fencing, be well lit and maintained throughout the works to ensure the safety of the public.

6.10 Prior to works commencing in each area of the Site, scaffolding would be erected around the perimeter of the existing buildings and protective gantries over pavements would be incorporated where necessary. Existing services on the Site would be identified, surveyed, tested and diverted or cut off as appropriate. Key services and re-instated services would be temporarily protected, and weather proofed to ensure a safe clearance process.

Demolition and Site Preparation

6.11 Prior to demolition, internal soft furnishings would be stripped and removed. An intrusive inspection would also be undertaken to identify the presence of any potentially hazardous materials such as asbestos-containing materials. If present, these would be removed from the Site and disposed of by appropriately licensed contractors following prescribed health and safety procedures.

6.12 During demolition, all building elevations which front public boundaries, or which are immediately adjacent to adjoining properties, would be fully scaffolded and completely enclosed by monarflex sheeting to provide a dust and safety shield. De-construction methods would be employed where possible. Should it be deemed necessary, short-term pavement closures would be implemented to ensure the safety of the public.

6.13 Archaeological evaluation and mitigation would commence prior to installation of foundations and would continue throughout the excavation and construction phase (as necessary).

Excavation

6.14 Excavation works would include:

- The excavation of basements to form the new car parks serving the Site. A plan showing the basement details of Phase 1 and the basement parameters for Phase 3 is included as drawings SHRN-SW-ZZ-PL-A-0262: Basement Parameters and SHRN-SW-ZZ-PL-A-0726: Phase 3: Outline Planning Application – Parameter Section. There would be no basements excavated for Phase 2 – the lowest podium level would be at approximate existing ground level;
- The installation of new services such as electricity, gas, drainage and water mains including the provision of water tanks and drainage attenuation tanks; and
- Establishment of foundations, such as the installation of piles, pile caps and ground beams.

6.15 Excavations would generally be undertaken using normal earth moving equipment, such as dozers, graders and excavators. High pressure wheel washing facilities will be used at egress points.

Foundations

6.16 The structural loads generated by the proposed buildings would necessitate the use of piled foundations. Adequate pile capacities would be achieved using either single piles or small groups of piles founded in the Valley Gravels over the Chalk.

6.17 It is envisaged that continuous flight auger (CFA) piles would be suitable for the foundations. These would be installed to depths of between 25m and 30m below ground level (bgl) dependent upon the applied load. It is anticipated that the upper and lower public spaces, together with the lower rise structures, would be supported on smaller foundations with CFA piles to a shallower depth. Mid and high-rise structures together with all core building areas would be supported on pile groups combined by pile caps. Piles would be spaced based on a minimum of three times the pile diameter.

Construction of the Sub-Structure

6.18 A new basement box would be installed in Phase 1 consisting of reinforced concrete retaining walls and reinforced concrete slabs. The amount of sub-structure works within Phase 1 have been minimised with the basement box extending to a maximum of 39m AOD; approximately 1m below existing basement levels. This would result in an excavation volume of approximately 9,000m^3.

6.19 A basement is proposed for Phase 3. To form the basement, a steel sheet pile solution is being proposed. The proximity to the Thames Water Sewer will dictate a reaction ('push in') methodology when within 15m of their assets. The sheet piles will also support the edge of the podium slabs vertically, and the slabs will offer lateral propping to the sheet pile in the permanent case. The maximum basement depth would be 32.25m AOD north of the Thames Water sewer (approximately 7.4m below average ground level) and 35.25m AOD between the Thames Water sewer and north of Garrard Street. At maximum extent, this would result in an excavation volume of approximately 100,000m^3.

6.20 A podium structure of suspended reinforced concrete slabs would be constructed across Phase 2 and 3 to provide car parking and servicing space, from which the building elements would rise. This would be above grade to compensate for level differences and therefore does not require significant excavation. All columns located in car park areas below ground level would also be concrete.

Construction of the Super-Structure

6.21 The Phase 1 residential buildings are to be constructed using a reinforced concrete post-tensioned flat slab, with in-situ concrete columns and stability walls. It is envisaged that this will be the same for residential buildings within Phase 3. The commercial buildings are also being taken forward as the same reinforced concrete frame structures, but with the possibility of some small areas of steel composite construction. This would be formed using a slab of lightweight concrete on a permanent metal deck shutter and will likely only be used for roof plant levels and any potential mezzanine levels.

Cladding

6.22 Phase 1 is proposed to be clad predominantly in brick with metal, stone and rendered elements.

6.23 Phase 2 is proposed to be clad in glass and anodised aluminium.

6.24 For Phase 3, building appearance is a reserved matter. However, at the time of writing, it is envisaged that cladding materials would follow that of Phase 1 and 2. This would include a glazed façade for the commercial buildings and brick with metal, stone and rendered elements for the residential buildings.

Fit-out

6.25 Fit-out is proposed for the residential units but the office and retail floorspace is anticipated to be provided as flexible shells to be completed by each occupier.

Landscaping

6.26 Landscaping works for the public realm areas would involve paving, tree planting, and provision of street furniture including seating and signage.

6.27 At roof level, landscape works would involve construction of the brown and green roofs and landscaping of private amenity spaces.

6.28 Streetscape works including provision of signage would also be undertaken along Garrard Street.

Materials and Resource Use

Excavation

6.29 Disposal of waste material would be carried out by appropriately licensed contractors to disposal sites licensed to accept material of the quality excavated. Where appropriate, inert or structurally suitable materials would be reused and/or recycled for both on and off-site uses.

Demolition

6.30 The Demolition Contractor has estimated that approximately 16,000m^3 demolition material would be generated on the South Site and 10,200m^3 material would be generated by the demolition of the NCP on the North Site. Xafinity House would generate approximately 3,500m^3 of demolition material. Table 6.2 provides an indication of the major types of materials likely to arise from demolition.

Table 6.2: Indicative Materials Arising from Demolition

Material	Material Sources
Concrete	Superstructures, floor slabs, walls, columns
Brick	External and internal walls
Glass and cladding	Windows and cladding
Metal components	Windows, plant, superstructures, sub-assemblies
Timber and plasterboard	Partitions and ceilings
Plastics/fibrous materials	Internal furnishings
Hard-standing/tarmac	Internal pathways, car parks
Earth spoil	Excavations

Construction

6.31 The generation of waste material would occur at all stages of the construction process, from structural and foundation works to the fit-out of the new buildings. The Applicant is targeting a minimum of one credit against the BREEAM UK New Construction 2018[1] Construction Waste criteria. As a result, a maximum of 13.3m^3 of waste per 100m^2 gross internal area (GIA) would be

generated. On the basis that the maximum GIA of the Proposed Development is 213,868m^2, the amount of waste generated by the Site during construction would be 28,444m^3.

Construction Traffic and Access

6.32 It is currently anticipated that the average volume of daily construction traffic would be approximately 35 vehicles/day (70 daily movements) during the peak construction period.

6.33 Construction routes to the Site would be selected to allow for the safest and most efficient movement into and around the Site during works. The routes of construction traffic to and from the Site would be agreed with RBC in accordance with the requirements of a Demolition Management Statement and Construction Management Statement, the implementation of which would be expected to be a condition on any planning consent. Construction traffic would be confined to the local major roads where possible. The Demolition and Construction Management Statements setting out the details of the construction routes, operating hours and other operational issues would be agreed with RBC prior to work commencing. This information would form part of the CEMP (further detail is provided later in this chapter).

6.34 As shown in **Figure 6.1**, incoming construction traffic would travel along the A329 Inner Distribution Road (IDR) and then egress the IDR via the Chatham Street/IDR roundabout travelling along Friar Street, up Greyfriars Road and into the Site access on Garrard Street.

6.35 Outgoing construction traffic would share the managed access point on to Garrard Street and would reach the IDR via Tudor Road to return to the A33.

6.36 **Figure 6.1** shows that the construction traffic routes avoid Reading's central area, thereby reducing potential disruption to the commercial core.

Plant and Equipment

6.37 Consideration has been given to the types of plant and equipment that are likely to be used during the demolition and construction works. An indication of typical types of plant and equipment associated with each key element of the construction process is set out within Table 6.4.

Table 6.4: Indicative Plant Used During Demolition and Construction

Plant and Equipment	Site Preparation, excavation, piling & Demolition	Substructure	Superstructure	Cladding	Fit out	Landscaping and construction of public realm
Bulldozers	✓					✓
Concrete crusher	✓					
Concrete silo and ready-mix lorries		✓	✓			
Concrete splitters and concrete saws	✓					
Cranes and hoists	✓	✓	✓	✓	✓	
Cutters, drills and small tools	✓	✓	✓	✓	✓	
Excavators and breakers	✓	✓				✓
Floodlights	✓	✓	✓	✓	✓	✓
Fork lift trucks	✓	✓	✓	✓	✓	✓

Plant and Equipment	Site Preparation, excavation, piling & Demolition	Substructure	Superstructure	Cladding	Fit out	Landscaping and construction of public realm
Hydraulic benders and cutters	✓	✓	✓	✓	✓	
Lorries/vans	✓	✓	✓	✓	✓	✓
Tarmac and paving laying equipment						✓
Scaffolding and hydraulic access platforms	✓	✓	✓	✓	✓	
Temporary supports	✓	✓	✓	✓		
Tipper lorries	✓	✓	✓			✓

Potential Environmental Effects

6.38 Demolition and construction works can cause significant environmental impacts and disruption to neighbours if they are not properly managed. The Applicant is committed to minimising the impacts of the works and, would require the appointed contractor(s) to implement a Construction Environmental Management Plan (CEMP) for the demolition and construction works. The CEMP would set out procedures that the contractors would be required to adopt to manage the environmental impacts of the works. The requirement to comply with the CEMP would be included as part of the contract conditions for each element of the work. All contractors tendering for work would be required to demonstrate that their proposals would comply with the contents of the CEMP. Trade Contractors would also be vetted to establish their history of compliance with the required environmental standards for their relevant disciplines. It is intended that planning conditions would be imposed on the planning consent which would also require compliance with the proposed CEMP, Demolition Method Statement and Construction Management Statement.

6.39 A summary of the key issues considered by the CEMP, and details of where further information in relation to mitigation can be found within the ES, is identified in Table 6.5 below.

Table 6.5: Key Issues Considered by the CEMP

Topic	Issues Covered	Location of further Information
Site Management	Working hours. Pedestrian safety and Site security. Management of sub-contractors.	Chapter 6: Development Programme, Demolition and Construction
Noise	Methods of minimising noise from demolition works, piling, concrete crushing, construction etc e.g. selection of quieter plant, plant maintenance and screening. Management of construction vehicle routing to minimise disruption due to vehicle noise.	Chapter 11: Noise and Vibration Chapter 6: Development Programme, Demolition and Construction
Vibration	Methods of minimising vibration from demolition works, piling, and general construction works e.g. selection of piling methods, cutting rather than breaking.	Chapter 11: Noise and Vibration

Topic	Issues Covered	Location of further Information
Dust / Air Quality	Methods of minimising windblown dust from ground surfaces, stockpiles, earth moving vehicles, work faces etc, e.g. damping down during dry weather, wheel washing, street sweeping. Methods of minimising the impact of exhaust emissions from construction vehicles e.g. switching off engines when not in use.	Chapter 10: Air Quality
Waste / Materials	Methods to minimise waste e.g. minimising packaging waste, protecting materials from damage by weather or vandalism, and the correct disposal of waste.	Chapter 6: Development Programme, Demolition and Construction
Traffic Management	Construction traffic routing to minimise congestion, conflicts between HGV traffic and pedestrians and disturbance to local residents. Wheel washing and street sweeping requirements to minimise the transfer of mud and material from vehicles onto the public highway. Requirements relating to planned closures and diversions of roads. Management of pedestrian access routes within the locality of the Site, particularly around Reading Mainline Station.	Chapter 6: Development Programme, Demolition and Construction
Site drainage and spill control	Methods of handling accidental spills and leaks. Fuel storage. Correct disposal of Site drainage. Pollution Prevention Guidelines.	Chapter 12: Ground Conditions and Contamination Chapter 6: Development Programme, Demolition and Construction
Ecology	Protection of important species including black redstart, peregrine falcons and other breeding birds from harm and/or disturbance.	Chapter 6: Development Programme, Demolition and Construction
Archaeology	Inclusion of archaeological evaluation and recording in the Construction Programme. Preventing disturbances or losses of archaeological resources.	Chapter 9: Historic Environment
Townscape and Visual Quality	Temporary visual intrusion of construction to nearby residents, occupiers of other properties and road and rail users.	Chapter 8: Townscape and Visual Impact Assessment
Built Heritage	Temporary adverse effects upon the setting of the nearby Grade II listed buildings including: the Three Guineas public house to the north, 13-15 Station Road, Great Western House on Station Road; the statue of King Edward VII adjacent to the east of the Site. Potential for damage due to vibration effects. Potential for temporary adverse effects upon nearby Conservation Areas.	Chapter 9: Historic Environment Chapter 11: Noise and Vibration
Liaison with neighbours and Reading Borough Council	Procedures for liaising with neighbours, including production of a regular newsletter. Procedures for liaison with RBC e.g. for planned departures from the CEMP. Procedures for handling complaints.	Chapter 6: Development Programme, Demolition and Construction

6.40 The CEMP would follow best practice guidelines and have due regard to RBC's Sustainable Design and Construction Supplementary Planning Document[2]. The CEMP would be secured by condition on any future planning consent and agreed with RBC's Environmental Health Department prior to the commencement of demolition and construction works.

6.41 The CEMP would also detail responsibilities for the Applicant, the Construction Manager, the Contractors and Sub-Contractors; housekeeping procedures; requirements for monitoring and record keeping; and prohibited or restricted operations.

6.42 The following sections provide further details on working hours, public safety and site security, waste management, materials storage, management of sub-contractors, transport, site drainage, ecology and liaison with RBC and Neighbours that would be incorporated into a CEMP. For details regarding the other issues outlined in Table 6.5 above, please refer to the relevant technical chapter of the ES.

Hours of Work

6.43 Prescribed hours of work would be agreed with RBC. However, due to the proximity of residential dwellings and commercial activities to the Site, and on the basis of initial consultation with RBC, it is likely that the standard hours of work would be as follows:

- 08:00 to 18:00 hours Monday to Friday;
- 08:00 to 13:00 hours Saturday; and
- No working on Sundays or Bank Holidays.

6.44 Such work would not include site start up and close down activities, which may take place for up to an hour before and an hour after the working hours identified above. These activities include: the arrival and departure of workforce and Site staff, maintenance and checking of plant and machinery, refuelling, Site inspections and meetings, safety checks prior to commencing work and Site clean-up at the end of the day. Where the works are undertaken in close proximity to sensitive receptors (such as residential uses), timing of some demolition and construction activities may be considered in further detail.

6.45 In certain cases, there may be a reason that specific activities cannot be completed within the standard hours of work. In these cases, prior notification would be provided to RBC and neighbouring occupiers.

Public Safety, Site Security, Emergencies and Accidents

6.46 A clear and secure demarcation between operational activities and other areas would be maintained to ensure public safety. Particular attention would be paid to crossing points on surrounding roads, demolition and construction routes, access gates and security arrangements. Hoarding will be maintained around the site at all times and will be positioned to maintain existing pedestrian and cycle routes wherever possible. The positioning of this hoarding must be agreed in writing with RBC and all relevant licenses acquired prior to its installation. The hoarding will be provided in accordance with Health and Safety Executive (HSE) standards and will be well lit during hours of darkness and maintained during the works. Information regarding the project and its progress would be provided at the Site boundaries.

6.47 An Emergency Incident Plan would be in place to deal with potential spillages and/or pollution incidents. Pollution incidents would be reported immediately to the relevant regulatory bodies.

Waste Management

6.48 The generation of waste material would occur at all stages of the demolition and construction process, from foundations and structural works through to fitting-out of the new buildings. Major sources include:

- Demolition spoil, for example, concrete, brick rubble, steel, aluminium, plastics, wood, that cannot be re-used or recycled;
- Geotechnically and/ or chemically unsuitable soils (Refer to Chapter 12: Ground Conditions and Contamination);
- Soils/ rock from basement excavation that is not required for use on-site;
- Packaging, for example, plastics, pallets, expanded foams; and
- Waste materials generated from inaccurate ordering, poor usage, badly stored materials, poor handling, spillage.

6.49 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. Records would be maintained regarding the types and quantities of waste produced during the demolition and construction works and the quantities sent for recycling, recovery or disposal.

6.50 All waste will be stored securely in clearly labelled stockpiles, skips or drums in designated areas. Where possible, materials to be reused or recycled will be sorted on-site and stockpiled ready for collection. However, it may be necessary for some wastes to be taken off-site for segregation by a specialist contractor. The amount of construction waste reused, recycled or sent to landfill will be recorded by the Contractor.

6.51 All waste removed from site (including recyclable waste) will be taken to a licensed or exempt waste disposal facility by a registered waste carrier. The Principal Contractor will ensure that all waste carriers and waste disposal facilities are appropriately licensed.

6.52 All potentially hazardous materials, such as waste oil and batteries, require additional handling, storage and disposal precautions. They will be clearly labelled and removed by a specialist licensed Waste Contractor and appropriate measures made for their disposal in accordance with all applicable environmental and health and safety legislation.

6.53 Where suspected contaminated or hazardous material or ground is encountered, that has not previously been identified by site investigations, the Contractor is responsible for commissioning testing of samples to classify the extent and nature of these substances. This shall be undertaken by a UKAS accredited testing facility. If contamination is confirmed present, a suitably qualified specialist would be consulted to determine an appropriate remediation strategy for the area concerned.

6.54 Stockpiling of potentially contaminated material shall be avoided. Where stockpiling is unavoidable, the material must be located on hardstanding and covered with sheeting. Samples of excavated material will also be tested by the Contractor, or appointed agent, to enable classification of the waste for disposal purposes.

6.55 When leaving the Site, appropriate measures will be taken to prevent waste escaping onto the public highways, for example containers must be secured and open skips must be covered by sheeting.

6.56 All roads, pavements, construction equipment, temporary structures, materials and machines will be kept clean and tidy at all times with litter and rubbish removed promptly. Food waste will be collected regularly to avoid attracting vermin to the Site.

6.57 On completion of the works, each contractor will clear away, and remove from the Site, all plant, surplus materials, rubbish and temporary works.

6.58 Provided that waste is managed in accordance with legislation, the likely effects from waste are not considered to be significant. No further consideration has therefore been given to the effects of waste in this ES.

Materials Storage and Handling

6.59 Environmental issues would be considered in the procurement of raw materials and manufactured building components and all such materials would be appropriately stored on-site to minimise damage by vehicles, vandals, weather or theft. Tanks and drums of liquid chemicals and fuels would be stored in bunded compounds. Packaging materials would be returned, where possible.

Management of Sub-Contractors

6.60 All sub-contractors on the Site (for example for demolition or waste disposal) would be required to follow a good working practice as outlined in the CEMP and comply with statutory requirements.

6.61 Through the tender process the sub-contractors would be required to demonstrate how they would achieve the provisions of the CEMP, how targets would be met, and how potential environmental and public nuisance effects would be minimised.

6.62 Contractors at the Site would be required to:

- Run induction courses for all personnel on-site to ensure that the Site rules are obeyed and to achieve the least amount of disruption to neighbouring properties; and
- Inform the Principal Contractor or Construction Manager of any complaints or abnormal works.

Transport

6.63. Detailed arrangements for changes required for the partial road closures and the resulting implications on the local transport system will be provided in a Demolition and Construction Method Statement, and / or a Demolition and Construction Traffic Management Plan. It is anticipated that implementation of these statements would be a requirement on any future planning consent.

6.64. The measures which would be included in these documents include:

- Delivery routes, access points and hours;
- Phased deliveries on a controlled basis with all being clearly marked to show their destination and entry gate number; and
- In the event of unusual activities or events that can be anticipated, RBC and the relevant adjacent property owners or occupiers would be notified, in advance of the activity, wherever possible.

6.65. The defined HGV routes set out within the Construction Traffic Management Plan will ensure vehicles are driven slowly and cautiously, and that drivers will be familiar with the routes and any potential risks associated with them. The routes which HGVs will be travelling along will already

have pedestrian and cyclist facilities, such as footways, cycle routes and crossings. This will mitigate the risk of conflict between vehicles and pedestrians and cyclists.

6.66. In addition, the passage of vehicular traffic to and from the Site would adhere to the Construction Method Statement, to be agreed with RBC, and which would be applicable to all contractors involved in the Proposed Development.

Site Drainage

6.67. All drainage flow routes and connections would be appropriately maintained throughout the demolition and construction works. Should dewatering be required, this would be carried out using standard techniques such as sumps and pump. Any increase in discharges to the foul or surface water sewer, including from dewatering, would be subject to prior agreement with Thames Water.

Ecology

6.68. In line with best practice, demolition and Site clearance works would be undertaken outside the main bird breeding season where practicable (i.e. within the months September to February inclusive). If these works cannot be restricted to within this period, an Ecological Watching Brief would be maintained during the bird breeding season to ensure that no nesting birds are adversely affected. This would include a pre-demolition check to see if birds including black redstarts and peregrines are breeding on Site.

6.69. Should black redstart or peregrine falcon be found on the Site during demolition or construction works in any year, all works in that area of the Site would stop immediately and professional advice taken from a suitably qualified ecologist (SQE) or Ecological Clerk of Works (EcOW). In order that the contractors working on the Site are able to recognise black redstarts, they would be briefed in their identification by means of a toolbox talk carried out by an SQE. If any other birds are found to be breeding on the Site, appropriate measures would be undertaken to protect the nest sites until after the young have fledged.

Liaison with Neighbours and Reading Borough Council

6.70 The Principal Contractor or the Construction Manager would be required to undertake the following:

- Establish a dedicated point of contact and responsibility to deal with issues as they arise. This would be a named representative;
- Undertake regular dialogue with the Council and the local community;
- Log complaints and respond to them in a timely manner. The required actions would be different in each specific case, depending on the operation, equipment and location, and may involve applying additional controls; and
- Notify the Council and neighbours, where appropriate, in advance of unusual activities or events that can be anticipated. The relevant activities would be determined by agreement wherever possible with the Council, once the detailed programme of construction is defined, and would include:
  - Commencement of demolition/construction in certain areas;
  - Necessary night time, weekend or evening working (outside core areas) of a type which may affect properties;
  - Road or footpath closures/diversions and movements of wide loads;
  - Actions requiring monitoring by the Council; and
  - Work on roads affecting land used by others.

References

[1] Building Research Establishment 2018, BREEAM UK New Construction 2018 Non Domestic Buildings (All UK) Technical Manual SD5078. Issue 3

[2] Reading Borough Council, 2011, Revised Sustainable Design and Construction Supplementary Planning Document

7. Socio Economics and Health

Introduction

7.1. This chapter, prepared by Hatch Regeneris, presents an assessment of the likely socio-economic and health effects of the Proposed Development on the existing socio-economic conditions within the local and wider area relevant to the Site.

7.2. The Chapter provides a description of the methods used in the socio-economic and health assessment as well as a description of the relevant baseline conditions of the Site and surrounding area. It also provides an assessment of the likely significant effects of the Proposed Development during site preparation and construction works, and once the Proposed Development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified and/or enhance any likely beneficial effects. The Chapter concludes by taking account of the mitigation measures and examining the nature and significance of likely residual effects.

7.3. This Chapter is accompanied by the following Technical Appendix, provided in **ES Volume 2**:

- **Technical Appendix 7.1: Health Impact Assessment**.

Assessment Methodology and Significance Criteria

Assessment Methodology

Overview

7.4. There are no published standards or technical guidelines that set out a preferred methodology for assessing the likely socio-economic effects of a development. However, there are a series of commonly used methodologies for quantifying economic effects both during the construction of a development and following its completion. Other established qualitative techniques are frequently adopted to assess the social effects of a development. The following section outlines the approach used to conduct this assessment. Where possible, the likely significant socio-economic effects are quantified, but where this is not feasible, a qualitative assessment is provided using professional judgement and experience.

Establishing the Baseline Conditions

7.5. A baseline of existing socio-economic characteristics of the Site and its surrounds was established and is presented later in this chapter. Data used to establish the relevant baseline conditions for the assessment was drawn from the following sources:

- 2011 Census data[1];
- Business Register and Employment Survey data (2017)[2];
- Indices of Multiple Deprivation (2015)[3];
- Claimant Count (JSA) data (2018)[4];
- 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 Assessment[5].

7.6. Different socio-economic effects affect a range of different geographies. A number of different geographies have therefore been used to assess the current baseline conditions. These are defined as follows:

- Local – The Local Impact Area (LIA) defined as Abbey Ward;
- District – defined as the area of Reading Borough (Reading) as the administrative area in which the Site is situated; and
- Regional – defined as the South East of England.

7.7. No national or international effects are anticipated to occur.

7.8. In addition to the above spatial scales, community infrastructure facilities are also assessed according to a number of 'catchment' or administrative spatial scales for planning purposes. These are summarised as follows:

- Primary Healthcare Facilities – within one mile (1.6km) of the Site for GP surgeries based on advice from the Healthy Urban Development Unit (HUDU);
- Primary Schools – within 2 miles[1] (3.2km) of the Site;
- Secondary Schools – across Reading as a whole.

7.9. Open Spaces – based on guidance within the Reading Borough Council (RBC) Open Spaces Strategy[6] (2018):

- <400m for local parks (0.2ha); and
- <1.2km for larger/district parks.

Impact Assessment

7.10. Where relevant, the assessment of effects has been undertaken using the following methods, estimates and assumptions.

Temporary Construction related employment

7.11. Effects have been assessed using the Homes and Communities Agency (HCA) Labour Coefficients[7] (workers per £1m spend) applied to the costs associated with site preparation and construction works. The total number of workers is then divided by the expected timescale of the demolition and construction works to provide an average annual number of workers per annum.

Employment Generation

7.12. Employment generated as a result of the completed and operational Proposed Development has been calculated by applying standard job density ratios for each Use Class and based on the quantum of floorspace development sought for planning approval. The relevant employment densities are based on the HCA's Employment Density Guide[8]. Where necessary, Gross Internal Area (GIA) has been converted to Net Internal Area using a ratio of 85% based on the aforementioned Density Guide to apply the appropriate density. Assumptions are set out below:

- Retail (Class A1-A5) at 17.5 square metres (sqm) per Full Time Equivalent (FTE);
- Leisure (Class D1-D2) at 70 sqm per FTE;

[1] Section 444(5) of the Education Act 1996 suggests a maximum walking distance of 2 miles (3.2 km) for a child who is under the age of eight. This is used as the upper bound for determining eligibility for free school transport. As this guidance applies to children under the age of eight, the distance of 2 miles (3.2 km) is used to assess primary provision.

- Offices (B1) at 11.5 sqm per FTE;
- Hotel (C1) assumed mid-scale at 1 FTE per 3 beds; and
- Residential Institutions (C2) – the quantity of employment associated with C2 uses can vary significantly depending on the nature of the facility and level of services and facilities. As the application for residential institutions is in outline and the nature of provision is not yet defined, it has not been possible to quantify the likely level of employment associated with this use class. Employment from C2 uses is therefore assumed to be zero in order to exercise caution.

7.13. For both the Interim and Completed Development Scenarios, permission is being sought for flexible retail and leisure floorspace (Use Classes A1-A5, D1-D2) whilst for Plot G in the Interim Scenario, permission is being sought for flexible retail, leisure and office floorspace. In relation to these elements of the Proposed Development, a 50:50 split has been assumed between retail and leisure uses (with no office floorspace assumed), as a reasonable worst-case scenario of employment generation.

7.14. In terms of the Completed Development Scenario, a best- and worst-case scenario in terms of employment generation has been assessed based on the minimum and maximum floorspace areas sought for Phase 3, combined with the fixed floorspace schedules for Phases 1 and 2.

Residential Site Population

7.15. An estimation of the new residential site population has been made based on the proposed mix of units applied to existing average household sizes within the local area (1.99 persons per household). Under the Completed Development Scenario, the assessment has been undertaken in accordance with the minimum (750 units) and maximum (1,300 units) scenarios in relation to the proposed number of units.

Child Yield

7.16. An estimate of the child yield arising from the Proposed Development has been established based on the pupil product ratios produced by Cognisant, which are consistent with the ratios used by Brighter Futures for Children[2]. These ratios have been applied to an assumed housing mix for the minimum and maximum number of units.

Spending

7.17. An estimate of the spending generated as a result of the completed and operational Proposed Development has been calculated using an average regional household expenditure figure of £196.80 per week on convenience and comparison goods (ONS, 2017)[9] and £12[3] per day[10] on food and drink by employees. These figures have been applied respectively to the minimum number of households, as a worst-case scenario, and to the number of FTE employees generated on Site.

Demand for General Practitioners

7.18. An estimate of impact on the demand for General Practitioners has been made by adding the estimated population yield from the Proposed Development under both the minimum and maximum housing scenarios to the existing number of registered patients at GPs within one mile (3.2km) of

[2] Brighter Futures are Reading Borough Council's Children's Social Services.
[3] Visa Europe 2014. N.B. this figure has been updated to 2018 prices

the Site and comparing the average ratio of registered patients per FTE GP to the benchmark ratio of 1,800[4] as well as the Reading CCG average ratio (established as part of the baseline).

Open Space and Children's Play Space

7.19. In the absence of any standards for provision set by RBC, the impact on requirements for open space and children's play space of the Proposed Development have been based on a review of the baseline position, the estimated population and child yield arising from the Proposed Development and consideration of information and data presented in RBC's Open Space Strategy (2018). The approach is therefore qualitative and based on professional judgement.

Health

7.20. The health impacts of the Proposed Development have been assessed according to the Healthy Urban Development Unit's (HUDU) Rapid Impact Assessment Tool, which assessed the scheme against 11 different determinants of human health related to the built environment. The Health Impact Assessment can be found in **Technical Appendix 7.1**.

Approach to Outline Assessment

7.21. The assessment of the Proposed 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 Proposed Development, two development scenarios are assessed. The minimum development scenario is based on the minimum area schedule and includes 63,770 sq. m GEA of commercial and leisure floorspace (B1, A1-5 and D1 / D2) and 538 residential units. The maximum development scenario is based on the maximum area schedule and includes 126,270 sq. m GEA commercial and leisure floorspace (B1, A1-5, D1 and D2) and 1,300 residential units. Alternatively, under the maximum development scenario, a proportion of the residential / commercial uses would be replaced by either a hotel or residential institution (assisted care facility). 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.

Approach to Future Baseline

7.23. For the purposes of this assessment it has been assumed that the existing on-Site uses would remain were it not for the Proposed Development. The future baseline scheme at the former Coopers BMW site will result in additional residential floorspace coming forward resulting in increased housing provision and overall population growth. This change in the baseline position may bring about increased demand for social and community infrastructure, such as healthcare, education and open space. The extent to which the capacity of these facilities will evolve is not possible to quantify as it will depend on mitigation measures adopted as part of the future baseline scheme (including built-in mitigation as well as the deployment of S106/Community Infrastructure Levy by the Council).

[4] This is the benchmark used by the Healthy Urban Development Unit (HUDU) and is a widely used and accepted benchmark for planning purposes.

Limitations and Assumptions

7.24. 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.

7.25. The assessment of effects assumes that the Proposed Development would be constructed in accordance with the parameters and area schedules being applied for.

Consultation

7.26. An EIA Scoping Report was prepared by Waterman Infrastructure & Environment Ltd and submitted to RBC, together with a request for a formal Scoping Opinion, in May 2019. The Scoping Opinion received from RBC on 24 July 2019 requested that the socio-economic effects of the increase in residential floorspace and the reduction in Class B1 floorspace compared with the 2016 Consented Scheme should be addressed. The impacts of different options or permutations under the proposed outline planning application should also be included. Impacts should be assessed in terms of their impact on the Borough as a whole.

7.27. A comparison of the effects of the Proposed Development compared with that of the 2016 Consented Scheme as amended by the 2019 Section 73 Applications is provided in the Summary section of this chapter.

7.28. As described above in the 'Approach to Outline Assessment' employment effects have been calculated based on the maximum and minimum floor space areas. Other effects have also been calculated based on the maximum and minimum floor space areas or the scenario likely to generate the worst-case effects as detailed in the 'Assessment Methodology' section of this chapter.

Significance Criteria

7.29. There are no formalised technical guidance or criteria for assessing the significance of socio-economic affects. Likely effects are therefore assessed by considering the following factors, using professional judgement:

- the sensitivity of each receptor affected; and
- the magnitude of change to the receptor brought about by the Proposed Development.

7.30. The sensitivity of each receptor will be evaluated as being high, medium, low or negligible based on a review of the baseline position of each receptor together with consideration of the importance of the receptor in policy terms. This can be summarised as follows:

- **High:** Evidence of direct and significant socio-economic challenges relating to receptor. May be given a high priority in local, regional or national economic and regeneration policy;
- **Medium:** Some evidence of socio-economic challenges linked to receptor, which may be indirect. Change relating to receptor has medium priority in local, regional and national economic and regeneration policy;
- **Low:** Little evidence of socio-economic challenges relating to receptor. Receptor is given a low priority in local, regional and national economic and regeneration policy; and
- **Negligible:** Very low importance and rarity with little or no priority even at local scale.

7.31. The magnitude of change to a receptor will be determined by considering the estimated deviation from baseline conditions, both before and, if required, after mitigation. The criteria used for the assessment of the magnitude of socio-economic effects (both beneficial and adverse) are shown in Table 7.1 below.

Table 7.1: Definition of Magnitude of Change

Magnitude	Criteria
High	The Proposed Development will cause a large change (>10%) to the quality and/or integrity of the receptor when compared with existing socio-economic conditions
Medium	The Proposed Development will cause a moderate change (5-10%) to the quality and/or integrity of receptor when compared with existing socio-economic conditions
Low	The Proposed Development will cause slight change (1-5%) to the quality and/or integrity of the receptor when compared with existing socio-economic conditions
Negligible	No discernible change (<1%) to the baseline socio-economic conditions

7.32. In reporting the likely significance of the effects of the Proposed Development, with respect to both the demolition and construction works and the completed Proposed Development, the assessment contextualises both the sensitivity of the receptor and the magnitude of the change as a result of the Proposed Development. The matrix used to determine the scale of socio-economic effects is presented in Table 7.2. Those effects assessed as minor, moderate and major are considered to be significant, and those assessed as negligible are considered to be insignificant.

Table 7.2: Matrix Used to Determine the Scale of Socio-economic Effects

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

Baseline Conditions

Existing Site and Spatial Context

7.33. The South Site is currently occupied by Telecom House and Friars Walk Shopping Centre both of which are vacant and are undergoing demolition. The North Site is occupied by Xafinity House (a vacant office building which is currently being used by the contractors undertaking the demolition of Telecom House and Friars Walk Shopping Centre), the NCP car park, which is still in use, and a Temporary Events Space used for market stalls, temporary ice rinks and other similar temporary events. The central part of the North Site is currently open land behind construction hoardings following the demolition of the Mecca Bingo Hall, Bus Station, Western Tower and the associated retail arcade in 2016. The Site is located in Reading Town Centre, within Abbey Ward in the administrative boundary of RBC.

Population and Demographic Characteristics

7.34. According to the latest available ONS mid-year population estimates from 2017[11], 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 10 years. Over the same period, Reading's population grew by 13,400 or 9%.

7.35. 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 7.3. 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 7.3: Population and Age Profile

	Abbey Ward		Reading Borough		South East	
	2017 No.	% Share	2017 No.	% Share	2017 No.	% Share
Total Pop	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

Housing Supply

7.36. Abbey ward has a population density of 39.8 persons per hectare (ha), which is roughly in line with the average for Reading as a whole, which is 38.5 persons per ha although residential uses in Abbey Ward are generally high-density developments due to the mix of uses in the town centre with a large amount of commercial space. The housing stock in Abbey ward mainly consists of flats and apartments at 72%. Reading has a higher proportion of houses; 68% of the housing stock across the Borough is houses compared to 32% flats and apartments. Across the South East, 78% of the housing stock is houses, compared to 21% flats and apartments.

Table 7.4: Housing Profile – type and tenure

	Abbey Ward	Reading	South East
Total Dwellings	**6,783**	**65,551**	**3,694,388**
Detached/Semi	5.6%	37.6%	55.8%
Terraced	22.4%	30.5%	22.5%
Flats/Apartments	72.7%	32.1%	21.3%
Other	0.0%	0.2%	0.7%
Total Households	**6,331**	**62,869**	**3,555,463**
Owned	28.0%	54.8%	67.6%
Shared Ownership	3.2%	1.8%	1.1%
Social rented	16.3%	16.3%	13.7%
Private rented	51.4%	26.1%	16.3%
Rent free	1.0%	1.0%	1.3%

Source: Census 2011

7.37. There is a high proportion of private rented households; 51%, in Abbey ward. This compares to 26% in Reading and 16% across the South East. Owner occupier households represent the highest proportion of the tenure split in Reading (55%) and the South East (68%) but makes up a lower proportion of the tenure split in Abbey ward; 28%. The proportion of affordable housing in the Abbey ward and Reading is higher than the average for the South East as a whole. In both Abbey ward and Reading, 16% of housing is social rented, compared to 14% across the South East. Shared Ownership housing makes up 3% of housing in Abbey ward, compared to 2% in Reading and 1% in the South East.

7.38. The Local Plan for Reading dated November 201 (the Plan)[12] sets out a housing target of 15,847 new dwellings to be delivered in the period 2013-2036, equating to 689 dwellings per annum (dpa) and with an affordable housing target of 30% (on sites providing 10 dwellings or more).

7.39. The Plan also notes that around 7,600 new homes are expected to be delivered within the central area of Reading over the plan period. The Plan indicates a mix of different sized dwellings are required in the central area of Reading and sets a maximum threshold for the proportion of three-bedroom units (5%) in order to ensure a diverse mix of sizes.

Employment and Local Economy

7.40. The Plan notes that Reading has a thriving economy and is a net importer of labour. The Plan highlights the wide mix of facilities within the central area of Reading with significant amounts of comparison retail and a strong evening economy supported by a variety of leisure, cultural and entertainment facilities.

7.41. There are around 42,000 jobs in Abbey ward according to the Business Register and Employment Survey (BRES[13]), which represents just over 40% of Reading's overall work-place based employment. Since 2009 employment growth in Abbey ward has been static whereas Reading and the South East have seen growth of over 8%.

Table 7.5: Total Employment Change, 2009-2017

	Abbey Ward	Reading	South East
2009	42,000	95,900	3,923,700
2017	42,000	104,000	4,240,000
% Change	0.0%	8.4%	8.1%

Source: ONS Business Register and Employment Survey, 2009-2017

7.42. The largest employment sectors within Abbey ward are the professional, scientific and technical sector and retail sector with 14.3% of total employment each. This proportion is above the average proportion of employment for Reading and the South East for both sectors. Other significant sectors in Abbey ward include business administration and support services (10.7%), Information & Communication (9.5%) and Financial & insurance (9.5%).

7.43. The construction sector accounts for 5.7% (approx. 241,000) of total jobs within the South East. In Reading, the proportion of jobs within the construction sector is below the regional average, at 2.9% (approx. 3,000 jobs).

Table 7.6: Work-Place based Employment by Sector

	Abbey Ward	Reading	South East
Agriculture, forestry & fishing	0.0%	0.0%	1.3%
Mining, quarrying & utilities	4.2%	2.2%	1.3%
Manufacturing	1.0%	1.9%	6.0%
Construction	1.2%	2.9%	5.7%
Motor trades	0.8%	1.9%	2.0%
Wholesale	1.7%	3.4%	4.5%
Retail	14.3%	10.6%	9.7%
Transport & storage	6.0%	4.3%	4.5%
Accommodation & food services	8.3%	6.7%	7.2%

	Abbey Ward	Reading	South East
Information & communication	9.5%	13.5%	5.7%
Financial & insurance	9.5%	4.8%	2.8%
Property	1.2%	1.2%	1.9%
Professional, scientific & technical	14.3%	10.6%	8.0%
Business administration & support services	10.7%	9.6%	8.6%
Public administration & defence	7.1%	3.4%	3.1%
Education	1.9%	5.8%	10.0%
Health	4.2%	13.5%	12.5%
Arts, entertainment, recreation & other services	3.0%	3.8%	5.3%

Source: ONS Business Register and Employment Survey, 2017

Social Infrastructure

Education: Early Years

7.44. The latest Childcare Sufficiency Assessment[14] (CSA) for Reading suggests that the population of children aged between 0 and 4 years old has increased from 11,937 to 12,472 (4.5%) between 2011 and mid-2015. The CSA attributes growth to international migration and a high birth rate. However, it also identifies that the birth rate is decreasing and suggests that child population growth will start to slow.

7.45. According to the CSA, Reading has a total of 272 registered child care providers, including child minders, day nurseries and pre-schools. Abbey Ward has 14 registered providers and ranks 10th out of 16 wards for child care provision across Reading.

7.46. In terms of the number of places, Reading has a total of 6,641 registered places for children aged 0-4 years old, the majority (31%) of which are in day nurseries.

7.47. Abbey ward has 629 places, 9% of the total in Reading and over 50% of which are in day nurseries. The vacancy rate amongst all registered places in Abbey ward is 12%, just below the average vacancy rate for Reading of 13%. However, there are no vacancies in the Abbey Ward amongst day nurseries and child minders.

7.48. Reading's latest Infrastructure Delivery Plan[15] (IDP) reverts to the Child Care Sufficiency Assessment (2107) and notes that the inner wards of Reading, of which Abbey Ward is one, currently have limited nursery places, and that the increase in entitlement from 15 hours to 30 hours for eligible three and four-year olds, has the potential to generate additional demand for places. However, it concludes that there are no specific priorities for the provision of additional child care places at the moment and that the situation will be subject to ongoing review.

Education: Primary Schools

7.49. There is a total of 40 primary schools and 10 secondary schools across Reading. The 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 7.7 sets out capacity data for schools that fall within two miles (3.2 km) of the Site. This suggests that only 1 of the 26 primary schools within the catchment of the Site is currently over capacity although a number of schools fall below the DfE recommended vacancy allowance of 5%. Overall amongst schools within the 2-mile catchment, there is a surplus in places of around 1,550 (14.8%). It should be noted the data reflects the total surplus within each school and is not reflective of capacity issues that may be apparent within individual year groups.

Table 7.7: Capacity at Primary Schools within 2 miles

School	Capacity	Pupil Roll	Surplus
Alfred Sutton Primary School	630	574	8.9%
All Saints Junior School	120	96	20.0%
Caversham Primary School	450	453	-0.7%
Coley Primary School	270	229	15.2%
E P Collier Primary School	420	316	24.8%
Battle Primary Academy	420	393	6.4%
The Palmer Primary Academy	498	390	21.7%
Civitas Academy	420	151	64.0%
Oxford Road Community School	240	230	4.2%
The Heights Primary School	350	226	35.4%
Redlands Primary School	240	234	2.5%
The Hill Primary School	540	470	13.0%
Wilson Primary School	420	417	0.7%
Ranikhet Academy	396	224	43.4%
Emmer Green Primary School	480	479	0.2%
Southcote Primary School	630	546	13.3%
New Town Primary School	420	252	40.0%
Thameside Primary School	420	414	1.4%
Katesgrove Primary School	630	599	4.9%
Micklands Primary School	480	405	15.6%
New Christ Church Church of England (VA) Primary School	210	192	8.6%
All Saints Church of England Aided Infant School	60	60	0.0%
St John's Church of England Primary School	420	420	0.0%
St Mary and All Saints Church of England Voluntary Aided Primary School	420	341	18.8%
St Anne's Catholic Primary School	240	192	20.0%
Whitley Park Primary and Nursery School	630	601	4.6%
Total	**10454**	**8904**	**14.8% (1,550)**

Source: DfE, School Capacity Tables 2017/18

7.52. In terms of secondary schools, there are 10 across Reading, with the closest to the Site being Kendrick School, which has a capacity of 790 and a current pupil roll of 742. Table 7.8 provides a list of secondary schools within Reading together with their capacity information and indicates that a large majority have a current surplus in capacity with the exception of Reading School. 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 Reading to meet demand.

Table 7.8: Capacity at Secondary Schools within Reading

	Capacity	Pupil Roll	Surplus
UTC Reading	600	430	28.3%
Maiden Erlegh School in Reading	900	538	40.2%
The WREN School	1176	406	65.5%
Highdown School and Sixth Form Centre	1440	1310	9.0%
Reading Girls' School	947	424	55.2%
Reading School	887	984	-10.9%
Prospect School	1700	1150	32.4%
Blessed Hugh Faringdon Catholic School	922	847	8.1%
Kendrick School	790	742	6.1%
John Madejski Academy	950	611	35.7%
Total	**10,312**	**7,442**	**27.8% (2,870)**

Source: DfE, School Capacity Tables 2017/18

Healthcare

7.53. There are ten GP surgeries within 1 mile (1.6km) of the Site. Within these surgeries there are 35.1 Full Time Equivalent (FTE) GPs and around 82,119 registered patients. This gives rise to an average patient list size per FTE GP of 2,341 which is above the Berkshire West Clinical Care Group (CCG) average of 2,058. The Healthy Urban Development Unit (HUDU) benchmark list size is 1,800 patients per FTE GP. This indicates that there may be limited surplus capacity to absorb new patients within the existing surgeries within 1 mile of the Site.

Table 7.9: GP Centres within 1 Mile

	Within 1 Mile	CCG
No. GP Centres	10	49
No. GP FTEs	35.1	266
No Registered Patients	82,119	547,536
Patients per FTE GP	2,341	2,058

Source: NHS Digital, Accessed May 2019

7.54. In terms of dentists, there are currently 12 within one mile (1.6km) of the Site, around half of which are accepting new NHS patients.

Open Space

7.55. Existing Open Space provision in proximity to the Site comprises:

- Forbury Gardens (2.4ha) (Local Park) located 300m west of the Site. This public park is the nearest open space to the Site and includes formal landscaped gardens which underwent

significant restoration in 2005, together with a bandstand and kiosk. This park has received a Green Flag Award. There are no formal children's facilities;

- Christchurch Meadow (Local Park) and the Thames riverbank located 680m to the north of the Site. These areas provide open space for public use;
- Kings Meadow (Local Park) located 800m to the north east of the Site. This provides open space and children's play space; and
- Un-named open space (small recreational open space) located 550m to the west of the Site and used by the surrounding residential areas. This open space has some recreational facilities and children's play space.

7.56. The Reading Open Space Strategy[16] sets out the following hierarchy of open space provision standards:

- District Park (20ha), 1-2km catchment radius;
- Local Park (2ha or 1-2ha equipped play areas), 0.8km catchment radius;
- Neighbourhood Park (Local Equipped Area for Play) (0.1-0.2ha), 0.4-0.8km catchment radius;
- Small recreational open spaces (0.1-0.2ha), 0.4-0.6km catchment radius.

7.57. The Strategy suggests that the total amount of recreational public open space (POS) remains broadly in line with the national guidelines, but it is unevenly distributed across Reading and that residents in the town centre are further away from POS than those in outer wards.

7.58. Key areas of deficiency include Central Reading, within which the Site is situated, and areas immediately to the north-west, south and east of the town centre. In addition, the Open Space Strategy notes that play areas and equipment are used to capacity and continuous investment is required to sustain existing provision. The IDP notes that additional future growth will exacerbate these issues[5].

7.59. The Plan policy EN9 states that on '*sites of 50 dwellings or more, or for developments where the availability and quality of existing open space has been identified as deficient, new provision will be sought. Development must ensure satisfactory provision of children's play areas and neighbourhood parks'*.

Receptor Sensitivity

7.60. Table 7.10 below sets out the receptors assessed, and their respective sensitivity based on the baseline conditions identified in previous sections.

Table 7.10: Sensitivity of Receptors

Receptor	Sensitivity	Comment
Population	Low	The population of both Abbey ward and Reading has been increasing over the last few years and the working age population and economic activity rates are above or in line with national averages.
Housing Supply	Medium	The provision of new dwellings is a strategic policy priority for both Reading borough as a whole and for central Reading.

[5] The Council's submission Local Plan document states at policy EN9 that all new development should make provision for appropriate open space based on the needs of the development. This can be achieved through on or off-site provision.

Receptor	Sensitivity	Comment
Total Employment	Medium	Total employment (work-place based) within Abbey ward represents 40% of total employment across Reading however employment growth in Abbey ward has been stagnant over the last few years.
Local Economy	Low	According to the draft Submission Local Plan, Reading has a thriving economy with a wide variety of comparison retail and a strong evening economy
Employment within the Construction Industry	Low	Employment within the construction industry across the South East is above the national average at 5.7% of total employment.
GP Capacity	High	The average patient list size per FTE GP across surgeries within 1 mile of the Site is above the HUDU benchmark level.
Early Years Provision	Medium	The latest Childcare Sufficiency Assessment indicates a lack of choice and limited capacity amongst providers in Abbey ward.
Primary School Capacity	Medium	Data on school capacity identifies a current surplus in primary school places in the local catchment area however pressures have been identified by the education authority in central Reading. .
Secondary School Capacity	Medium	Data on school capacity identifies a current surplus in Secondary school places across the borough, however the education authority anticipated this will be absorbed due to new housing development.
Open Space Provision	Medium	Central Reading is identified as an area deficient in open space according to the borough's Open Space Strategy.

Source: Hatch Regeneris

Likely Significant Effects

Demolition and Construction

7.61. 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 3.5 years for Phases 1 and 2 and a further three years for Phase 3.

Interim Development Scenario

7.62. The costs associated with the demolition and construction of Phase 1 and 2 of the Proposed Development are expected to generate approximately 3,800 workers, equating to an average of 1,090 workers per annum over the course of the demolition and construction period.

7.63. Construction employment is relatively mobile and therefore employees will likely be drawn from across the region and beyond. The sensitivity of the receptor (construction employment) is low and the magnitude of change is negligible (+0.4%) therefore the likely significance of effects on regional construction levels is **negligible**.

Completed Development Scenario

7.64. The costs associated with the demolition and construction of Phase 1, 2 and 3 of the Proposed Development are expected to generate approximately 7,670 person years of employment, equating to an average of 1,180 per annum over the course of the demolition and construction period.

7.65. Construction employment is relatively mobile and therefore employees will likely be drawn from across the region and beyond. The sensitivity of the receptor (construction employment) is low and the magnitude of change is negligible (+0.5%) therefore the likely significance of effects on regional construction levels is **negligible**.

Interim Development Scenario

Population

7.66. The expected residential population of the new housing provided under the Interim Development Scenario is estimated to be 1,070 people[6]. This would represent a 7.5% increase on the existing population of the local area and a 0.7% increase at the district level. The additional population would include those of working age and would contribute to economic activity levels in the local area and district.

7.67. At the local level, the sensitivity of the receptor is low and the magnitude of change is medium, therefore the significance of effect is **minor beneficial** in the **long term** at the **local** level. At the district level, the magnitude of change is negligible and therefore the significance of effect **negligible**.

7.68. These new residents would create demand for community facilities, particularly primary healthcare, education and open space. These are considered in further detail below.

Housing Supply

7.69. The Interim Development Scenario would deliver up to 538 residential build-to-rent units. These would be studio, one, two and three-bedroom apartments and would include 5% affordable units on site together with an off site financial contribution. The housing units would make a significant contribution towards Reading's annual housing targets, equating to 3.4% of the of the 2013-2036 housing target (15,847) set out within the submission draft Local Plan, 2018 and 7% of the target (7,600) 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. The sensitivity of the receptor is medium and the magnitude of change is medium at the local level and low at the district level, therefore the significance of effect is **moderate beneficial** in the **long term** at the **local** level. At the borough **district** level, the overall effect is **minor beneficial** in the **long term**.

Employment

7.71. Once completed, the Interim Development Scenario will generate employment on Site through the provision of 37,041 sqm GIA of commercial floorspace. Table 7.11 sets out the number of FTE jobs generated based on floorspace proposed within the Development using standard job densities as set out in the Assessment Methodology Section.

Table 7.11: Proposed Employment generating floorspace and job creation

Use Class	GIA	Jobs (FTEs)
Retail & leisure (A1-A5 and D1-D2, B1)	3,852	
Assume 50% leisure (D1-D2)	1,926	28
Assume 50% retail (A1-A5)	1,926	84

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

Use Class	GIA	Jobs (FTEs)
Offices (B1)	33,189	2,432
Total	**37,041**	**2,553**

Source: Hatch Regeneris

7.72. Table 7.11 indicates that the Interim Development Scenario would generate around 2,553 FTE jobs. 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 total employment generation would increase the overall number of jobs at the district level by 2.5%.

7.73. The sensitivity of the receptor is medium and the magnitude of change is low (2.5%) therefore the significance of effect is **minor beneficial** in the **long term** at **district** level.

Local Economy

7.74. In addition to the direct effect of additional employment and housing on Site there are likely to be indirect spending effects on the local economy as a result of the Proposed Development.

7.75. ONS data estimates that the average weekly household spending on comparison and convenience goods and retail services in the South East is £449.60 per week. Therefore, under the Interim Development Scenario, the additional 538 residential units are estimated to generate spending of around £12.5 million per year.

7.76. 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 Proposed Development, local spending by employees could equate to £7.2 million per year.

7.77. Given the town centre location of this Site, it would be expected that a significant proportion of this spending would be captured locally. However, in the context of overall employee and household spending, the magnitude of change is assessed as low

7.78. The sensitivity of the receptor (local economy) is assessed as low and the magnitude of change is low. Therefore, under the Interim Development Scenario the significance of effect is **minor beneficial** in the **long term** at the **district** level.

GP Capacity

7.79. The additional population of 1,070 generated by the Interim Development Scenario will increase demand for primary healthcare facilities. Assuming that all residents are net additional, the number of registered patients per FTE GP within one mile of the Proposed Development may increase to 2,370 (+1.2%). The sensitivity of the receptor is high and the magnitude of change is low, therefore the overall significance of the effect is **moderate adverse** in the **long term** at the **local** level.

7.80. Further details can be found in the Health Impact Assessment (HIA) appended to this Chapter.

Early Years Education

7.81. Based on the methodology set out earlier in this chapter, it is estimated that there would be around 98 early years children generated by the Interim Development Scenario. The latest childcare sufficiency assessment indicates a lack of choice and limited capacity amongst child care providers within and around Abbey ward. Assuming, as a worst-case scenario that all children are net additional, this will increase the early years population at the local level by 9.1% district level by 0.8%. The sensitivity of the receptor is medium and the magnitude of change at the local level is

high, therefore the overall significance of effect is **moderate adverse** in the **long term** at the **local** level.

Primary Years Education

7.82. Based on the methodology set out earlier in this chapter, it is estimated that there would be around 52 primary school aged children generated by the Interim Development Scenario.

7.83. As set out in the Baseline Section there are fourteen primary schools within 3.2 km of the Site. There are 1,550 surplus places within these schools. Assuming, as a worst-case scenario all children are net additional, this will reduce the surplus capacity by 3.3%. The sensitivity of the receptor is medium and the magnitude of change is low, therefore the overall significance of effect is **minor adverse** in the **long term** at the **local** level.

Secondary Years Education

7.84. Based on the methodology set out earlier in this chapter, it is estimated that there would be around 18 secondary school aged children generated by the Interim Development Scenario including post-16 aged school children.

7.85. Across Reading there are ten secondary schools, which have a combined surplus capacity of 2,870 places across all year groups. Assuming as a worst-case scenario all children are net additional, this will reduce the surplus capacity by less than 1%. The sensitivity of the receptor is medium and the magnitude of change is negligible, therefore the overall significance of effect is **negligible**.

Open Space

7.86. The Interim Development Scenario would include approximately 6,380m^2 of new public realm. In addition, each apartment would have access to a shared amenity space and / or private balcony. A minimum of 6m^2 of private or shared amenity space would be provided per residential unit.

7.87. The sensitivity of the receptor is medium and the magnitude of change is assessed as minor, therefore the overall significance of effect is **minor beneficial** in the **long term** at the **local** level. Further details can be found in the HIA appended to this chapter.

Completed Development Scenario

Population

7.88. The expected residential population of the new housing provided under the Completed Development Scenario is estimated to range between 1,070 people under the minimum housing scenario and 2,590 under the maximum housing scenario. This would represent a minimum increase of 7.5% and a maximum increase of 18% on the existing population of the Abbey Ward and a minimum increase of 0.7% and a maximum increase of 1.6% at the district level.

7.89. At the local level, the sensitivity of the receptor is low and the magnitude of change is medium to high under the minimum and maximum scenario respectively, therefore the significance of effect is minor to **moderate beneficial** in the **long term** at the **local** level. At the **district** level, the magnitude of change is negligible under the minimum scenario resulting in a **negligible** effect in the **long term**, and low under the maximum scenario resulting in a **minor beneficial** in the **long term**.

7.90. These new residents would create demand for community facilities, particularly primary healthcare, education and open space. These are considered in further detail below.

Housing Supply

7.91. The Development would deliver a minimum of 538 and a maximum of 1,300 residential units, 538 of which would be build-to-rent under Phase 1, with the remainder of units under Phase 3 not yet specified. These would be studio, one, two and three-bedroom apartments and would include a proportion of affordable housing; the percentage and tenure split would be subject to agreement with Reading Borough Council. The housing units would make a significant contribution towards Reading's annual housing targets, equating to between 3.4% and 8.2% of the of the 2013-2036 housing target (15,847) set out within the submission draft Local Plan, 2018 and between 7% and 16.9% of the target (7,600) for the central area of Reading for the same period. The units will be a combination of build-to-rent units and other types of market housing thereby contributing to the variety and mix of units on offer in the centre of Reading.

7.92. The sensitivity of the receptor is medium and the magnitude of effect at the local level is medium under the minimum scenario and high under the maximum scenario, therefore the significance of effect is **major to moderate beneficial** in the **long term** at the **local** level. At the **district** level, the magnitude of change is low under the minimum scenario and medium under the maximum scenario, therefore the overall effect is **minor** to **moderate beneficial** in the **long** term.

Employment

7.93. The Completed Development will generate employment through the provision of a minimum of 62,491 sqm and a maximum of 126,141 sqm of commercial floorspace. The minimum and maximum parameters would vary the level of employment generated by the commercial floorspace. Table 7.12 sets out the number of FTE jobs generated based on the minimum and maximum GIA floorspace proposed within the Completed Development using standard job densities as set out in the Methodology Section.

Table 7.12: Proposed Employment generating floorspace and job creation

Use Class	Minimum scenario		Maximum scenario	
	GIA	Jobs (FTEs)	GIA	Jobs (FTEs)
Retail & leisure and office (A1-A5 and D1-D2, B1)	4,302 sq. m		7,352	
Assumed 50% Leisure	2,151 sq. m	31	3,676	53
Assumed 50% retail	2,151 sq. m	104	3,676	179
Residential Institutions (C2)	0		250 room	Not known
Hotel (C1)	0	0	450 rooms	150
Offices B1	58,189 sq. m	4,264	118,789 sq. m	8,704
Total	**62,491 sq. m**	**4,399**	**126,141/ 250 rooms C2 / 450 rooms C1**	**9,085**

Source: Hatch Regeneris

7.94. Table 7.12 indicates that the Completed Development Scenario would generate a minimum of 4,399 FTE jobs and a maximum of 9,085 FTE jobs through the commercial end uses. In addition, a small number of jobs (minimum of 10) would be created from car-parking and residential uses through management and maintenance roles as well as potentially through the C2 uses. Under the minimum scenario this would increase the jobs at the district level by 4.2% and under the maximum scenario by 8.7%.

7.95. The sensitivity of the receptor is medium and under a minimum scenario the magnitude of change is low (4.2%) therefore the significance of effect is **minor beneficial** in the **long term** at **district**

level. Under the maximum scenario, the magnitude of change is medium (8.7%), therefore the significance of effect is **moderate beneficial** in the **long term** at the **district** level.

Additional Spending

7.96. In addition to the direct effect of additional employment and housing on Site there are likely to be indirect spending effects on the local economy as a result of the Completed Development.

7.97. ONS data estimates that the average weekly household spending on comparison and convenience goods and retails services in the South East is £449.6 per week. Therefore, under the Completed Development Scenario, the additional 538 to 1,300 residential units are estimated to generate spending of between £12.6 and £30.3 million per year.

7.98. Employees working on Site would also generate 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 minimum and maximum commercial floorspace scenarios, local spending by employees could equate to between £12.4 and £25.6 million per year. It should be noted that some of this spending will be captured already as part of household spending if employees also live on Site.

7.99. Given the town centre location of this Site, it would be expected that a significant proportion of this spending would be captured locally. In the context of overall employee and household spending, the magnitude of change is assessed as medium.

7.100. The sensitivity of the receptor (local economy) is assessed as low and the magnitude of change is medium. Therefore, the under the Completed Development Scenario the significance of effect is **minor beneficial** in the **long term** at the **district** level.

GP Capacity

7.101. The maximum additional population of 2,590 generated by the Completed Development Scenario will increase demand for primary healthcare facilities. Assuming that all residents are net additional, the number of registered patients per FTE GP may increase to 2,413 (+3.1%). Under the minimum housing scenario, the additional population equates to 1,1,070 leading to an increase of 1.2 in registered patients per FTE GP. The sensitivity of the receptor is high and the magnitude of change under both the minimum and maximum housing scenarios is low, therefore the overall significance of the effect is **moderate adverse** in the **long term** at the **local** level.

7.102. Further details can be found in the Health Impact Assessment (HIA) appended to this chapter.

Early Years Education

7.103. Based on the methodology set out earlier in this chapter, assuming development of the maximum number of residential units (1,300), it is estimated that there would be around 237 early years children generated by the Completed Development Scenario. The latest childcare sufficiency assessment indicates a lack of choice and limited capacity amongst child care providers within and around Abbey ward. Assuming as a worst-case scenario all children are net additional, this will increase the early years population in the local area by 22% and in the district by 2%. Under the minimum housing scenario, the early years child yield is expected to be 98 which would lead to an increase in the early years' population of 9.1% in the local area and 0.8% in the district.

7.104. The sensitivity of the receptor is medium and the magnitude of change at the local level is high under both the minimum and maximum scenario, therefore the overall significance of effect is **major adverse** in the **long term** at the **local** level.

7.105. In reality, not all early years' children will be net additional to the local area and not all will require or take-up early years places.

Primary Years Education

7.106. Based on the methodology set out earlier in this Chapter, assuming development of the maximum number of residential units (1,300), it is estimated that there would be around 125 primary school aged children generated by the Completed Development Scenario.

7.107. As set out in the Baseline Section there are fourteen primary schools within 3.2 km of the Site. There are 1,550 surplus places within these schools. Assuming, as a worst-case scenario that all children are net additional, this will reduce the surplus capacity by 8% still maintaining a vacancy rate well above the 5% minimum recommended allowance. Under the minimum housing scenario, the child yield of primary school aged children is expected to be 52 leading to a reduction of 3.3% of surplus capacity. The sensitivity of the receptor is medium and the magnitude of change is medium under the maximum housing scenario and low under the minimum housing scenario, therefore the overall significance of effect is **minor** to **moderate adverse** in the **long term** at the **local** level.

Secondary Years Education

7.108. Based on the methodology set out earlier in this chapter, assuming development of the maximum number of residential units (1,300), it is estimated that there would be around 45 secondary school aged children generated by the Completed Development Scenario including those aged post-16.

7.109. Across Reading there are ten secondary schools, which have a combined surplus of 2,870 places across all year groups. Assuming, as a worst-case scenario that all children are net additional, this will reduce the surplus capacity by 2%. Under the minimum housing scenario, the child yield of secondary school pupils is expected to be 18 which will reduce the surplus capacity by less than 1%. The sensitivity of the receptor is medium and the magnitude of change is low under the maximum housing scenario and negligible under the minimum housing scenario, therefore the overalls significance of effect is **negligible** under the minimum housing scenario and **minor adverse** in the **long term** at the **district** level under the maximum housing scenario.

Open Space

7.110. The Proposed Development would include approximately 7,880m2 of public realm. In addition, each apartment would have access to a shared amenity space and / or private balcony. A minimum of 6m^2 of private or shared amenity space would be provided per residential unit.

7.111. The sensitivity of the receptor is medium and the magnitude of change is assessed as minor, therefore the overall significance of effect is **minor beneficial** in the **long term** at the **local** level. Further details can be found in the HIA appended to this chapter.

Mitigation Measures and Likely Residual Effects

Demolition and Construction

7.112. No long term adverse socio-economic effects of the construction phase have been identified and therefore no mitigation is required.

7.113. However, the benefit of construction employment can be maximised at the local level by the implementation of job brokerage schemes, apprenticeships and training schemes. The Section 106 Agreement for Phase 1 of the Proposed Development incorporates a requirement for the

production, implementation and monitoring of an Employment and Skills Plan for the construction phase of the Proposed Development or an equivalent commuted sum. On the basis that such a scheme is implemented, the effects would likely be minor beneficial. However, as the amount of local construction employment cannot be determined at this stage the residual effect for the demolition and construction employment of the Development are assessed to remain, at worst, **negligible** at the district level.

Interim and Completed Development Scenario

7.114. Unless otherwise stated, the mitigation measures and likely residual effects of the Interim and Completed Development scenario remain the same as presented in the Likely Effects section.

7.115. Under the Interim Development Scenario, mitigation required to address potential capacity issues relating to demand for primary healthcare provision, early years provision, and primary school places would be made in the form of financial contributions through the Community Infrastructure Levy and contributions under the S106 Agreement.

7.116. Under the Completed Development Scenario, potential capacity issues relating to demand for primary health care, early years provision, as well as primary and secondary school places would be made in the form of financial contributions through the Community Infrastructure Levy and contributions under the S106 Agreement.

7.117. As a result, following mitigation, the residual effect of the additional population and children on primary healthcare, early years and primary school capacity would be **negligible.**

7.118. The effect of the Proposed Development on the generation of employment, the delivery of housing, open space, and the effect on secondary school places is assessed as beneficial or negligible. Therefore, the effects do not require mitigation. The residual effect on population, housing, employment, local economy, open space and secondary (under the Interim Development Scenario) school places scenario therefore remains the same as presented in the Likely Effects section.

Summary

7.119. A summary of the potential and residual socio-economic effects of the Proposed Development are summarised within Table 7.13 below.

Table 7.13: Summary of Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Construction Interim Development Scenario			
Temporary construction employment	**Negligible**	None required. Consider implementation of job brokerage schemes, apprenticeships and training schemes	**Negligible**
Construction Completed Development			
Temporary construction employment	**Negligible**	None required. Consider implementation of job brokerage schemes, apprenticeships and training schemes	**Negligible**
Interim Development Scenario			

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Population	**Long term and of minor beneficial significance at the local level and negligible significance at the district level**	None required	**Long term and of minor beneficial significance at the local level and negligible significance at the district level**
Housing Supply	**Long term and of moderate to major beneficial significance at the local level and minor to moderate beneficial significance at the district level**	None required	**Long term and of moderate to major beneficial significance at the local level and minor to moderate beneficial significance at the district level**
Total Employment	**Long term and of minor beneficial significance at the district level**	None required	**Long term and of minor beneficial significance at the district level**
Local Economy	**Long term and of minor beneficial significance at the district level**	None required	**Long term and of minor beneficial significance at the district level**
GP Capacity	**Long term and of moderate adverse significance at the local level**	Financial Contributions	**Negligible**
Early Years Capacity	**Long term and of moderate adverse significance at the local level**	Financial Contributions	**Negligible**
Primary School Capacity	**Long term and of minor adverse significance at the local level**	Financial Contributions	**Negligible**
Secondary School Capacity	**Negligible**	None required	**Negligible**
Open Space	**Long term and of minor beneficial significance at the district level**	None required	**Long term and of minor beneficial significance at the district level**
Completed Development			
Population	**Long term and of minor to moderate beneficial significance at the local level and negligible to minor beneficial significance at the district level**	None required	**Long term and of minor to moderate beneficial significance at the local level and negligible to minor beneficial significance at the district level**
Housing Supply	**Long term and of major beneficial significance at the local level and moderate beneficial significance at the district level**	None required	**Long term and of major beneficial significance at the local level and moderate beneficial significance at the district level**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Total Employment	**Long term and of minor to moderate beneficial significance at the district level**	None required	**Long term and of minor to moderate beneficial significance at the district level**
Local Economy	**Long term and of moderate beneficial significance at the district level**	None required	**Long term and of moderate beneficial significance at the district level**
GP Capacity	**Long term and of moderate adverse significance at the local level**	Financial Contributions	**Negligible**
Early Years Capacity	**Long term and of major adverse significance at the local level**	Financial Contributions	**Negligible**
Primary School Capacity	**Long term and of minor to moderate adverse significance at the local level**	Financial Contributions	**Negligible**
Secondary School Capacity	**Long term and of negligible to minor adverse significance at the local level**	Financial Contributions (under maximum housing scenario)	**Negligible**
Open Space	**Long term and of minor beneficial significance at the district level**	None required	**Long term and of minor beneficial significance at the district level**

Comparison of Effects between this ES and the 2015 ES as amended by the 2019 ES Addendum

7.120. The key difference between this application and the 2015 ES as amended by the 2019 ES Addendum in relation to socio-economics impacts are the changes to the commercial floorspace provision and the increased number of residential units. Table 7.14 sets out the resulting changed to impacts:

Table 7.14: Comparison of Impacts

	2015 ES	This ES
FTE Jobs	4,950-9,100	4,399-9,085
Housing	475-550	538-1,300
Population Yield	950-1,100	1,070-2,590
Primary Child Yield	53	52-125
Secondary Child Yield	14	18-45

7.121. As a result of these changes to impacts, there has been the following changes to the scale and significance of effects:

- There has been a change to the potential effect on employment from '**substantial beneficial**' in the 2015 ES as amended by the 2019 ES Addendum to **minor to moderate beneficial** in this ES. However, this change in the significance of effects is partly as a result of a change in the method of assessing significance

- There has been a change to the potential effect on housing under the maximum Completed Development Scenario from '**moderate beneficial**' in the 2015 ES as amended by the 2019 ES Addendum, to **major beneficial** in this ES;
- There has been a change to the potential effect on primary school capacity prior to mitigation from '**minor adverse**' in the 2015 ES as amended by the 2019 ES Addendum to **moderate adverse** under a maximum parameter housing scenario in this ES. Following mitigation, the residual effect on primary school capacity remains **negligible** as set out in the 2015 ES;
- There has been a change to the potential effect on primary healthcare capacity prior to mitigation from '**minor adverse**' in the 2015 ES as amended by the 2019 ES Addendum to **moderate adverse** in this ES. Following mitigation, the residual effect on primary healthcare remains as set out in the 2015 ES; that is **negligible.**

7.122. All other effects remain as stated in the 2015 ES.

References

[1] ONS 2011 Census data
[2] Business Register and Employment Survey data (2017) Office for National Statistics;
[3] Indices of Multiple Deprivation (2015);
[4] ONS Claimant Count, (September 2018);
[5] Reading Borough Council, Childcare Sufficiency Assessment 2017, October 2017
[6] Reading Open Spaces Strategy Update, January 2018, Reading Borough Council
[7] Homes and Communities Agency (2015), 'Calculating Cost Per Job – Best Practice Note. Third Edition'
[8] Homes and Community Agency, Employment Density Guide, 3rd Edition, November 2015
[9] Office for National Statistics, 2017, Family Sending.
[10] Visa Europe, 2014, UK Working Day Spend Report
[11] ONS Mid-Year Population Estimates, 2017
[12] Reading Borough Council, November 2019 Local Plan
[13] Business Register and Employment Survey, 2017, Office for National Statistics
[14] Childcare Sufficiency Assessment 2017, Final Report, October 2017, Reading Borough Council
[15] Reading Infrastructure Delivery Plan, May 2017, Reading Borough Council
[16] Reading Open Spaces Strategy Update Note 2018, January 2018

8 Townscape and Visual

Introduction

8.1 This chapter assesses the likely significant effects of the Proposed Development on townscape character and views. It provides a description of the methods used in the assessment and the relevant baseline conditions of the Site and surrounds. This is followed by an assessment of the likely significant effects of the Proposed Development during demolition and construction and once the Proposed Development is completed.

8.2 Where appropriate, mitigation measures are identified to avoid, reduce or offset any likely adverse effects, or enhance any beneficial effects. Taking account of the mitigation measures, the likely nature and significance of the residual effects are described.

8.3 It should be noted that the assessment of the likely significant effects of the Proposed Development upon built heritage is presented in **Chapter 9: Historic Environment**.

Assessment Methodology and Significance Criteria

Assessment Methodology

8.4 The aim of this townscape and visual effects assessment is to establish the following in relation to the Proposed Development:

- An understanding of the Site and its wider townscape setting, identifying the character and sensitivity of receptors to the Proposed Development;
- An assessment of the composition, character and aesthetic value and sensitivity of views from relevant visual receptors;
- The predicted likely effects (and their significance) of the Proposed Development upon townscape character and visual amenity;
- Compliance of the Proposed Development with relevant policy;
- The need for any mitigation to reduce, offset or minimise any significant adverse effects; and
- The likely residual effects and their significance upon townscape character and visual amenity.

8.5 The methodology is based on current best practice and guidance from the following sources:

- *'Guidelines for Landscape and Visual Impact Assessment*[1]*'*, Landscape Institute (LI) and Institute of Environmental Management and Assessment (IEMA), Third Edition, 2013;
- *'An Approach to Landscape Character Assessment*[2], Natural England 2014;
- '*Advice Note 01/11: Photography and Photomontage in Landscape and Visual Impact Assessment'*[3], Landscape Institute, 2011[1;] and
- *'Tall Buildings - Advice Note 4'*[4], Historic England, 2015.

8.6 This assessment considers two inter-linked issues as follows:

- **Townscape effects**: the likely effects (and their significance) of
- the Proposed Development on the physical and cultural characteristics of the Site and on the surrounding townscape character; and

- **Visual effects**: the likely effects (and their significance) of the Proposed Development on views from visual receptors, and the likely effects and their significance on the amenity value of these views.

Establishing the Baseline

8.7 The baseline conditions relevant to the assessment were derived from the following:

- Fieldwork to undertake an assessment of the character of the Site and its surrounds, together with the sensitivity of the townscape to change;
- Use of existing descriptions of townscape character using national level character assessment from the National Character Areas[5] (produced by Natural England), The Reading Tall Building Strategy[6] and the Reading Local Plan[7]; and
- A description of the key features and views of the existing Site and surrounding area and identification of their sensitivities to change.

Townscape Assessment

8.8 A townscape resource should be understood in terms of:

- Its constituent elements;
- Its character and the way this varies spatially;
- Its geographic extent;
- Its history;
- Its condition; and
- The way it is experienced, including the value attached to it.

8.9 A receptor is a defined aspect of the townscape resource that has the potential to be affected by a development. Therefore, the baseline, alongside the description of the physical and cultural characteristics of the Site and surrounds, forms the basis for the identification and description of the changes that may result to townscape as a result of a development. Through a combination of baseline data, including relevant data from published character studies at national and local scales, and Site survey the townscape is classified into units of distinct and broadly homogenous characteristics referred to as Townscape Character Areas (TCAs). Additionally, definition of townscape character includes consideration of certain locally valued / designated aspects such as Conservation Areas, Buildings of Townscape Merit (BTM) and Other Open Land of Townscape Importance (OOLTI).

Visual Assessment

8.10 The visual baseline establishes the area in which the Site may be visible, the nature of the views and amenity value attributed to the views. Viewpoint locations were established through desk-based research, including Geographical Information System (GIS) analysis of the topography of the Site and surrounding area. Using Ordnance Survey (OS) base mapping and profile height data, a Terrain Analysis has been produced (refer to **Figure 8.1**). Consideration was also given to protected or locally defined views such as views and vistas defined in the Local Plan (Reading Borough Local Plan (November 2019))[7].

8.11 The desk-based selection of viewpoints has then been verified through Site fieldwork.

8.12 The photographic locations for each viewpoint were agreed via consultation with RBC through the Scoping Report and Scoping Opinion, a copy of which can be found in **Technical Appendix 2.2**

and Technical Appendix 2.3. In total 27 viewpoints have been selected and agreed. The viewpoints predominantly comprise a selection of those used for the 2015 ES. Although 35 viewpoint points were used in the 2015 ES, in agreement with RBC some of these were changed or removed as they represented very similar viewpoints. However, for completeness and to allow comparison with the assessment completed for the 2015 ES as amended by the 2019 ES Addendum, the viewpoint numbering has remained the same where possible.

8.13 The selected viewpoints are considered as being the best locations for representative views of the Proposed Development. Whilst some 'private' views may have more direct views than those selected, by necessity, the visual analysis is based on views from external spaces within the public domain and not from inside buildings or private spaces.

8.14 The process of generating verified views (also referred to as Accurate Visual Representations (AVRs)) for the Proposed Development was carried out using a methodology that is compliant with relevant sections of:

- The Landscape Institute / IEMA Guidelines for Landscape and Visual Impact Assessment (3rd edition 2013); and
- The Landscape Institute Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment.

8.15 Field surveys were undertaken in March 2019 to obtain all viewpoint photography (with the exception of viewpoint 6 which was undertaken in July 2019). Cityscape uses a Canon 5D MK IV high resolution digital camera for the digital photography. All baseline photographs comprise high resolution images. For local views, a wide angle lens of 24mm or 35mm is generally used in order to capture as much of the proposal and its surroundings as possible. Intermediate distance views were photographed with a lens between 35mm to 70mm and occasionally, where required, long range views were photographed with lens options ranging from 70mm to 600mm.

8.16 It is acknowledged that differing visual effects are possible due to seasonality and that the winter view provides clearer prospects where deciduous vegetation intervenes. The assessment considers the winter view (no leaves on the trees) through review and assessment of the winter photography and consequently, the assessment is based on winter views which depict the worst-case scenario. The photography for viewpoint 6 was taken in July 2019 following consultation with RBC. In the photograph, a tree in full leaf obscures the view of St Giles' Church spire. However, an outline of the church has been added to the base photo and wirelines to show its location relative to the Proposed Development as the spire would be more visible in winter.

8.17 The assessment process aims to be objective and to qualify effects as far as possible. However, it is recognised that subjective judgement is appropriate, if it is based on training and experience and supported by clear evidence. Whilst changes to a view can be factually defined, the evaluation of townscape character and visual amenity does require qualitative judgements to be made on the significance of effects. The conclusions of this assessment therefore combine systematic observation and measurement, with informed professional interpretation.

Approach to Outline Assessment

8.18 In respect of the assessment of the outline component of the Proposed Development, the assessment set out within this Chapter has considered the both the maximum and minimum allowable parameters sought for approval.

Approach to Future Baseline

8.19 For the purposes of this assessment the future baseline scheme which is currently being implemented (Former Coopers BMW site (planning reference 162166)), is considered to form part of the of the existing baseline. It has been represented as the black outline in the baseline photography and wirelines for all scenarios. This future baseline scheme has been considered when assessing the sensitivity of baseline views/townscape character and during the assessment of effects of both the Interim Development and Completed Development scenarios.

Significance Criteria

8.20 The two principal criteria determining significance are the sensitivity of the receptor (based on its value and susceptibility to change as a result of the Proposed Development), and the magnitude of the effect. To come to an overall conclusion on the significance of townscape and visual effects, the separate judgements regarding the sensitivity of the receptors and the magnitude of the effects need to be combined.

Value and Sensitivity to Change

8.21 Table 8.1 sets out the criteria used to define the value of townscape and visual receptors and the criteria used to define the sensitivity of townscape and visual receptors to change.

Table 8.1: Value and Sensitivity to Change Criteria

Value and Sensitivity to Change	Criteria	
	Townscape Receptor	**Visual Receptor**
High	• Internationally (i.e. World Heritage Site) or nationally statutory designated (i.e. National Parks, Areas of Outstanding Natural Beauty, Registered Park and Garden, Listed Buildings and Scheduled Monuments) recognised townscape of high quality and distinctive character with a large number of features and strong sense of place. • A relatively undisturbed, pristine townscape where changes or disruptions to the existing townscape would be noticeable and difficult to mitigate or restore. • Susceptible to change which would permanently alter key characteristics and elements of the townscape. • Locally designated (i.e. BTMs, OOLTIs, Conservation Areas, Local Green Spaces, and Local Nature Reserves) / recognised townscape with some distinctive and / or designated characteristics and features in reasonable condition (e.g. a public/ semi-public private open space that is of value to the local community). Townscape of relatively widespread and common features or characteristics, capable of tolerating moderate levels of	• Receptors with a key interest and expectation of enjoying the view (e.g. walkers and cyclists. • Residents in homes who have open, uninterrupted views in the direction of the Proposed Development. Receptors within a nationally or internationally designated townscape.

Value and Sensitivity to Change	Criteria	
	Townscape Receptor	Visual Receptor
	change without affecting the key characteristics and elements.	
Medium	• Locally designated (i.e. BTMs, OOLTIs, Conservation Areas, Local Green Spaces, and Local Nature Reserves) / recognised townscape with some distinctive and / or designated characteristics and features in reasonable condition (e.g. a public/ semi-public private open space that is of value to the local community). Townscape of relatively widespread and common features or characteristics, capable of tolerating moderate levels of change without affecting the key characteristics and elements.	• Recreational receptors where the view is valued but not fundamental to the location or activity. • Existing residents who have views in the direction of the Proposed Development where the quality, condition and extent of the existing view is unexceptional. • People travelling on local roads or on trains with specific interest in the view but where viewing periods are discontinuous and / or irregular. Receptors within locally valued townscapes.
Low	• Undesignated townscape with local value but low quality. • Few distinctive characteristics, features or elements many of which may be in poor condition. • Townscape capable of tolerating substantial change / improvement / enhancement.	• People engaged in activities that either distract from the view or require concentration on the foreground, resulting in minimal interest or appreciation of the view (e.g. people at work, motorists travelling not for the specific enjoyment of the scenery or people engaged in sports or recreation where the focus is more on the activity rather than the view). Receptors where visual amenity is not the principal reason for them to be present or where the quality of the existing view is poor (e.g. industrial areas or derelict land).

Magnitude

Townscape

8.22 The magnitude of townscape impact depends on the following:

- The scale and extent of change in the townscape with respect to the loss and / or addition of new characteristics or features;
- The degree of contrast, or integration / compatibility of any new features with existing characteristics of the townscape;
- The duration of the impact (temporary or permanent). Impacts for the Interim Development Scenario have been assessed as Permanent. However, in some cases the level of significance changes for the Completed Development;
- The distance of the townscape resource from the source of the impact;
- The degree of containment / openness, influenced by urban grain, topography and presence of intervening vegetation and other features (and therefore also seasonal variation); and
- The extent of mitigation planting or other mitigation measures such as extent or positioning of new buildings or structures.

Visual

8.23 The magnitude of the visual impact depends on the following:

- The scale of change in the view with respect to the loss and / or addition of new features;
- The degree of contrast, or integration of / compatibility with any new features with existing features in the view;
- The duration of the effect (temporary or permanent). Impacts for the Interim Development Scenario have been assessed as Permanent. However, in some cases the level of significance changes for the Completed Development;
- The distance of the receptor from the source of the impact;
- The angle of view and presence of intervening vegetation or features;
- The dominance of the impact feature in the view;
- Seasonal variation;
- The extent and position of the new buildings and structures that would be visible in the view;
- The extent to which views of the Proposed Development would be screened or filtered by intervening landform or by townscape elements such as trees, or built structures; and
- The extent of mitigation planting.

8.24 Table 8.2 sets out the criteria used to assess the magnitude of predicted townscape and visual impacts.

Table 8.2: Magnitude Criteria

Magnitude of Change	Criteria	
	Townscape Receptor	**Visual Receptor**
Major	• All / most key characteristics / features / elements of the townscape would be affected within a specific area. • Limited change in townscape characteristics over an extensive geographical area. • The Proposed Development would be completely incompatible or inconsistent with the area and its surroundings.	• Extensive change to baseline view and / or loss of key visual features. • Introduction of anomalous and highly prominent or dominant new elements.

Magnitude of Change	Criteria	
	Townscape Receptor	Visual Receptor
Moderate	• Some key characteristics / features / elements would be affected within a specific area. • Limited change in townscape characteristics over a wider area without compromising the overall integrity of the townscape. • The Proposed Development would introduce some notable elements which would be inconsistent with the existing character which would affect a limited area of the townscape.	• Notable change to baseline view (e.g. partial loss of key visual features). • Introduction of prominent, but essentially localised new features or elements.
Minor	• Very few key characteristics / features / elements would be affected. • The Proposed Development would introduce some elements which would affect a very limited number of key characteristics / features / elements within a localised area of the townscape.	• Minimal change to baseline view (e.g. limited loss of visual features), changes are evident, but not especially prominent and are generally localised.
Negligible	• No discernible change to the key characteristics of the townscape character. • Could include a minimal degree of change within a highly localised area of the townscape.	• Barely perceptible change to baseline view and / or very brief exposure to view.

Significance of Effect

8.25 The assessment combines the sensitivity of the receptors with the predicted magnitude of impact to establish the significance of the townscape and visual effects as shown in Table 8.3.

Table 8.3: Significance of Effect Matrix

Sensitivity to Change

		High	Medium	Low
Magnitude of Change	Major	Major Adverse / Beneficial	Major Adverse / Beneficial	Moderate Adverse / Beneficial
	Moderate	Major Adverse / Beneficial	Moderate Adverse / Beneficial	Minor Adverse / Beneficial
	Minor	Moderate Adverse / Beneficial	Minor Adverse / Beneficial	Minor Adverse / Beneficial
	Negligible	Negligible	Negligible	Negligible

8.26 Based upon the significance matrix presented within Table 8.3, the assessment of likely and residual townscape and visual effects can be described as stated within Table 8.4.

Table 8.4: Significance of Likely Effects and Likely Residual Effects

Significance	Description	
	Townscape Character	Visual Amenity
Adverse effect of major significance	The Proposed Development is at considerable variance with the scale, landform and pattern of the townscape, and / or there is a total or major loss of key characteristics.	The Proposed Development would be visually intrusive and would cause substantial deterioration and / or adverse change in the existing view / general visual amenity of the area.
Adverse effect of moderate significance	The Proposed Development is out of proportion and does not fit with the scale, landform and pattern of the townscape, and / or damages quality, with a loss of key characteristic features.	The Proposed Development would be visually intrusive and would cause noticeable deterioration and / or adverse change in the existing view/ general visual amenity of the area.
Adverse effect of minor significance	The Proposed Development fits within the scale, landform and pattern of the townscape however, there is some loss of quality or characteristic features.	The Proposed Development would cause limited visual intrusion and would cause minor deterioration and / or adverse change in the existing view / general visual amenity of the area.
Negligible	The Proposed Development has no easily discernible effect on townscape character.	The Proposed Development would cause no easily discernible change to visual amenity and key views.
Beneficial effect of minor significance	The Proposed Development would complement the scale, landform and pattern of the townscape, whilst contributing to the existing character.	The Proposed Development would result in minor improvement and / or positive changes to key views / visual amenity of the area.
Beneficial effect of moderate significance	The Proposed Development would fit in well with the scale, landform and existing pattern of the townscape, and maintain and / or enhance the existing townscape character.	The Proposed Development would create a very noticeable improvement and / or positive change in key views / visual amenity of the area.
Beneficial effect of major significance	The Proposed Development would fit in very well with the scale, landform and existing pattern of the townscape, and bring considerable enhancements.	The Proposed Development would create a substantial improvement and enhancement of key views / visual amenity of the area.

Baseline Conditions

Townscape Character

National Character

8.27 The National Character Areas map (produced by Natural England) divides England into 159 National Character Areas (NCAs).

8.28 The Site is located within the western region of NCA 115: Thames Valley and some of the key characteristics of relevance to the Site and its setting include:

- *"…Flat and low-lying land, rising to low, river-terraced hills…;*
- *…The numerous hydrological features provide unity to an area which otherwise lacks homogeny; these features include the River Thames and its tributaries…;*
- *Woodlands characterise the north-western area, with the wooded character extending up to the southern edge of the Chiltern Hills…..*
- *Farming is limited. Where it survives, grazed pasture is the major land use….*
- *Although densely populated and developed, pockets of woodland, open grassland, parkland, wetlands and intimate meadows provide escape and tranquillity…..*
- *The area has an urban character, and there are very few villages of more traditional character…*
- *The area is important for recreation, both for residents and visitors. Historic parkland and commons provide access to green space, the Thames Path National Trail runs the length of the NCA….."*

Local Character

Reading Tall Building Strategy (2008) / Reading Station Area Framework (2010)

8.29 The Site falls at the heart of the Station Cluster, as identified in the Tall Building Strategy[6], which identified these locations adjacent to the station as being suitable for the tallest buildings in Reading. An appendix to the document contains a thorough baseline views analysis. Relevant views were adopted in the Reading Station Area Framework (2010)[8] and assessment of the views is cited where relevant in the Views Assessment later in this chapter.

Reading Borough Local Plan, (November 2019)

8.30 RBC's Local Plan sets out how Reading will develop up to 2036 and 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. It also sets out policies for how planning applications will be decided.

8.31 Policy EN5: Protection of Significant Views with Heritage Interest sets out that:

"*…new development should not harm and where possible make a positive contribution to views of acknowledged historical significance*…." including the:

"View northwards down Southampton St from Whitley St towards St Giles Church, St Mary's Church and Greyfriars Church."

8.32 This viewpoint on Southampton Street has been incorporated into the assessment of views as viewpoint 6.

Designations/Conservation Areas etc.

8.33 There are no designations and the Site. Designations including Listed Buildings, Conservation Areas, Scheduled Ancient Monuments, Registered Parks and Gardens, Open Space and Public Rights of Ways on surrounding the Site are illustrated in **Figure 8.2**. The designations identified have informed the selection of Townscape Character Areas and viewpoints assessed in this Chapter.

Townscape Character Areas

8.34 Reading has experienced substantial redevelopment since production of the Reading Tall Building Strategy. Therefore, for the purposes of the townscape character assessment a bespoke list of Townscape Character Areas has been produced for the townscape assessment as described below and shown in **Figure 8.3**.

TCA 1: Station Hill and Station East

8.35 This TCA is located within Reading town centre and includes the recently redeveloped Reading Mainline Railway Station and the area immediately to the south. The north of the Site is within this character area. In addition to the railway station, the area comprises a mixture of office and retail land uses. The Reading Tall Building Strategy states the townscape condition as having buildings that are "*occasionally derelict and all are either of a poor condition or an unexceptional design quality. The spaces between the buildings are awkward shapes and sizes and poorly maintained. The overall effect is of a poor quality townscape*." Given that this is an undesignated townscape of limited value and low quality, the value and sensitivity to change has been assessed as **Low**.

TCA2: Vastern Road

8.36 This TCA is to the north of Reading Mainline Railway Station on the south bank of the River Thames. The area comprises predominantly office use, a retail park, warehouse/deport and some low rise residential property. The Reading Tall Building Strategy states that the "*blank faces of the warehouses create an unexceptional area of townscape which does not respond well to the surrounding residential land use. Although the buildings are occupied and function well for their purpose, their design is unattractive and creates a weak and uninspiring area of townscape*". Given that this is an undesignated townscape of limited value and low quality, the value and sensitivity to change has been assessed as **Low**.

TCA3: Kings Meadow

8.37 This TCA is characterised by parkland situated on both sides of the River Thames to the north and east of the Site. The Reading Tall Building Strategy states the meadows are "*a well maintained recreational resource and contribute positively to the townscape character*". The area is generally open with the taller buildings of Reading Town centre in the south of the TCA, indicating the urban presence beyond the park boundary. Given that this TCA has many distinctive characteristics and features in good condition and contains an area important for recreation, the value and sensitivity to change of this TCA has been assessed as **Medium**.

TCA4: Napier Road and Forbury Road

8.38 This is an area to the east of Reading Town centre comprising a retail park, large modern office blocks and and generally low rise apartment blocks. The area has experienced substantial redevelopment in recent years. The Former Coopers BMW site provides a tall apartment block at the western end of the TCA and the modern office buildings at Forbury Place are a significant feature

highlighting the largely commercial character of the area. This is an undesignated townscape of limited value and low quality, and therefore the value and sensitivity to change has been assessed as **Low**.

TCA5: St Lawrence/Market Place

8.39 The most notable feature of the area is the cluster of buildings which surround the market place, particularly the Town Hall and St Lawrence's Church. This area is part of the Market Street/London Street Conservation Area. The Reading Tall Building Strategy notes "*This is a small scale area of townscape. The building pattern is fine grained, the roofline is low and although there are areas of open spaces in front of the church, Town Hall, and at Market Place, these are also small in scale and contained by the surrounding built form*". Given that this TCA has many distinctive characteristics and designated features, the value and sensitivity to change of this TCA has been assessed as **High**.

TCA 6 Forbury Gardens

8.40 Forbury Gardens is located to the east of the St Laurence/Market Place TCA. It comprises an attractive garden with an enclosed character created by strong tree and vegetation cover on the perimeter. Much of the TCA is designated as a Scheduled Ancient Monument associated with Reading Abbey: a Cluniac and Benedictine monastery and Civil War earthwork. A number of Listed buildings are also within the TCA including the Reading Abbey Ruins (Grade I), Abby Gate (Grade I), Maiwand Memorial (Grade II), Anglian Cross (Grade II) The Reading Tall Building Strategy notes that it is "*the largest area of open space within the centre of Reading. The surrounding built form is visually prominent and has a large block size".* The value and sensitivity to change of this TCA has been assessed as **High**.

TCA7: Reading Retail Centre

8.41 This character area is dominated by tightly packed shopping streets, pedestrian thoroughfares and arcades. The buildings are generally low rise of three to four storeys. The southern part of the Site is situated within this character area. The Reading Tall Building Strategy describes this area as having a "*fairly consistent, low rise roof line which is occasionally punctuated with views of taller structures*". This area includes the prominent buildings of the Oracle Shopping Centre. The Oracle is a retail arcade that occupies the space between Broad Street, Mill Lane, Bridge Street and Duke Street. This is an undesignated townscape, but given the nature of the buildings on the shopping streets, including a number of Listed buildings the value and sensitivity to change has been assessed as **Medium.**

TCA 8: Reading West

8.42 This TCA is located to the west of the main retail area of Reading Town centre. It comprises low to medium rise apartment blocks, commercial buildings and light industrial areas. Due to the mixed uses in this area the townscape appears disjointed with modern apartment blocks sitting close to low rise industrial buildings some of which are in a poor condition. This is an undesignated townscape, and the value and sensitivity to change has been assessed as **Low**.

TCA9: St Mary's and Castle Street

8.43 This is a distinctive character area, occupying part of the St Mary's Butts/Castle Street Conservation Area and surrounded by the retail uses of Reading town centre. It comprises a cluster of historic buildings including St Mary's Church, a Grade I listed building, the associated buildings beyond, which are Grade II listed, and the Horn Inn, a Grade II listed 16th century, timber framed public

house. The buildings are in good condition and this creates a localised area of strong historic character compared with the surrounding retail areas. Given that this TCA has many distinctive characteristics and features in good condition and contains an area important for recreation, the value and sensitivity to change of this TCA has been assessed as **High**.

Visual Amenity

Visual Characteristics

Viewpoints

8.44 As indicated earlier in this chapter, the visual assessment is based upon 27 representative views taken from the surrounding environs of the Site. The following descriptions describe the composition of views and likely receptors referring to the viewpoint locations illustrated on **Figure 8.5**. Images of these baseline views are also included in **Figure 8.6** to **Figure 8.32** inclusive.

Table 8.5: Description of Representative Views and Identification of Receptors and Sensitivity to Change

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
VP3. St Peter's Churchyard	Visitors to St Peter's Church and Church Yard	High	This view is from the Church Yard of St Peter's Church Grade II Listed Building. The Church Yard contains 11 Grade II Listed grave stones and the Church is within the St Peter's Church Conservation Area. The view is orientated in a south east direction towards the Site. The foreground comprises the graveyard and a low brick wall that separates the graveyard from an area of allotments within Caversham Court Gardens, a Grade II Registered Park and Garden. Within the middle ground, large trees that line the River Thames are visible. A very small part of the River Thames is visible through the vegetation cover in the mid frame. On the left of the frame in the mid ground is the roof of Caversham Court Stables, a Grade II Listed brick house with a number of chimney stacks. In the centre of the frame are views obscured by vegetation of the Reading Rowing Club House and residential/hotel buildings. Thames Tower and the Novotel/Ibis are visible behind these buildings though the vegetation cover.

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
VP4 Balmore Walk	Visitors to of Balmore Park	High	This viewpoint faces south from an elevated position within Balmore Park, with a predominantly un-obstructed long distance panoramic view towards the Site and Reading town centre. The foreground comprises an open area of grass framed on the left side by a large tree. The mid ground is formed of a band of trees marking the boundary of Balmore Park with the urban landscape of central Reading beyond. Prominent buildings on and close to the Site are clearly visible from this viewpoint including the Garrard Street multi-storey Carpark, Thames Tower, Chatham Square, Reading Station and the Former Coopers BMW site (Ref. 162166). The Reading Tall Buildings Strategy (2008) describes the view as follows: "*Views of Reading from this position are panoramic and are experienced from a recreational resource… Consideration should be given to how any proposed tall buildings respond to the existing tall buildings, and to how the skyline would be viewed as a whole. Although true of all viewpoints, this is particularly true in this instance due to the elevated and panoramic nature of the view."* (p.68)[6]
VP 5 Junction of Prospect Street and Peppard Road	Road users traveling south on Westfield Road	Low	This viewpoint faces south towards the Site from the junction of Prospect Street, Peppard Road and Westfield Road. The road at the centre of the frame is Westfield Road. Houses to the to the east of Westfield Road are obscured by a hedge and tree cover with only the gable of the end house visible. The west side of the road is clearly visible and comprises a row of two storey brick built houses. In the background Thames Tower is prominent protruding above the houses in the centre of the frame.
	Pedestrians on Westfield Road	Low	
VP 6 Junction of Mount Pleasant and Southampton Street	Road users on Southampton Street	Low	This viewpoint views the Site from the south at the junction of Mount Pleasant and Southampton Street. The foreground consists of the streetscape of Southampton Street. The right of the view is framed by the cream painted building of the Pheasant Pub with a row of brick built 2/3 story terraced houses extending downhill towards Reading Town centre. The left of the frame comprises a brick wall lining the west side of Southampton Street with a 3 storey residential property behind. A large tree on the west pavement of Southampton Street partially obscures the Grade II Listed spire of St Giles Church (shown as a dashed outline in **Figure 8.9**).
	Pedestrians on Southampton Street	Low/med	

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
VP8 Dunsden Way, south of Dunsden Green	Users of the footpath of Dunsden Way	High	This is a long distance view from a footpath off Dunsden Way south west towards Reading town centre. The foreground is dominated by rolling arable fields. The skyline is formed of trees, scattered low rise houses, a pylon and power cables. Towards the left of this frame the distinct profile of the Blade and Kings Point are visible on the horizon. The former Coopers BMW site (Ref. 162166) and Thames Tower are visible in the centre of the view. Despite the visibility of some of the taller buildings within Reading town centre on the horizon this view retains a rural outlook. The Reading Tall Building Strategy (2008) describes the view as follows: *"Gently undulating, large arable fields form the dominant feature of the view. The fields are interspersed with overhead power lines and electricity pylons. The skyline is occasionally wooded, but the woodland does not significantly contain a view which is long ranging… Although large scale man made features are a feature of the view, a strong rural character remains." (Ref 1-12, p.65)*
VP9 Chatham Street	Road users of Chatham Street	Low	The viewpoint looks east towards the Site from Chatham Street to the west of the junction with Caversham Road and Friar Street. The view towards the Site is dominated by a road junction with a roundabout in the foreground. There are two groups of trees prominent in the foreground on the left side of the frame and right centre. Within the far right of the frame is a security fence surrounding a substation. A light industrial brick building with some blue coloured cladding is visible in the far left of the viewpoint. The Grade I listed Greyfriars Church is visible through trees located on the roundabout; the view of the church in summer would be reduced with leaf growth. In the centre of the frame are a mixture of 3-4 storey predominantly brick buildings that are partly obscured by tree cover. In the background of the centre of the frame, Thames Tower protrudes above the closer 3-4 storey buildings and is also partly obscured by tree cover to its full height particularly the south side of the tower.
	Pedestrians on Chatham Street	Low	
VP10 Weldale Street	Road users of Chatham Street	Low	This view looks east towards the Site from Weldale Street which runs parallel to Chatham Street. Both sides of the street show an urban character with buildings of an industrial and functional nature and a lack of tree cover. The mid-ground and background to the frame offer a more contemporary character in contrast to the industrial brick sheds with metal corrugated cladding and corrugated roofs. On the left side of the frame the industrial building is set back with a fenced off tarmac parking area on the street front. At the end of Weldale Street, on the right, is a six-storey contemporary residential building with curved mansard roof and a largely blank brick west elevation. Opposite this on the left of the Street is a similar five-storey residential block with brick cladding. A terrace of modern brick townhouses with pitched roofs on the west side of Caversham Road separates the two apartment blocks. Rising above the roofline of the townhouses is the refurbished Thames Tower that, at 12 storeys, is prominent within the centre of the view.
	Pedestrians on Chatham Street	Low	

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
VP12 Junction of Friar Street and Greyfriars Road looking along Friar Street	Shoppers / pedestrians on Friar Street	Low	This viewpoint is from the pavement on the south side of Friar Street. The view provides a channelled outlook down a main town centre retail street with unbroken built form on both sides. The foreground comprises wide pavements flanked by five / six storey buildings with a building with modern grey coloured cladding in the near left of the frame. Lower two/three storey brick buildings make up the right of the frame from this viewing position. This makeup of the built form comprising of taller buildings on the left and lower buildings on the right continues into the mid ground. The taller profile of the Novotel/Ibis marks the centre background of the view on the horizon. The frontage of the south side of the Site is viewed obliquely from this viewpoint and comprises a brick built five storey building on the left of the frame with a brick gabled roofline.
	Road users on Friar Street	Low	
VP13 Junction of Friar Street and Greyfriars Road looking along Greyfriars Road	Pedestrians on Friar Street and Greyfriars Road	Low	This view looks northeast towards the Site from west of Friar Street at the junction with Greyfriars Road. On the right of the frame is a modern residential six storey building with red brick and grey and white cladding with retail units on the ground floor. The left of the frame is formed of a brick wall and railings belonging to the former Vicarage of Greyfriars Church; these are Grade II Listed. The brick dwelling visible to the left is on the site of the old Vicarage and is not listed. The wall and a tree obscure the view north along Greyfriars Road with only one building protruding above the wall (Greyfriars House), a modern white clad five storey office building.
	Road users on Friar Street and Greyfriars Road	Low	
VP15 Stanshawe Street	Pedestrians on Stanshawe Street	Low	This viewpoint looks east towards the Site along Stanshaw Street from the junction with Caversham Road. The left of the view is framed by a row of small brick terraced houses with the taller brick built form of 35 to 43 Greyfriars Road. (currently undergoing refurbishment and surrounded by scaffolding). The right of the view is framed by a four storey brick built office block and a brick built 3 storey apartment block with a white painted gable end of a row of terrace houses beyond. The end of Stanshawe Street is terminated by the façade of Xafinity House that has bands of red brick and glazing. A small section of the top of Thames Tower is visible above 35 to 43 Greyfriars Road.
	Road Users on Stanshawe Street	Low	
VP16 Tudor Road	Pedestrians on Tudor Road	Low	This viewpoint looks east towards the Site from the north pavement of Tudor Road. Thames Tower is prominent at the centre of the view with the on Site Garrard Street multi-storey Carpark below. The view is framed on the left side by Phoenix House, a modern, red brick office building with stone-faced ground floor level. On the far right is a red brick 4 storey apartment building with the Greyfriars pub beyond.
	Road users on Tudor Road	Low	
VP17 Caversham Road	Pedestrians on Caversham Road	Low	This viewpoint is on Caversham Road, beyond the junction of Brigham Road. It looks south east towards the Site. Road and signage dominate the foreground of the frame and winter trees filter the view of low retail park buildings. Above these buildings, Thames Tower is visible through the tree cover. On the far right of the view is a brick terrace three storey buildings with ground floor shops.
	Road users on Caversham Road	Low	

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
VP18 Caversham Bridge	Pedestrians on Caversham Bridge	High	This viewpoint looks south east towards the Site across the River Thames taken from the east side of Caversham Bridge. The view comprises residential and leisure uses on both side of the River Thames in the foreground including a restaurant clad in white panels situated on an island in the centre of the river channel. The right hand side of the frame includes a decorative stone balustrade on Caversham Bridge. In the centre of the view, Thames Tower is clearly visible on the skyline and the former Coopers BMW site (Ref. 162166) is prominent further to the east.
	Road Users on Caversham Bridge	Low	
VP19 Christ Church Meadows	Pedestrians and users of the Park	High	This viewing position is located in Christchurch Meadows and looks south towards the Site. The foreground is open grassland with a tarmac path on the left. A playground is in the centre of the view obscured by trees and not prominent due to background building cover. These buildings are of about six storeys. Rising above the buildings Thames Tower is prominent. To the right of the viewpoint the modern Christchurch pedestrian bridge frames the view and the newly redeveloped Reading Station is visible to the left of the pedestrian bridge.
VP20 Reading Bridge Near Vastern Road	Pedestrians on George Street crossing Reading Bridge	Low / Medium	This viewpoint is orientated south west towards the Site, from the southern end of Reading Bridge near to the roundabout junction with Vastern Road. The foreground of the view is dominated by the roundabout and connecting roads. Beyond the roundabout to the left, embankments lead up to rail lines which lead into Reading Station. Beyond the railway to the far left is a broad office building clad in polished pink granite known as Apex Plaza and on the right of the view, is a five storey brick and concrete multi storey car park. In the distance, rises Thames Tower.
	Road users on George Street	Low	
VP22 Kings Meadow	Pedestrians and users of the Park	High	The Kings Meadow is designated locally as a Major Landscape Feature. This view looks across the playing fields towards the Site. In the foreground, the view is dominated by the grass of the playing field which is bound on all sides by mature trees. The small brick building to the right of the playing field is the Kings Meadow Swimming Pool and is listed at Grade II. The trees allow filtered views to the buildings surrounding Kings Meadow. On the far left of the frame are the office buildings of One Reading Central and Apex House. In front of these buildings are a line of low pitched roofed office buildings, known as Napier Court. In the centre of the view the tower at the former Coopers BMW site (Ref. 162166) is prominent. Further to the right of the frame and mainly obscured by trees are Kings Meadow House with North Reading Bridge House behind.
VP23 Forbury Road near Reading Prison	Pedestrians on Forbury Road and Kenavon Drive	Low	This viewpoint looks due west towards the Site from the roundabout junction of Forbury Road with Kenavon Drive. The view is distinctly urban in character being dominated in the foreground by the road, roundabout and associated street furniture. The left of the frame is dominated by the blank, dark brick wall surrounding Reading Prison, which

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
	Road users on Forbury Road and Kenavon Drive	Low	is Grade II listed. Beyond, and also listed at Grade II, is the less imposing stone form and bell tower of the Church of St James. The wall and Church lie within the area designated as the Scheduled Ancient Monument of Reading Abbey. To the right, is the broad modern mass of the modern office development of 1, 2 and 3 Forbury Place. In the distance is the pink granite cladding of Apex house and Thames Tower behind the Church of St James.
VP24 St Laurence's Church	Pedestrians / shoppers in Market Place	Medium	St Laurence's Church, which was the former gatehouse of the Abbey and is Grade I listed, is behind this viewing position which looks northwest across the Market Place towards the Site. The Market Place in the foreground is pedestrianised and forms a focal point of the Market Place/London Street Conservation Area, in which this viewing position lies. This is an attractive central space, without traffic and with a number of the town centre's significant historic buildings in view. It has simple hard landscaping with raised brick planters, a number of mature trees and a statue of Queen Victoria which is listed at Grade II. Most prominent, and on the right is Reading Council Chamber, which is listed at Grade II*. It has richly ornamented red and grey brickwork and two steeply pitched-roof towers, one containing a clock. To the left of the trees in the centre, and appearing much lower due to their distance, brick buildings front the south side of Friar Street. They are three to four storeys and have shops at the ground floor. Several of the more distant buildings are listed at Grade II. Rising above them at the centre is the light blue Angel House occupied by Novotel/Ibis. On the left of the frame is a row of four storey brick buildings with shops at street level which curves out of view into Friar Street.
VP25 Station Road, Looking West	Pedestrians / shoppers on Friar Street	Low	This view looks northwest towards the Site from the junction of Friar Street and Station Road. Station Road leads off the right side of the frame and the north side of Friar Street extends along the left of the frame. It is a retail thoroughfare with wide pavements fronted by a mixture of building styles and ages with a varied roofline. Most prominently, the blue and white clad and glazed upper storeys of the Novotel/Ibis which has a number of projecting bays which create a stepped form, rising steeply above the buildings on Friar Street and Station Road and dominating the view. At the far right of the view Thames Tower is visible.
	Road users on Friar Street	Low	
VP26 Friar Street Looking West	Pedestrians / shoppers on Friar Street	Low	This view is from the south pavement of Friar Street, just to the east of Merchant's Place. Friar Street is a retail thoroughfare with widened pavements and restricted traffic flow, and fronted on both sides by an assortment of building styles and ages. They are largely three to six storeys in height and lower on the south side. The Chatham Place apartments appear in the background of the frame on the left side of Friar Street. On the right is a

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
	Road users on Friar Street	Low	six storey concrete framed office building and beyond, a terrace of three storey dormered buildings in grey and red brick, then a modern brick building with projecting bay windows and, to the east of the Site, a small three storey brick building. Further along the north side of the street are the buildings which currently occupy the Site: a five storey, flat-roofed building and, beyond, a 1960s flat-roofed office building of six storeys. The north street frontage peters out towards Greyfriars Road to the west.
VP28 Junction of Castle Street and St Mary's Butts	Pedestrians on Castle Street and St Mary's Butts	Medium	This viewing location, on Castle Street at its junction with St Mary's Butts, is situated in the St. Mary's Butts/Castle Street Conservation Area and looks northeast towards the Site. The Reading Tall Buildings Strategy (2008) describes the view as follows: "*The main component of the view is St. Mary's Church which is the tallest building on the skyline. The low rise buildings on St. Mary's Butts, trees within the graveyard and the street furniture are all secondary elements of the view. All of these features are of a significantly smaller height and scale than the church tower.*" (p.39)[6] St Mary's Church is listed at Grade I and the associated buildings beyond are listed at Grade II. To the left of the view is the Horn Inn, a Grade II listed 16th century, timber framed public house.
	Road Users on Castle Street and St Mary's Butts	Low	
VP29 Station Hill Looking South	Pedestrians on Station Hill	Low	This viewpoint is a close view of the Site from the western end of Station Hill looking south. To the left of the view is the Garrard Street multi-storey carpark. The centre of the viewpoint comprises the derelict buildings of the Friar Street Shopping Centre appearing lower on the skyline than the surrounding buildings. A mobile communications mast is visible in front of these buildings. The right of the frame is bookended by Xafinity House, a five storey red brick and concrete office building. Currently, construction site hording on the south side of Station Hill runs west east through the whole of the frame.
	Road users on Station Hill	Low	
VP30 Looking east from the junction of Greyfriars Road and Garrard Street	Pedestrians on Garrard Street	Low	This view looks east along Garrard Street from Greyfriars Road, towards the rear of the buildings at the centre of this urban block which is bounded by Garrard Street to the north, Greyfriars Road to the west, Friar Street to the south and Merchant's Place to the east. The view is framed by Xafinity House, a five storey red brick and concrete office building to the left, and Greyfriars House, a taller office building with tinted glazing, grey panels and black and grey polished granite to the ground floor. Further along the street to the left is the Garrard Street multi storey car park. To the right of the car park are the rear elevations of retail and commercial buildings fronting Friar Street. A small section of the top floors of Thames Tower appear above the Garrard Street car park. This is very much a backlands view, set off the main nearby thoroughfares.
	Road users on Garrard Street	Low	
VP31 Looking west along Garrard Street	Pedestrians on Garrard Street	Low	This view is from the north pavement of Garrard Street, behind the Garrard Street multi-storey car park. To the left are the rear elevations of retail and commercial buildings fronting Friar Street and then Greyfriars House, an eight storey office building with tinted glazing, grey

Viewpoint	Visual Receptor	Sensitivity to Change	Description of View
	Road Users on Garrard Street	Low	panels and black and grey polished granite to the ground floor. The right of the frame is formed of site hording surrounding the former bus station with Xafinity House, a five storey red brick and concrete office building visible beyond. A mobile phone mast also protrudes above the site hoarding. No. 9 Greyfriars Road is a concrete framed four storey office building with brick panels below the windows and is visible in the centre of the view.
VP33 Kings Meadow Road towards Junction with Vastern Road	Pedestrians of Kings Meadow Road	Low	This viewpoint looks south west towards the Site from the Kings Meadow Road on the junction with Vastern Road. The foreground of the view is dominated by the roundabout and connecting roads. Beyond the roundabout to the left of the frame, earthbanks lead up to rail lines which lead into Reading Station. Beyond the railway to the far left is a broad office building clad in polished pink granite known as Apex Plaza and on the right of the view, a five storey brick and concrete multi storey car park. Thames Tower is prominent in the centre of the frame rising above the railway infrastructure.
	Road users on Kings Meadow Road	Low	
VP34 Top of Shepherds Hill near to the junction with Pitts Lane	Pedestrians on Pitts Lane	Low	This is a long distance view towards the Site from Shepherds Hill near to the junction with Pitts Lane approximately 3.5km from the Site to the east. The foreground is dominated by the multilane London Road and dividing railings. The right of the frame is formed of a row of two storey houses. The skyline of Reading town centre is visible but partially obscured by trees and pylons in the mid ground. Buildings visible from this location include The Blade, Kings Point, the tower at the former Coopers BMW site (Ref. 162166), Forbury Place and Thames Tower.
	Road Users on Pitts Lane	Low	
VP35 Kings Road Bridge over River Kennet	Pedestrians on Kings Bridge using the Kennet Side Path	Medium	This viewpoint is located on Kings Bridge looking towards the Site from the south east. The foreground comprises the River Kennet that runs diagonally though the left of the frame, the concreate balustrade on the Kennet Bridge and Kings Road. The Kennet Side Foot path is also visible in the far left of the frame. Kings Road Gardens are located in the centre of the view on the north bark of the Kennet and comprise a grass area, trees, benches and railings. Kings Point a modern 16 story apartment block is prominent forming the skyline on the left side of the frame. The 8 storey brick built St James Wharf building is visible through tree cover in the centre of the frame with The Blade protruding above. The right of the frame is dominated a 5 storey office building clad in pale brick and concrete blocks.
	Road Users on Kings Bridge	Low	

Summary of Visual Amenity

8.45 The locality of the Site is generally flat with limited occurrences of elevated ground. Overall, the area is densely developed, and views tend to be of a short-range nature, being typical of a high-density townscape. In contrast, the River Thames to the north of the Site provides a corridor of comparatively medium range views particularly from bridges and elevated areas in Caversham.

Likely Significant Effects

Demolition and Construction

8.46 Demolition and construction activities are discussed in detail in **Chapter 6: Demolition and Construction**, of the ES Volume. Likely visual effects associated with the demolition process would be the use of vehicles and machinery such as demolition excavators in combination with the appearance of buildings at various stages of being demolished.

8.47 In terms of the construction process, the most significant visual effect would be the presence of tower cranes. Their presence is inevitable in connection with construction of the type and scale envisaged. The top of a tower crane is likely to be higher than the top of the building, so it may be more visible than the finished building.

8.48 Any assessment of the visual effect of site preparation and construction activities in aesthetic terms would tend to find the impact adverse rather than beneficial.

8.49 Demolition and construction would be phased and during construction, the perimeter of the Site would be surrounded by hoarding in the conventional manner. This will provide some screening of construction activities on the Site from street level.

Table 8.6: Likely Effects on Townscape Character Demolition and Construction

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
TC1 Station Hill and Station East Low Sensitivity	Construction traffic using the existing road network, noise and increased activity levels would directly affect this TCA. Extensive demolition and construction activities on Site, including demolition of the Garrard Street carpark and Xafinity House and construction of the new buildings would be noticeable in an area characterised by residences and offices. Site hording would help to contain and limit effects from ground level activity locally. The Proposed Development would have a prominent and widespread detrimental effect during demolition and construction on the TCA, through noise, visual intrusion and traffic and the disruption. However, road traffic is a pre-existing dominant feature of this town centre area and the addition of construction traffic and construction operations would not be entirely out of place.	Major	**Temporary**, **local**, **adverse effect** of **moderate significance**.
TCA2 Vastern Road Low Sensitivity	Works associated with demolition and construction at the Site would occur outside this TCA. There would some visual intrusion from construction and demolition activities.	Minor	**Temporary**, **local**, **adverse effect** of **minor significance**.
TCA3 Kings Meadow Medium Sensitivity	The Site is outside of this TCA. The existing tall buildings close the south west boundary of the TCA would provide an element of separation from the demolition and construction activities. This would reduce the effect on the TCA to some extent. However, detracting visual intrusion to the character	Moderate	**Temporary**, **local**, **adverse effect** of **moderate significance**.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
	area from the demolition and construction works would be noticeable in this open environment.		
TCA4 Napier Road and Forbury Road Low Sensitivity	The Site is outside of this TCA. The visual intrusion in this character area during demolition and construction would be largely imperceptible.	Negligible	**Negligible**.
TCA5 St Lawrence / Market Place High Sensitivity	The Site is outside of this TCA. Existing tall buildings and trees would provide an element of separation from the from the demolition and construction activities diminishing the effects on this townscape to some extent. However, detracting visual intrusion to the character area from the demolition and construction works would be noticeable.	minor	**Temporary**, l**ocal**, **adverse effect** of **minor significance**.
TCA6 Forbury Gardens High Sensitivity	The Site is outside of this TCA. Due to the enclosed nature of the TCA, demolition and construction work would be unnoticed within this area.	Negligible	**Negligible**
TCA7 Reading Retail Centre Medium Sensitivity	Construction traffic using the existing road network, noise and increased activity levels would directly affect this TCA. Extensive demolition and construction activities on Site including demolition of the Friar Street Shopping Centre, would be noticeable to an area characterised by shops, hotels, residences and offices. Site hording would help to contain and limit effects from ground level activity locally. Demolition and construction activities would have a prominent and widespread detrimental effect on within the northern area of the TCA, through noise, visual intrusion and traffic and the disruption. However, road traffic is a pre-existing dominant feature of this town centre area and the addition of construction traffic and construction operations would not be entirely out of place.	Major	**Temporary**, l**ocal**, **adverse effect** of **major significance**.
TCA8 Reading West Low Sensitivity	The Site is outside of this TCA. There would be increased noise and activity levels from construction traffic on the local road network, however road traffic is a pre-existing dominant feature of the area and the addition of construction traffic would not be entirely out of place. Existing tall buildings and trees would provide an element of separation from the demolition and construction activities diminishing the effects on this townscape to some extent. However, detracting visual intrusion to the character area from the demolition and construction would be noticeable.	Minor	**Temporary**, l**ocal**, **adverse effect** of **minor significance**.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
TCA9 St May's and Castle Street High Sensitivity	The Site is outside of this TCA. There may be increased noise and activity levels from construction traffic on the local road network particularly in western areas of the TCA, however road traffic is a pre-existing dominant feature of the area and the addition of construction traffic would not be entirely out of place. Existing buildings and trees would provide an element of separation from the demolition and construction activities diminishing the effects on this townscape to some extent. However, detracting visual intrusion to the character area from the demolition and construction would be noticeable.	Minor	**Temporary**, l**ocal**, **adverse effect** of **moderate significance**.

Table 8.7: Likely Effects on Views and Visual Amenity during demolition and construction

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP3. Visitors to St Peter's Church and Church Yard High Sensitivity	The location of this view is from an elevated position towards the northern parts of the Site. Views of the Site activity during demolition and construction would be limited to upper parts of cranes and partially constructed buildings with trees providing some screening of the works particularly the lower elevations. Site buildings to be demolished would not be visible from this location.	Minor	**Temporary**, l**ocal**, **adverse effect** of **moderate significance**
VP4 Balmore Walk Visitors / users of Balmore Park High Sensitivity	The location of this view is from an elevated position towards the northern parts of the Site. Views of the demolition and construction activities would largely be limited to the appearance of cranes and partially constructed buildings. Site buildings to be demolished have low perceptibility from this location are therefore likely to go un-noticed.	Moderate	**Temporary**, l**ocal**, **adverse effect** of **major significance**
VP 5 Road users traveling south on Westfield Road and Peppard Road Low Sensitivity	The location of this view is from an elevated position towards the northern parts of the Site. Views of the construction activities would be limited to upper parts of cranes and partially constructed buildings with the existing built form screening the lower elevations. Site buildings to be demolished would not be visible from this location.	Minor	**Temporary**, l**ocal**, **adverse effect** of **minor significance**
VP 5. Pedestrians on Westfield Road Low Sensitivity			**Temporary**, l**ocal**, **adverse effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP 6 Road users on Southampton Street Low Sensitivity	The location of this view is from an elevated position viewing towards the Site from the south. Views of the construction activities would be limited to very upper parts of cranes and partially constructed buildings with the existing built form screening the lower elevations. Site buildings to be demolished would not be visible from this location. Due to the distance from the Site and the screening of the lower elevations provided by existing built form, construction activities would be discreet on the skyline.	Minor	**Temporary**, l**ocal**, **adverse effect** of **minor significance**
VP6. Pedestrians on Southampton Street Low/Medium Sensitivity			**Temporary**, l**ocal**, **adverse effect** of **minor significance**
VP8 Users of the footpath off Dunsden Way High Sensitivity	The location of this view is from a distant position viewing towards the northern parts of the Site. Views of the construction and demolition works would be limited to upper parts of cranes and partially constructed buildings with trees in the mid ground providing some screening of the works particularly the lower elevations. Site buildings to be demolished are not be visible from this location.	Minor	**Temporary**, l**ocal**, **adverse effect** of **moderate significance**
VP9 Road users of Chatham Street Low Sensitivity	This is a close view of the Site from the west from Chatham Street. Views of the demolition and construction activities would be limited to upper parts of cranes and partially constructed buildings with trees in the mid ground providing some screening of the works particularly for construction of Plot A. However, due to the close proximity of the viewpoint to the Site cranes and buildings under construction would appear prominent within the view. Site buildings to be demolished are not be visible from this location.	Moderate	**Temporary**, l**ocal**, **adverse effect** of **minor significance**
VP9 Pedestrians on Chatham Street Low Sensitivity			**Temporary**, l**ocal**, adverse **effect** of **minor significance**
VP10 Road users of Weldale Street Low Sensitivity	The location of this view is from Weldale Street close to the Site viewing from the west. Views of the Works would be predominantly limited to upper parts of cranes and partially constructed buildings with buildings in the mid ground providing some screening of the demolition and construction activities particularly for construction of the lower elevations of Plot A. Due to the close proximity of the viewpoint to the Site cranes and buildings under construction would appear prominent within the view. Site buildings to be demolished are imperceptible from this location.	Moderate	**Temporary**, l**ocal**, adverse **effect** of **minor significance**
VP10, Pedestrians on Weldale Street Low Sensitivity			**Temporary**, l**ocal**, adverse **effect** of **minor significance**
VP12 Shoppers/pedestrians on Friar Street Low Sensitivity	Only demolition and construction activities associated with Plot E and F would be visible in this view. Throughout the Works, views towards the Site would be partially screened by Site hoarding which would prevent views towards low level construction elements. However, the demolition of Friar Street Shopping Centre and the subsequent	Moderate	**Temporary**, l**ocal**, **adverse effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP12. Road users on Friar Street Low Sensitivity	construction of Plot E and F would be prominent due to the proximity of visual receptors.		**Temporary**, **local**, **adverse effect** of **minor significance**
VP13 Pedestrians on Friar Street and Greyfriars Road Low Sensitivity	Views of the construction activities would be limited to the construction of the upper parts of Plots A and B with cranes and partially constructed buildings appearing on the skyline to the left of an existing apartment block. Site buildings to be demolished would not be visible from this location.	Minor	**Temporary**, **local**, **adverse effect** of **minor significance**
VP13. Road users on Friar Street and Greyfriars Road Low Sensitivity			**Temporary**, **local**, adverse **effect** of **minor significance**
VP15 Pedestrians on Stanshawe Street Low Sensitivity	Demolition and construction activities associated with Plots A, B and D would be visible in this close view. Throughout the Works, views towards the Site would be partially screened by Site hoarding which would prevent views towards low level construction elements. However, the demolition of Xafinity House and the subsequent construction would be prominent due to the proximity of visual receptors.	Major	**Temporary**, **local**, **adverse effect** of **moderate significance**
VP 15 Road Users on Stanshawe Street Low Sensitivity			**Temporary**, **local**, **adverse effect** of **moderate significance**
VP16 Pedestrians on Tudor Road Low Sensitivity	Demolition and construction activities would be visible in this close view. Throughout the Works, views towards the Site would be partially screened by Site hoarding which would prevent views towards low level construction elements. However, the demolition of the Garrard Street multi-storey carpark and the subsequent construction works would be prominent due to the very close proximity of visual receptors.	Major	**Temporary**, **local**, **adverse effect** of **moderate significance**
VP16, Road users on Tudor Road Low Sensitivity			**Temporary**, **local**, adverse **effect** of **moderate significance**
VP17 Pedestrians on Caversham Road Low Sensitivity	The location of this view is from a viewing position looking towards the northern parts of the Site. Views of the construction activities would be limited to upper parts of cranes and partially constructed buildings with the existing built form and trees providing some	Moderate	**Temporary**, **local**, **adverse effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP 17, Road users on Caversham Road Low Sensitivity	screening of the lower elevations. Site buildings to be demolished would not be perceptible from this location.		**Temporary**, **local**, adverse **effect** of **minor significance**
VP18 Pedestrians on Caversham Bridge High Sensitivity	The location of this view is from a viewing position looking towards the northern parts of the Site. Views of the construction activities would be limited to upper parts of cranes and partially constructed buildings with the existing built form and trees providing screening of the lower elevations. Site buildings to be demolished are not perceptible from this location.	Moderate	**Temporary**, **local**, **adverse effect** of **major significance**
VP18, Road Users on Caversham Bridge Low Sensitivity			**Temporary**, **local**, **adverse effect** of **minor significance**
VP19 Pedestrians and users of the Park High Sensitivity	The location of this view is from a viewing position looking towards the northern parts of the Site. Views of the construction activities would be prominent in the view with the cranes and partially constructed buildings sitting on the skyline. Existing built form and trees would provide screening of the lower elevations. Site buildings to be demolished are largely imperceptible from this location.	Moderate	**Temporary**, **local**, **adverse effect** of **major significance**
VP20 Pedestrians on George Street crossing Reading Bridge Low/Medium Sensitivity	Views of the construction activities would be limited to upper parts of cranes and partially constructed buildings which would appear prominent in the centre of the frame. The existing built form provides screening of the lower elevations and on Site buildings to be demolished are not visible from this location.	Moderate	**Temporary**, **local**, **adverse effect** of **minor to moderate significance**
VP 20 Road users on George Street Low Sensitivity			**Temporary**, **local**, **adverse effect** of **minor significance**
VP22 Pedestrians and users of the park High Sensitivity	Views of the construction activities would be limited to upper parts of cranes and partially constructed buildings (Plots A and C only) which would appear behind the former BMW site in the centre of the frame. The existing built form provides screening of the lower elevations and on Site buildings to be demolished are not visible from this location.	Minor	**Temporary**, **local**, **adverse effect** of **moderate significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP23 Pedestrians on Forbury Road and Kenavon Drive Low Sensitivity	Construction activities including buildings under construction and cranes would be visible extending above and to the north of the existing Thames Tower. The existing built form provides screening of the lower elevations and on Site buildings to be demolished are not visible from this location.	Minor	**Temporary, local, adverse effect** of **minor significance**
VP 23. Road users on Forbury Road and Kenavon Drive Low Sensitivity			**Temporary, local, adverse effect** of **minor significance**
VP24 Pedestrians / shoppers in Market Place Medium Sensitivity	Views of the construction activities would be limited to upper parts of cranes and partially constructed buildings which would appear prominent in the centre of the frame behind Thames Tower and Novotel/Ibis. The existing built form provides screening of the lower elevations and on Site buildings to be demolished are not visible from this location.	Moderate	**Temporary**, l**ocal**, **adverse effect** of **minor to moderate significance**
VP25 Pedestrians / shoppers on Friar Street Low Sensitivity	Construction activities associated with Plot E in the far left of the frame and the top floors of Plots C and G would be visible in this view. Throughout the Works, views towards Plot E would be partially screened by Site hoarding which would prevent views towards low level construction activities. However, the demolition of Friar Street Shopping Centre and the subsequent construction of Plot E, C and G would be relatively discreet from this viewing position.	Minor	**Temporary**, l**ocal**, **adverse effect** of **minor significance**
VP25 Road users on Friar Street Low Sensitivity			**Temporary**, l**ocal**, **adverse effect** of **minor significance**
VP26 Pedestrians / shoppers on Friar Street Low Sensitivity	Only demolition and construction activities associated with Plot E would be visible in this view. Throughout the Works, views towards the Site would be partially screened by Site hoarding which would prevent views towards low level construction activities. However, the demolition of Friar Street Shopping Centre and the subsequent construction of Plot E would be prominent due to the proximity of visual receptors.	Moderate	**Temporary**, **local, adverse effect** of m**inor significance**
VP 26 Road users on Friar Street Low Sensitivity			Temporary, local, adverse **effect** of m**inor significance**
VP28 Pedestrians on Castle Street and St Mary's Butts Medium Sensitivity	Views of the construction activities would be prominent to the right of St Mary's Church Tower with the upper parts of cranes and partially constructed buildings appearing on the skyline. The lower elevations of the Site and Site buildings to be demolished would not visible from this location.	Moderate	Temporary, local, adverse **effect** of **moderate significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP28 Road Users on Castle Street and St Mary's Butts Low Sensitivity			Temporary, local, adverse **effect** of **minor significance**
VP29 Pedestrians on Station Hill Low Sensitivity	Demolition and construction activities would be highly visible in this close view. Throughout the Works, views towards the Site would be partially screened by Site hoarding which would prevent views towards low level construction activities. However, demolition of the Garrard Street multi-story carpark, Xafinity House, Friar Street Shopping Centre and the subsequent construction would be prominent due to the very close proximity of visual receptors.	Major	Temporary, local, adverse **effect** of **moderate significance**
VP29 Road users on Station Hill Low Sensitivity			**Temporary**, l**ocal**, adverse **effect** of **moderate significance**
VP30 Pedestrians on Garrard Street Low Sensitivity	Demolition and construction activities would be highly visible in this close view. Throughout the Works, views towards the Site would be partially screened by Site hoarding which would prevent views towards low level construction elements. However, the demolition of the Garrard Street multi-story carpark, Xafinity House, Friar Street Shopping Centre and the subsequent construction would be prominent due to the very close proximity of visual receptors.	Major	**Temporary**, l**ocal**, **adverse effect of moderate significance**
Road Users on Road users on Garrard Street Low Sensitivity			**Temporary**, l**ocal**, **adverse effect** of **moderate significance**
VP31 Pedestrians on Garrard Street Low Sensitivity	Demolition and construction activities would be highly visible in this close view. Throughout the Works, views towards the Site would be partially screened by Site hoarding which would prevent views towards low level construction elements. Demolition works on Xafinity House, Friar Street Shopping Centre and Telecom House and the subsequent construction would be prominent due to the very close proximity of visual receptors.	Major	**Temporary**, l**ocal**, **adverse effect** of **moderate significance**
VP 31 Road Users on Garrard Street Low Sensitivity			**Temporary**, l**ocal**, **adverse effect** of **moderate significance**
VP33 Pedestrians on Kings Meadow Road Low Sensitivity	Views of the construction activities would be limited to upper parts of cranes and partially constructed buildings which would appear prominent in the centre of the frame. The existing built form provides screening of the lower elevations, and on Site buildings to be demolished are not visible from this location.	Moderate	**Temporary**, l**ocal**, **adverse effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP 33 Road users on Kings Meadow Road Low Sensitivity			**Temporary**, **local**, **adverse effect** of **minor significance**
VP34 Pedestrians on Pitts Lane Low Sensitivity	The location of this view is from a distant position viewing the Site from an elevated position to the west. Views of the Works would be limited to upper parts of cranes and partially constructed buildings, pylons and trees in the mid ground providing some screening of the works particularly the lower elevations. Site buildings to be demolished are not be visible from this location.	**Minor**	**Temporary, local, adverse effect** of **minor significance**
VP 34 Road Users on Pitts Lane Low Sensitivity			**Negligible**
VP35 Pedestrians on Kings Bridge as using the Kennet Side Path Medium Sensitivity	A very small section of construction activity would be visible low on the skyline between existing buildings. Its presence would go unnoticed from this location.	Negligible	**Negligible**
VP35 Road users on Kings Bridge Low Sensitivity			**Negligible**

Interim Development Scenario

8.50 The Interim Development Scenario comprises the completed Plots E, F and G together with provision of new public realm linking Reading mainline station with Friar Street and Reading town centre beyond. Plots E and F comprise two buildings that would provide 538 residential units together with some ground floor retail / leisure uses and 165 car parking spaces. The buildings range in height from a minimum of 50m above ordnance datum (AOD) to a maximum of 85.6m AOD.

8.51 Central Reading has a mix of modern and traditional buildings, with the character of the central area defined by the building stock of the late 19th and early 20th centuries with the predominant use of reds, greys and buff coloured bricks and sandstones coursing and pilasters. Blocks E and F would share a similar palette with red bricks fronting Friars Walk and greys to Garrard Street.

8.52 Phase 2 (Plot G and surrounding public realm) of the Proposed Development is being submitted as a detailed planning application. Plot G would comprise a glass clad building containing predominantly offices with ground floor retail and leisure uses. Plot G would rise up 17 storeys above a podium to a maximum height of 127m above ordnance datum (AOD).

8.53 Significant areas of public realm would be provided around Plot G together with enhancements to the public realm outside Reading Station including a pocket park and redesign of the existing steps on Station Hill. Construction hoarding would be provided along the boundary of the Phase 2 podium. Refer to **Chapter 5: Development Description** of this ES for further phasing and scheme information.

Table 8.8: Likely Effects on Townscape Character from the Interim Development

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
TCA1 Station Hill and Station East Low Sensitivity	The Interim Development would add high quality buildings to the TCA which is currently dominated by derelict buildings in poor condition. The detracting feature of the Garrard Street multi-storey carpark and Xafinity House would be removed from the TCA whilst the detracting features of Friars Walk Shopping Centre and Telecom House which are immediately adjacent to this TCA would also be removed. The new buildings would add a positive visual effect on the streets surrounding the Site through the quality of its design, materials and improvements to public realm. The buildings will be of appropriate and high quality architectural styles and materials, relating to their specific contexts in different parts of the Site and reflecting their different uses. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
TCA2 Vastern Road Low Sensitivity	The Site is located outside of this TCA. The Interim Development would add positively to the urban skyline of Reading by adding to the cluster of tall buildings that make up the focal point of the redeveloped area of central Reading. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Minor	**Permanent local**, **beneficial effect** of **minor significance**.
TCA3 Kings Meadow Medium Sensitivity	The Site is located outside of this TCA. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA. The Interim Development is of a scale that matches the built from surrounding Kings Meadow and would not affect the openness of the park.	Negligible	**Negligible**
TCA4 Napier Road and Forbury Road Low Sensitivity	The Site is located outside of this TCA. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Negligible	**Negligible**
TCA5 St Lawrence /Market Place Medium Sensitivity	The Site is located outside of this TCA. Whilst visible from TCA the Interim Development would be discrete and not detract from the character of the area. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Negligible	**Negligible**.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
TCA6 Forbury Gardens Medium Sensitivity	Due to the enclosed nature of this character area there would be no effects to this TCA during the Interim Development Scenario.	Negligible	**Negligible**
TCA7 Reading Retail Centre Medium Sensitivity	The Interim Development would add high quality buildings to an area within the TCA which is currently dominated by derelict buildings in poor condition. The detracting feature of Friars Street Shopping Centre and Telecom House would be removed from this TCA whilst Xafinity House and the Garrard Street car park, which are located immediately adjacent, would also be removed. The new buildings would add a positive visual effect on the streets surrounding the Site through the quality of its design, materials and improvements to public realm. The buildings will be of appropriate and high quality architectural styles and materials, relating to their specific contexts in different parts of the Site and reflecting their different uses. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Major	**Permanent, local, beneficial effect of major significance.**
TCA8 Reading West Low Sensitivity	The Site is located outside of this TCA. The Interim Development would add positively to the urban skyline of Reading by adding to the cluster of tall buildings that make up focal point of the redeveloped area of central Reading. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Minor	**Permanent, local**, **beneficial effect** of **minor significance**.
TCA9 St Mary's and Castle Street Medium Sensitivity	The Site is located outside of this TCA. Whilst visible from TCA, the Interim Development would be discrete and not detract from the character of the area. The Interim Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Negligible	**Negligible**.

Table 8.9: Likely Effects on Views and Visual Amenity from the Interim Development

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP3. Visitors to St Peter's Church and Church Yard High Sensitivity	Plot G would represent the highest urban feature in the viewpoint which currently has limited urban form. Plot G would sit alongside Thames Tower at a higher level on the skyline with some screening provided by trees in the foreground and midground. The low forms of Plots E and F on the skyline would be barely perceptible through the vegetation cover and existing built form. Overall, the change would be evident but not especially prominent and essentially localised within the wider view.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP4 Balmore Walk Visitors / users of Balmore Park High Sensitivity	Plot G would represent the highest urban feature in the viewpoint with an already strong urban form in the midground and on the skyline. Plots E, F and G would sit among the other tall buildings on the skyline including Thames Tower, the tower at the former Coopers BMW site and Chatham Square. The Interim Development would add positively to the urban skyline of Reading by adding to the cluster of tall buildings that make up focal point of the redeveloped area of central Reading. Plot G would have a glazed façade that responds to its orientation and massing of the other proposed buildings on the Site. However, from this viewing position the buildings would appear as a relatively discrete presence on the skyline.	Minor	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP 5 Road users traveling south on Westfield Road and Peppard Road Low Sensitivity	From this elevated position, Plot G would rise up from behind the terraced houses on the west side of Westfield Road. Plot G would sit slightly higher on the skyline and to the right of Thames Tower adding another city feature to the largely low rise residential character of the viewpoint.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 5. Pedestrians on Westfield Road Low Sensitivity			**Permanent, local**, **beneficial effect** of **minor significance**.
VP 6 Road users on Southampton Street Low Sensitivity	The Interim Development would not be visible from this location.	Negligible	**Negligible**
VP6. Pedestrians on Southampton Street Low/Medium Sensitivity		Negligible	
VP8 Users of the footpath off Dunsden Way High Sensitivity	Plot G would represent the highest urban feature in the viewpoint with a currently limited urban presence on the skyline. Both plots E and F would be imperceptible from this viewpoint. Plot G would sit above the distant tree line among other dispersed tall buildings on the skyline including Thames Tower, the tower at the former Coopers BMW site and The Blade. The Interim Development would add positively to the urban skyline of Reading by adding to the cluster of tall buildings that make up focal point of the redeveloped area of central Reading. However, from this distance Plot G would appear as a discrete presence on the skyline.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**.
VP9 Road users of Chatham Street Low Sensitivity	The Interim Development would be visible in the centre background of the view, framed and partially obscured by, tree cover. It would conceal the existing view of Thames Tower.	Minor	**Permanent**, **local**, beneficial **effect** of **minor significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP9 Pedestrians on Chatham Street Low Sensitivity	Plot E, the lowest of the proposed buildings in the view would create a building with a contrasting character to commercial building of Plot G to reflect its residential use.		**Permanent**, **local**, beneficial **effect** of **minor significance**.
VP10 Road users of Weldale Street Low Sensitivity	The Interim Development would positively change this view through the addition of contemporary built elements on the skyline in additional to Thames Tower and modern apartment block at the east end of Weldale Street. Plot E would be the lowest of the new buildings sitting to the south of the tall commercial building of Plot G. Plot G would have a glazed façade that responds to its orientation and massing of the other proposed buildings on the Site.	Moderate	**Permanent**, **local**, beneficial **effect** of **minor significance**.
VP10, Pedestrians on Weldale Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP12 Shoppers/pedestrians on Friar Street Low Sensitivity	Only Plot E of the Interim Development would be visible in this view. The higher elements of Plot E, toward Garrard Street, are not visible in this viewpoint, giving the impression of a building that appears similar in height to the building on the left of the frame. The Plot E building steps up and out towards Friar Street at its easterly end and would be cantilevered to partially enclose the proposed Friars Walk pedestrian thoroughfare. This would allow glimpsed views at street level into the on Site public realm. Plot E would be visibly residential in nature and provide a new high quality building which would add positively to the varied street frontage on Friar Street. The building would also highlight the entrance to the new pedestrian route north through the Site leading to the new public spaces and pedestrian activity associated with these spaces.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP12. Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP13 Pedestrians on Friar Street and Greyfriars Road Low Sensitivity	The Interim Development would not be visible from this viewpoint.	Negligible	**Negligible**
VP13. Road users on Friar Street and Greyfriars Road Low Sensitivity			**Negligible**
VP15 Pedestrians on Stanshawe Street Low Sensitivity	Plot G would be prominent in the centre of the frame adding a substantial feature to the skyline above 35 to 43 Greyfriars Road. Plot G would remove the existing view of Thames Tower but provide a modern building with a highly glazed facade. A small section of the top of Plot F would also be visible.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 15 Road Users on Stanshawe Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP16 Pedestrians on Tudor Road Low Sensitivity	Plot G would be prominent in the centre of the frame adding a substantial feature to the skyline at the end of Tudor Road. Plot G would remove the existing view of Thames Tower and the Garrard Street Multi Storey Carpark but provide a modern building with a glazed façade that responds to its orientation and massing of the other proposed buildings on the Site. Plots E and F would not be visible from this view point.	Moderate	**Permanent**, **local**, beneficial **effect** of **minor significance**.
VP16, Road users on Tudor Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP17 Pedestrians on Caversham Road Low Sensitivity	Plot G would be prominent in the centre of the frame on the right side of Thames Tower with some minor screening from trees in the mid ground. Plots E and F would be visible but would sit much lower on the skyline above the existing low rise retail buildings.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 17, Road users on Caversham Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP18 Pedestrians on Caversham Bridge High Sensitivity	The Interim Development would add a new tall building to the frame in a viewpoint characterised by the attractive waterway of the River Thames, low-rise residential property and a tree lined river bank. The view of Plots E and F would be limited because of building and tree cover.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**.
VP18, Road Users on Caversham Bridge Low Sensitivity			**Permanent**, **local**, **adverse effect** of **minor significance**.
VP19 Pedestrians and users of the Park High Sensitivity	Plot G would be prominent in the centre of the frame on the right side of Thames Tower with some minor screening from trees in the mid ground. The building would appear lower on the skyline than the Christchurch pedestrian bridge. The upper stories of Plot E would be visible above Reading Mainline Railway Station.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**.
VP20 Pedestrians on George Street crossing Reading Bridge Low/Medium Sensitivity	Only Plot G of the Interim Development Scenario would be visible from this viewpoint. Plot G would be prominent in the centre of the frame on the right side of Thames Tower rising up above the multistorey car park.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 20 Road users on George Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP22 Pedestrians and users of the park High Sensitivity	The Interim Development would not be visible form this viewpoint.	Negligible	**Negligible**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP23 Pedestrians on Forbury Road and Kenavon Drive Low Sensitivity	Only the top floors and the north side of Plot G would be visible from this viewpoint because Thames Tower would screen most of the building. Plot G would add to the urban context of the view but its presence would be largely unnoticeable from this position. Plots E and F are not visible from this position.	Negligible	**Negligible**
VP 23. Road users on Forbury Road and Kenavon Drive Low Sensitivity			**Negligible**
VP24 Pedestrians / shoppers in Market Place Medium Sensitivity	Plot G would appear on the skyline above and to the west of Thames Tower with further partial screening from a tree within Market Place. A very small part of Plot F may be visible on the north side of the Novotel/Ibis and would be largely imperceptible. Plot E would not be visible.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP25 Pedestrians / shoppers on Friar Street Low Sensitivity	Plot E would be visible on the left side of the view on Friar Street (Plot F is set back and is therefore not visible) and would rise a small amount above the existing buildings particularly to the east of the Site where the building would step up to a slightly higher elevation. Plot E would be seen obliquely within this varied street frontage in the far left of the frame. A small part of the upper stories of Plot G would be visible the gap between the Novotel/Ibis and Thames Tower. It would be lower on the skyline than the Novotel/Ibis and appear at a similar height to Thames Tower.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP25 Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP26 Pedestrians / shoppers on Friar Street Low Sensitivity	Only Plot E of the Interim Development would be visible in this view. Plot E would rise to a similar height as its close neighbours. Plot E would appear taller than the buildings further west and provide a local marker for the entrance to the new Friars Walk pedestrian route that would run northwards through the Site. The far eastern end of Plot E would be cantilevered to partially enclose the proposed Friars Walk and this would provide a frontage with a more open character at street level. In contrast, the Plot E roofline would add depth and interest to the streetscape and the high quality architectural finishes would add positively to the eclectic street frontage.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 26 Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP28 Pedestrians on Castle Street and St Mary's Butts Medium Sensitivity	Plot G would not be visible from this viewpoint. The top floors of Plot E would be visible appearing at the same level as the existing retail buildings in the view. Only a very small section of the upper part of Plot F would be visible to the west of the St Mary's Church Tower above	Negligible	**Negligible**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP28 Road Users on Castle Street and St Mary's Butts Low Sensitivity	existing retail units. Tree cover means that only fleeting glimpses of Plots E and F would be observed from this position.		**Negligible**
VP29 Pedestrians on Station Hill Low Sensitivity	Plots E and F of the Interim Development would be prominent in the view and remove existing detracting features on the Site including the Garrard Street Carpark and the back of the Friar Street Shopping Centre.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP29 Road users on Station Hill Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP30 Pedestrians on Garrard Street Low Sensitivity	The Interim Development would be prominent in the view and would remove existing detracting features on the Site including the Garrard Street Carpark and the back of the Friar Street Shopping Centre. The southern elevation of Plot G would appear in the left of the frame and remove the view of Thames Tower. Plots E and F would appear prominent in the right and centre of the frame. Plot E would appear higher on the skyline than Greyfriars House.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP30 Road Users on Road users on Garrard Street Low Sensitivity			**Permanent**, **Local**, **beneficial effect** of **moderate significance**.
VP31 Pedestrians on Garrard Street Low Sensitivity	Plots E and F would remove the existing view of the rear elevations of the Friar Street Shopping Centre and Telecom House. The new buildings would create a substantially higher skyline than at present on the left side of the frame with the buildings appearing considerably higher than Greyfriars House and No 9 Greyfriars Road.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP 31 Road Users on Garrard Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP33 Pedestrians on Kings Meadow Road Low Sensitivity	Plot G would be the only building of the Interim Development visible from this viewpoint location. It would appear above and on the north side of Thames Tower, with the southern elevation screened by the mass of Thames Tower.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 33 Road users on Kings Meadow Road Low Sensitivity			**Permanent**, **Local**, **beneficial effect** of **minor significance**.
VP34 Pedestrians on Pitts Lane Low Sensitivity	Plots E and F would be imperceptible from this distant viewpoint location, merging into the mass of existing buildings within central Reading. Plot G would become one of the highest town centre buildings on the skyline. However, its presence would be largely unnoticed due to its distance from the viewing location and pylons, trees and other town centre buildings providing screening.	Negligible	**Negligible**
VP 34 Road Users on Pitts Lane			**Negligible**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP35 Pedestrians on Kings Bridge as using the Kennet Side Path Medium Sensitivity	A very small section of Plot G would be visible low on the skyline between existing buildings. Its presence would go unnoticed from this location.	Negligible	**Negligible**
VP35 Road users on Kings Bridge Low Sensitivity			**Negligible**

Completed Development Scenario

8.54 The Completed Development Scenario comprises the Interim Development Scenario together with Phase 3 which would provide four buildings rising up from a podium. Phase 3 would provide office and potentially residential / hotel floor space with some ground floor retail and leisure uses. Car parking would be provided within the podium. The parameter plans for Phase 3 show that the buildings within Plots A to D would range in height from a minimum of 62m AOD to a maximum of 163m AOD.

8.55 Public realm would be provided between the buildings within Phase 3; minimum distances between the buildings have been defined by the Parameter Plans but the exact location of the spaces would be subject to agreement at future reserved matters stage. Refer to **Chapter 5 Development Description** of this ES for further phasing and scheme information.

Table 8.10: Likely Effects on Views and Visual Amenity from the Completed Development

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
TCA1 Station Hill and Station East Low Sensitivity	The Completed Development would add high quality buildings to the TCA which is currently dominated by derelict buildings in poor condition. The detracting features of the Garrard Street multi-storey carpark and Xafinity House which are located within this TCA would be removed whilst Friars Walk Shopping Centre and Telecom House, which are immediately adjacent to this TCA would also be demolished. The buildings would add a positive visual effect to the streets surrounding the Site through the quality of their design, materials and improvements to public realm. The buildings will be of appropriate and high quality architectural styles and materials, relating to their specific contexts in different parts of the Site and reflecting their different uses. The Completed Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
TCA2 Vastern Road Low Sensitivity	The Site is located outside of this TCA. However, due to its proximity to the Site the Completed Development would add positively to the urban skyline of Reading by adding to the cluster of tall buildings that make up the focal point of the redeveloped area of central Reading.	Moderate	**Permanent**, **local**, **beneficial effect** of

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
	The Completed Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.		**minor significance**.
TCA3 Kings Meadow Medium Sensitivity	The Site is located outside of this TCA. The Completed Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA. The Completed Development is of a scale that matches the built from surrounding Kings Meadow and would not affect the openness of the park.	Negligible	**Negligible**.
TCA4 Napier Road and Forbury Road Low Sensitivity	The Site is located outside of this TCA. The Completed Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Negligible	**Negligible**
TCA5 St Lawrence/Market Place Medium Sensitivity	The Site is located outside of this TCA. Whilst visible from TCA the Completed Development would be a discrete presence and not detract from the character of the area. The Completed Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Negligible	**Negligible**
TCA6 Forbury Gardens Medium Sensitivity	Due to the enclosed nature of this character area there would be no effects to this TCA as a result of the Completed Development.	Negligible	**Negligible**
TCA7 Reading Retail Centre Medium	The Completed Development would add high quality buildings to an area within the TCA which is currently dominated by derelict buildings in poor condition. The detracting feature of the Friar Street Shopping Centre and Telecom House would be removed from this TCA whilst Xafinity House and the Garrard Street Car Park, which are located immediately adjacent to the TCA would also be demolished. The new buildings would add a positive visual effect to the streets surrounding the Site through the quality of their design, materials and improvements to public realm. The buildings will be of appropriate and high quality architectural styles and materials, relating to their specific contexts in different parts of the Site and reflecting their different uses. The Completed Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Major	**Permanent**, **local**, **beneficial effect** of **major significance**.
TCA8 Reading West Low Sensitivity	The Site is located outside of this TCA. The Completed Development would add positively to the urban skyline of Reading by adding to the cluster of tall buildings that make up the focal point of the redeveloped area of central Reading. The Completed Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
TCA9 St Mary's and Castle Street	The Site is located outside of this TCA. Whilst visible from this TCA, the Completed Development would be discrete and not detract from the character of the area. The Completed Development would not lead to the	Negligible	**Negligible**.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
Medium Sensitivity	clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.		

Table 8.11: Likely Effects on Views and Visual Amenity from the Completed Development

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP3. Visitors to St Peter's Church and Church Yard High Sensitivity	At maximum parameters, Plots C and A would become the highest urban features in a view that currently has limited urban form with a distinct rural outlook. Plots A, C, and G would sit alongside Thames Tower at a higher level on the skyline creating a stepped profile with some screening provided by trees in the foreground and midground. Plots B, D, E and F would not be visible. The change would be prominent but would not dominate the view in its entirety and the leafy outlook would be retained.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**.
	At minimum parameters the outline elements would be largely imperceptible, and the effects would therefore be similar to the Interim Development Scenario.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**.
VP4 Balmore Walk Visitors / users of Balmore Park High Sensitivity	The Completed Development would represent the highest buildings in the viewpoint with an already strong urban form in the midground and on the skyline. If built out to maximum parameters, Plots A, C and G would form a stepped profile and sit among the other tall buildings on the skyline including Thames Tower, the tower at the former Coopers BMW site and Chatham Square. The Completed Development would add positively to the urban skyline of Reading through adding to the cluster of tall buildings that make up focal point of the redeveloped area of central Reading.	Moderate	**Permanent**, **local**, **beneficial effect** of **major significance**.
	At minimum parameters building A and C would appear low on the skyline to the right of Plot G and the effects would therefore be similar to the Interim Development Scenario.	Minor	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP 5 Road users traveling south on Westfield Road Street and Peppard Road Low Sensitivity	From this elevated position the mass of Plots A and C (at maximum parameters) and G would rise up from behind the terraced houses on the west side of Westfield Road. The Plots would sit higher on the skyline and to the right of Thames Tower adding another city feature to the largely low rise residential character of the viewpoint. The new buildings would appear lower on the skyline than the houses in the foreground and therefore would not dominate the view. They would provide a focal point marking the centre of Reading.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 5. Pedestrians on Westfield Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	At minimum parameters the outline elements of the Completed Development would not be visible and therefore the effects would be the same as those of the Interim Development Scenario.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 6 Road users on Southampton Street Low Sensitivity	At maximum parameters, three of the proposed buildings (Plots A, C and D) would be visible above the roofline at the far end of Southampton Street separated from the St Giles Church spire. The cluster of buildings would appear lower on the skyline than the terraced houses in the foreground and midground but would sit higher on the skyline than St Giles Church. Plots A and D would share a common architectural language so that they complement one another. Due to the distance from the Site and the screening of the lower elevations provided by existing built form the new buildings would be relatively discreet on the skyline.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP6. Pedestrians on Southampton Street Low/Medium Sensitivity			
	At minimum parameters the Completed Development would not be visible.	Negligible	**Negligible**
VP8 Users of the footpath off Dunsden Way High Sensitivity	Plots A and C (at maximum parameters) and G would represent the highest urban features in a viewpoint with a limited urban presence on the skyline. Plots B, D, E and F would not be visible from this viewpoint. Plots A and C (at maximum parameters) and G would sit above the distant tree line among other existing dispersed tall buildings on the skyline including Thames Tower, the tower at the former Coopers BMW site and The Blade. The new buildings would appear considerably higher on the skyline than existing tall buildings. This would increase the urban presence of Reading town centre for users of the footpath in this predominantly rural view.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**.
	At minimum parameters the outline elements of the Completed Development would not be visible and therefore the effects would be the same as for the Interim Development Scenario.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**.
VP9 Road users of Chatham Street Low Sensitivity	The Completed Development would be visible in the centre background of the view, framed, and partially obscured by tree cover. If built out to the maximum parameters, the upper sections of the proposed buildings would appear as a tight cluster with differing heights and massing. This would add depth to the skyline which, with the exception Thames Tower, is currently devoid of tall buildings. The massing of the buildings rises towards Plot C in the north east of the Site. Plot B, would be visible in the west of the Site.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP9 Pedestrians on Chatham Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	At minimum parameters, the outline elements of the Completed Development would be largely imperceptible as they would sit very low on the skyline. The effects would therefore be very similar to those of the Interim Development Scenario.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP10 Road users of Weldale Street Low Sensitivity	The Completed Development would positively change this view through the addition of contemporary built elements on the skyline. From this westerly position, if built out to the maximum parameters, the rooflines of Plots A, C and D would appear as a tight group, with their different heights and massing adding depth to the skyline form and rising towards Plot C to mark the northeast end of the Site at the Station. Plot D would conceal the view of Thames Tower. Plots A and D would share a common architectural language so that they complement one another. The lower buildings of Plot B and E sitting to the south and west of the tall commercial buildings would add to the stepped character of the cluster of buildings. Plot F would not be visible from this position.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP10, Pedestrians on Weldale Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters the outline elements of the Completed Development would not be visible and therefore the effects would be the same as the Interim Development Scenario.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP12 Shoppers/pedestrians on Friar Street Low Sensitivity	Only Plot E of the Completed Development would be visible in this view at both maximum and minimum parameters. The higher elements of Plot E, toward Garrard Street, are not visible in this viewpoint, giving the impression of a building that appears similar in height to the building on the left of the frame. The Plot E building steps up and out towards Friar Street at its easterly end and would be cantilevered to partially enclose the proposed Friars Walk pedestrian thoroughfare; this would allow glimpsed views at street level into the on Site public realm. Plot E would be visibly residential in nature and provide a new high quality building which would add positively to the varied street frontage on Friar Street. The building would also highlight the entrance to the new pedestrian route north through the Site leading to the new public spaces and pedestrian activity associated with these spaces.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP12. Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP13 Pedestrians on Friar Street and Greyfriars Road Low Sensitivity	At maximum parameters, the top floors of Plot A and Plot B be would be visible rising above the offices of Greyfriars House. All of the remaining Plots of the Completed Development would be screened by existing built form. Plot A would appear to the west the existing six storey residential apartment block on	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP13. Road users on Friar Street and Greyfriars Road Low Sesitivity	the junction of Friar Street and Greyfriars Road. This residential building screens a large portion of the southern elevation of Plot A. Plot A would appear at the same height on the skyline as the residential building but would provide a focal point marking the redeveloped area at Station Hill and add a new high quality building to the viewpoint.		**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters no elements of the Completed Development would be visible.	Negligible	**Negligible**
VP15 Pedestrians on Stanshawe Street Low Sensitivity	The Completed Development would positively change this view through the addition of contemporary built elements on the skyline. Xafinity House, a detracting feature in the viewpoint would be replaced with new buildings. From this westerly position, if built out to the maximum parameters, the rooflines of Plots A, B and the top of D would appear as a cluster of buildings with their different heights and massing adding depth to the skyline form with Plot A appearing as the highest point on the skyline.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP 15 Road Users on Stanshawe Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**.
	At minimum parameters Plots A and B would appear low on the skyline at a similar height to 35 to 43 Greyfriars Road.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP16 Pedestrians on Tudor Road Low Sensitivity	If built out to maximum parameters, Plot A would be dominant in the frame removing much of the view of the open sky due to the close proximity of the viewpoint The gap between Plot A and Plot C (partially obscured by scaffolding on the left of the frame) would be visible from this position breaking up the singular mass of Plot A as it appears in the wire line. The remaining Plots of the Completed Development would not be visible from this location. The detracting features of the Garrard Street carpark and Xafinity house would be removed from the view. Plots A and D would provide a new building appropriate to this important Site close to the Reading Mainline Railway Station.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP16, Road users on Tudor Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**.
	At minimum parameters the mass of Plot A would appear at a similar height on the skyline to the existing buildings on Tudor Road with the top floors of Plot G rising up above.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP17 Pedestrians on Caversham Road Low Sensitivity	Plots A and C (at maximum parameters) and G would be prominent in the centre of the frame forming a stepped cluster of buildings raising from Thames Tower in the centre of the frame to the west. The buildings would rise up above the existing retail buildings and postal sorting office with some minor	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP 17, Road users on Caversham Road Low Sensitivity	screening from trees in the mid ground to the lower elevations. The Completed Development would add positively to the urban skyline of Reading by adding to the cluster of tall buildings that make up the focal point of the redeveloped area of central Reading.		**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters plot C would appear lower on the skyline to the right of Plot G and be partially screened by vegetation/building cover. Plot A would not be visible.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP18 Pedestrians on Caversham Bridge High Sensitivity	The Completed Development would add new tall buildings to the frame in a viewpoint characterised by the attractive waterway of the River Thames, low-rise residential property and a tree lined river bank. Plot G and, at maximum parameters, Plots A and C, would be considerably higher on the skyline than an of the existing buildings, being prominent in the centre of the frame forming a stepped cluster of buildings raising from Thames Tower in the centre of the frame to the west. The appearance of the buildings would provide an urban element to a view largely devoid of substantial buildings; this would be particularly noticeable to pedestrians using Caversham Bridge.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**.
VP18, Road Users on Caversham Bridge Low Sensitivity			**Permanent**, **local**, **adverse effect** of **minor significance**.
	At minimum parameters plot C would appear lower on the skyline to the right of Plot G. Plot A would not be visible.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**. (minor for Road users)
VP19 Pedestrians and users of the Park High Sensitivity	Plots A, C and G would be prominent in the centre of the frame on the right side of Thames Tower rising up above the existing built form including Reading Mainline Railway Station. Plot G would be partly screened by trees in the mid ground. The buildings would appear lower on the skyline than the Christchurch pedestrian bridge however they would be considerably more prominent on the skyline than the existing buildings within the frame.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**.
	At minimum parameters plot C would appear lower on the skyline to the right of Plot G. Plot A would be largely imperceptible very low on the skyline and screened by the Christchurch pedestrian bridge. The effects would therefore be similar to those of the Interim Development Scenario.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP20 Pedestrians on George Street crossing Reading Bridge Low/Medium Sensitivity	Plots A and C (at maximum parameters) and G of the Completed Development would be prominent in the centre right of the frame creating a cluster of buildings (including Thames Tower) with a stepped profile. The buildings would rise up above the multi-storey car park. The Completed Development would add positively to the urban skyline of Reading by adding a cluster of tall buildings to create a focal point marking the redeveloped area of central Reading.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor to moderate significance**.
VP 20 Road users on George Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters the outline elements of the Completed Development would not be visible.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP22 Pedestrians and users of the park High Sensitivity	At maximum parameters, Plots A and C would add built form behind the new tower on the former Coopers BMW site appearing lower on the skyline extending away from the viewpoint to the west. The foreground and midground of the frame have a natural parkland character. However, the existing buildings on the skyline create a strong urban presence that the new buildings would enhance proving a stepped profile to the skyline.	Minor	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
	At minimum parameters no elements of the Completed Development would not be visible.	Negligible	**Negligible**
VP23 Pedestrians on Forbury Road and Kenavon Drive Low Sensitivity	At maximum parameters the Completed Development would be visible extending above and to the north of the existing Thames Tower. The upper floors of Plot C would be visible to the south of Thames Tower with its low elevations screened by road signage and trees. The Completed Development would appear lower on the skyline than the than the modern office buildings of Forbury Place on the north side of Forbury Road and would enhance the presence of the existing tall buildings that mark the commercial centre of Reading.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 23. Road users on Forbury Road and Kenavon Drive Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters the outline elements of the Completed Development would be largely imperceptible with only a very small section of Plot visible low on the skyline.	Negligible	**Negligible**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP24 Pedestrians / shoppers in Market Place Medium Sensitivity	At maximum parameters the Completed Development would sit on the skyline behind Thames Tower and the Novotel/Ibis and appear as a prominent cluster of tall buildings stepping up to Plot C. Only a very small part of the upper floor of Plot F would be visible and Plot E is screened in its entirety by existing buildings. The new buildings create a focal point marking the redeveloped area of central Reading and would enhance the outlook of existing modern built form in the frame (Novotel/Ibis & Thames Tower).	Moderate	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
	At minimum parameters the outline elements of the Completed Development would not be visible and therefore the effects would be the same as the Interim Development Scenario.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP25 Pedestrians / shoppers on Friar Street Low Sensitivity	Plot E would be visible on the left side of the view on Friar Street (Plot F is set back and is therefore not visible) and would rise a small amount above the existing buildings particularly to the east of the Site where the building would step up to a slightly higher elevation. Plot E would be seen obliquely within this varied street frontage in the far left of the frame. A small part of the upper stories of Plot G and, at maximum parameters, Plot C, would be visible in the gap between the Novotel/Ibis and Thames Tower. They would be lower on the skyline than the Novotel/Ibis and appear at a similar height to the Thames Tower.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP25 Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters the outline elements of the Completed Development would not be visible.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP26 Pedestrians/shoppers on Friar Street Low Sensitivity	Only Plot E of the Completed Development would be visible in this view. Plot E would rise to a similar height as its close neighbours and would appear taller than the buildings further west. It would provide a local marker for the entrance to the new Friars Walk pedestrian route that would run northwards through the Site. The eastern end of Plot E would be cantilevered to partially enclose the proposed Friars Walk and this would provide a frontage with a more open character at street level. In contrast, the Plot E roofline would add depth and interest to the streetscape and the high quality architectural finishes would add positively to the eclectic street frontage.	Moderate	**Permanent, local, beneficial effect** of **minor significance.**
VP 26 Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters only Plot E of the Completed Development would be visible in this view and therefore the effects would be the same as the Interim Development Scenario.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP28 Pedestrians on Castle Street and St Mary's Butts Medium Sensitivity	At maximum parameters, the Completed Development would appear as a cluster of tall building directly to the left of St Mary's church tower in the centre of the frame. Although the new buildings would appear lower on the skyline than the top of the church tower, the mass of new buildings would be a substantial modern built feature that would detract from prominence of the church tower at that currently sits on the skyline in a view characterised by older low rise built form, trees and the grave yard.	Moderate	**Permanent**, **local**, **adverse effect** of **moderate significance**
VP28 Road Users on Castle Street and St Mary's Butts Low Sensitivity			**Permanent**, **local**, **adverse effect** of **minor significance**
	At minimum parameters the outline elements of the Completed Development would not be visible and the effect would therefore be the same as the Interim Development Scenario.	Negligible	**Negligible**
VP29 Pedestrians on Station Hill Low Sensitivity	Plot A would be the only building visible from this position. It would replace the existing detracting features including the Garrard Street multi-storey carpark, Friar Street Shopping Centre, Telecom House and Xafinity House. Due to the close proximity of the viewpoint to the Site, Plot A would dominate both the foreground and midground of the frame. Plot A would provide a new building appropriate to this important site close to Reading Mainline Railway Station.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP29 Road users on Station Hill Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**.
	At minimum parameters Plot A would be remain prominent in the view.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP30 Pedestrians on Garrard Street Low Sensitivity	The Completed Development would be prominent in the view and replace the existing detracting features on the Site including the Garrard Street Carpark and the back of the Friar Street Shopping Centre and Telecom House. Plots B and D would provide a strong frontage on the north side of Garrard Street whilst Plots E and F would follow the route of the road on the right. Plots B and D would replace the existing view of Thames Tower. The existing disjointed back street character of Garrard Street would be transformed by the Proposed Development creating a modern townscape with a defined route down Garrard Street and increased permeability of the wider area.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP30 Road Users on Road users on Garrard Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**.
	At minimum parameters the Completed Development would remain prominent in the view with Plots B and D appearing lower on the skyline on the north side of Garrard Street.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP31 Pedestrians on Garrard Street Low Sensitivity	The new buildings would remove the existing view of the rear elevations of the Friar Street Shopping Centre, Telecom House and Xafinity House. The new buildings would create a substantially higher skyline than at present on both sides of Garrard Street. The existing disjointed back street character of Garrard Street would be transformed by the Proposed Development creating modern townscape with a defined route down Garrard Street and increased permeability of the wider area.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP 31 Road Users on Garrard Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**.
	Due to the close proximity of Plots D and F the view would at the same at minimum parameters.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**.
VP33 Pedestrians on Kings Meadow Road Low Sensitivity	Plots A and C (at maximum parameters) and G of the Completed Development would be prominent in the centre right of the frame creating a cluster of buildings (including Thames Tower) with a stepped profile. The buildings would rise up to the left of the multi-storey car park. The Completed Development would add positively to the urban skyline of Reading by adding a cluster of tall buildings that create a focal point marking the redeveloped area of central Reading.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 33 Road users on Kings Meadow Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**.
	At minimum parameters Plots A and C would be low on the skyline appearing at a similar height to the railway gantries in the midground.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP34 Pedestrians on Pitts Lane Low Sensitivity	The cluster of Plots C and D (at maximum parameters) and G would form the highest buildings on the skyline rising up behind Thames Tower. However, their presence would be largely unnoticed, particularly to road users, due to the distance from the viewing location to the Site and the pylons, trees and other town centre buildings providing screening. Plots E and F would be imperceptible from this distant viewpoint location appearing merged into the mass of existing building with in central Reading.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**.
VP 34 Road Users on Pitts Lane			**Negligible**
	At minimum parameters the outline elements of the Completed Development would not be perceptible from this viewing position.	Negligible	**Negligible**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP35 Pedestrians on Kings Bridge as using the Kennet Side Path Medium Sensitivity	A very small sections of Plots A, B, C and D would be visible at maximum parameters low on the skyline between exiting buildings. Their presence would go largely unnoticed from this location.	Negligible	**Negligible**
VP35 Road users on Kings Bridge Low Sensitivity			**Negligible**
	At minimum parameters the outline elements of the Completed Development would not be visible and the effects would be the same as the Interim Development Scenario.	Negligible	**Negligible**

Mitigation Measures and Likely Residual Effects

Demolition and Construction

8.56 An appraisal of mitigation in relation to the demolition and construction works is contained within **Chapter 6: Demolition and Construction**. However, specific to the issues of townscape and visual impact, good site management, maintenance and housekeeping and careful siting of construction machinery would be implemented via the Construction Environmental Management Plan (CEMP) to minimise visual intrusion during the Works. This would ensure that temporary deterioration of townscape character and visual intrusion would be minimised as far as practicable. The use of attractive hoardings and the maintenance of a clean, safe pedestrian environment along the street frontages of the Site would aid in screening views of much of the ground level construction works from the adjoining townscape in and around the Site.

8.57 However, some adverse effects would be inevitable during the demolition since the use of large scale plant such as tower or mobile cranes, partially demolished buildings and buildings under construction cannot be completely mitigated.

8.58 As such, these changes are anticipated to result in **temporary, local** residual effects of **major adverse** for TCA7: Reading Retail Centre within which the Site is located, **moderate adverse** significance to TCA 1: Station Hill (within which the Site is also located) and TCA3: Kings Meadow and **temporary**, **local** residual effects of **negligible** to **minor adverse** significance to the TCAs surrounding the Site.

8.59 Visual receptors most likely to be affected by the demolition and construction works include residents, pedestrians, road users and recreational users of parks, with close range views towards the Site. Effects resulting to views would remain **temporary**, and range between **negligible** and of **major adverse** significance depending on the angle and distance of view from the Proposed Development.

Interim Development and Completed Development

8.60 All mitigation measures are inherent within the Proposed Development design. Consequently, all residual effects would remain the same as those identified within the assessment of likely effects summarised within Tables 8.9 and 8.11 and below.

Interim Development Scenario

8.61 **Permanent**, **local** effects of **major beneficial** significance would result to TCA7: Reading Retail Centre and **permanent, local** effects of **moderate beneficial** significance would result to TCA1: Station Hill and Station East. Effects on surrounding TCAs would be **negligible** to **permanent**, **local** and of **minor beneficial** significance in the vicinity of the Site.

8.62 The majority of local views would experience either **negligible** or **permanent**, **local** effects, ranging from **minor** to **moderate beneficial** significance depending on angle, range and context of view. **Minor** to **moderate permanent**, **local adverse** effects would be experienced for four viewpoints (VP3: St Peters Church, VP8: Dunsden Way, VP18: Caversham Bridge and VP19: Christchurch Park) due to the addition of built urban form in sensitive views with an rural outlook.

Completed Development

8.63 **Permanent**, **local** effects of **moderate** and **major**, **beneficial** significance would result to the TCAs within which the Site is located (TCA1: Station Hill and Station East and TCA7: Reading Retail Centre). Effects on surrounding TCAs would be **negligible** to **temporary**, **local** and of **minor beneficial** significance in the vicinity of the Site.

8.64 The majority of views would experience either **negligible** or **permanent**, **local** effects, ranging from **minor** to **major beneficial** significance depending on angle, range and context of view.

8.65 **Major permanent**, **local adverse** effects would be experienced for four viewpoints (VP3: St Peters Church, VP8: Dunsden Way, VP18: Caversham Bridge and VP19: Christchurch Park) due to the addition of built urban form in sensitive views with an existing rural outlook.

Table 8.12: Summary of Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Demolition and Construction			
Townscape Character	**Temporary, local and of negligible to moderate adverse significance**	CEMP	**Temporary, local and of negligible to major adverse significance**
Visual	**Temporary, local and of negligible to major adverse significance**	CEMP	**Temporary, local and of negligible to major adverse significance**
Interim Development Scenario			
Townscape Character	**Permanent, local effects of negligible to major beneficial significance.**	Mitigation measures are inherent within the Proposed Development design	**Permanent, local effects of negligible to major beneficial significance.**
Visual	**Permanent, local effects of moderate adverse to moderate beneficial significance.**	Mitigation measures are inherent within the Development design,	**Permanent, local effects of moderate adverse to moderate beneficial significance.**
Completed Development			

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Townscape Character	**Permanent, local effects of negligible to major beneficial significance.**	Mitigation measures are inherent within the Proposed Development design,	**Permanent, local effects of negligible to major beneficial significance.**
Visual	**Permanent, local effects of moderate adverse to major beneficial significance.**	Mitigation measures are inherent within the Proposed Development design,	**Permanent, local effects of major adverse to major beneficial significance.**

Comparison of Effects between this ES and the 2015 ES as amended by the 2019 ES Addendum

8.66 The previous TVIA was carried out by Tavernor and updated using the same methodology by Waterman Infrastructure & Environment Ltd (Waterman) as part of the 2019 ES Addendum. The methodology adopted in this assessment has however, been updated to Waterman's standard format given that it represents a new assessment rather than an update an existing assessment. The changes in the effects between this ES and the 2015 ES as amended by the 2019 ES Addendum are largely related to the use of a different methodology and changes to the baseline.

Townscape

8.67 The systematic approach to assessing the effects to Townscape Character applied for this assessment is different from the one used in the 2015 ES as amended by the 2019 ES Addendum which did not assign specific levels of effect to Townscape Character. However, the 2015 ES stated:

"The Site has a low sensitivity to change. This is because it comprises a number of dilapidated buildings…. It is recognised, however, that the Proposed Development will have a substantial and permanent effect on the existing townscape and public realm character…

8.68 The assessment went on to outline that:

"..The *buildings will be of appropriate and high quality architectural styles and materials, relating to their specific contexts in different parts of the Site and reflecting their different uses;….*

… townscape changes of the Proposed Development on the local area will be:… The positive visual effect of the Proposed Development on the streets surrounding the Site through the quality of its design…"

8.69 No changes were made to these conclusions as part of the 2019 ES Addendum and these findings are consistent with the beneficial effects to Townscape Character of the Completed Development set out within this ES Chapter.

Visual

8.70 For the majority of the assessment, the findings are consistent with those of the 2015 ES as amended by the 2019 ES Addendum with changes associated with the updated methodology generally being small.

8.71 The most substantial changes are related to the following viewpoints: VP3, St Peter's Church, VP 8. Dunsdon Way, VP18 Caversham Bridge, VP19 Christchurch Meadows. These views were previously assessed in the 2015 ES as amended by the 2019 ES Addendum as **moderate to major beneficial** (**minor to moderate beneficial** for VP19). These viewpoints have now all been

assessed as having a permanent, local and **adverse** effect of **major significance**. The main reason for this is the methodology applied. Given the existing rural outlook of these viewpoints, the addition of tall built elements to the views has been assessed as an adverse effect under the methodology applied. Also, Western Tower a detracting feature was previously visible in the baseline views and does not appear in the revised baseline.

References

1 Landscape Institute and Institute of Environmental Management and Assessment (2013); 'Guidelines for Landscape and Visual Impact Assessment', Third Edition, Routledge.
2 Natural England (2014); 'An Approach to Landscape Character Assessment', October 2014.
3 Landscape Institute (2011); 'Advice Note 01/11: Photography and Photomontage in Landscape and Visual Impact Assessment', Landscape Institute.
4 Historic England (2015); 'Tall Buildings Historic England Advice Note 4', Historic England.
5 Natural England (2012), NCA in south east England and London, NCA 115 Thames Valley.
6 Reading Borough Council/Entec 2018.Reading Tall Building Strategy, January 2008.
7 Reading Borough Council, Local Plan, November 2019
8 Reading Borough Council (2010) Reading Station Area Framework

9. Historic Environment

Introduction

9.1. This chapter presents an assessment of the likely significant effects of the Proposed Development on the historic environment. It provides a description of the methods used in the assessment, followed by an outline of baseline conditions within the Site and a 250m study area for designated heritage assets and a 500m study area for non-designated heritage assets, together with an assessment of likely potential effects of the Proposed Development during Site preparation (including demolition) and construction works and once the Proposed Development is completed and operational.

9.2. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

9.3. The chapter is accompanied by the following technical appendices provided in **ES Volume 2**:

- **Technical Appendix 9.1:** Waterman, 2019. *Historic Environment Desk-Based Assessment;*
- **Technical Appendix 9.2:** Oxford Archaeology, 2019. *Station Hill North Plots A, B, C, D and G Reading, Archaeological Watching Brief Report;*
- **Technical Appendix 9.3:** Oxford Archaeology, 2019. *Station Hill South Plots E and F Reading, Archaeological Watching Brief Report.*

Assessment Methodology and Significance Criteria

Assessment Methodology

9.4. The likely effects of the Proposed Development on the historic environment have been determined using current legislation, the National Planning Policy Framework (NPPF), pertinent local planning policies and guidance produced by Historic England and the Chartered Institute for Archaeologists (CIfA). These are presented in detail in Section 3 and Appendix D of the Historic Environment Desk-Based Assessment (HEDBA – see **Technical Appendix 9.1**).

9.5. This chapter comprises an assessment of the likely effects on the historic environment and is based on the results of the HEDBA (see **Technical Appendix 9.1**) and the findings of the recent 2019 Watching Briefs (see **Technical Appendix 9.2** and **9.3**).

9.6. The following tasks were undertaken for the HEDBA to establish the baseline:

- A search of Historic England's *The National Heritage List for England* (NHLE) online database for designated assets within the Site and a 250m radius study area;
- A search of Reading Historic Environment Record (RHER) for non-designated heritage assets within the Site and a 500m radius study area;
- A site walkover survey undertaken on 29th May 2019 (see Section 5.8 of **Technical Appendix 9.1**) to assess the known archaeological resource, to identify any additional significant heritage assets or features of historic interest and assess potential setting impacts (where applicable); and
- A review of available secondary sources, including historic mapping information accessed online, such as The National Library of Scotland which holds historic Ordnance Survey (OS) covering England.

9.7. Due to dense extant development surrounding the Site, visibility is highly restricted. As a result, a 250m search radius for designated heritage assets has been deemed appropriate. A 500m study area for non-designated heritage assets to give more context in regard to potential archaeological remains within the Site has also been undertaken.

9.8. Appendix B of the HEDBA (see **Technical Appendix 9.1**) contains a list of all the known designated and non-designated heritage assets within the Site and study area. The asset references used throughout this chapter are those created by Waterman for the HEDBA.

Approach to Outline Assessment

9.9. The assessment of the Proposed Development was based on the maximum depth and extent of excavation, maximum foundation depths and maximum building heights. As such, it is considered that the assessment represents the 'worst case'.

Approach to Future Baseline

9.10. It is assumed that the planning approval for the future baseline scheme at the former Coopers BMW site, Napier Road would have been subject to appropriate conditions requiring archaeological evaluation and recording to mitigate potential effects on the archaeological resource. This scheme would not alter the archaeological baseline at the Site and has therefore not been considered further in terms of archaeology. In terms of built heritage, the viewpoint assessment included within this chapter has considered this scheme as part of the Baseline Scenario although given the location of the scheme relative to the Proposed Development, it is not considered to alter the baseline conditions or the assessment of effects.

Significance Criteria

9.11. The significance of the effects of the Proposed Development on the historic environment have been determined using the assessment criteria described below.

9.12. The importance or value of a heritage asset is determined according to its statutory designation or non-designation status as set out below in Table 9.1. This provides an initial framework for identifying the likely most sensitive assets. Further assessment of their significance is then undertaken against Historic England's (formerly published under English Heritage) 2008 guidance[1] on using the value categories of evidential, historic, aesthetic and communal value which are set out in Table 9.2.

Table 9.1: Statutory Value of Heritage Assets

Value	Type of Heritage Asset
Very High	World Heritage Sites (including nominated sites). Scheduled Monuments (including assets of schedulable quality). Grade I Listed Building. Grade I Registered Parks and Gardens. Protected Wrecks. Heritage assets of national or international importance.
High	Grade II* and II Listed Buildings. Conservation Areas. Grade II* and II Registered Parks and Gardens. Registered Battlefields. Protected heritage landscapes (ancient woodlands or historic hedgerows).

Value	Type of Heritage Asset
	Heritage assets of regional or county importance.
Medium	Locally listed buildings. Heritage assets with a district value or interest.
Low	Heritage assets with a local (e.g. parish) value or interest.
Negligible	Historic environment resource with no significant value or interest.
Unknown	Heritage assets for which current level of understanding is insufficient to allow significance to be determined.

Table 9.2: Heritage Values

Heritage Values	Definition
Evidential	Evidential value derives from the potential of a place to yield evidence about past human activity.
Historical	Historical value derives from the ways in which past people, events and aspects of life can be connected through a place to the present. It tends to be illustrative or associative.
Aesthetic	Aesthetic value derives from the ways in which people draw sensory and intellectual stimulation from a place.
Communal	Communal value derives from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical (particularly associative) and aesthetic values but tend to have additional and specific aspects.

9.13. The magnitude of impact on a heritage asset from development is assessed based on the criteria outlined in Table 9.3. These criteria are developed from guidance outlined in the Design Manual for Roads and Bridges (DMRB)[2] and the International Council for Monuments and Sites (ICOMOS)[3] which provide a detailed description of positive to negative impacts on the historic environment.

Table 9.3: Magnitude of Impact

Magnitude of Change / Impact	Description
Major Beneficial	The development will significantly improve the overall setting and character of heritage assets. The development will reveal and/or enhance important characteristics which were previously unknown or inaccessible. There would be a substantial improvement to important elements of the asset.
Moderate Beneficial	The proposed changes will considerably improve the setting or overall character of the heritage asset. There may be an improvement in key uses and beneficial change (e.g. the creation of coherency) to the characteristics of the asset.
Minor Beneficial	The proposed changes will cause a slight beneficial improvement to the setting or overall character of a heritage asset.
Neutral (Insignificant)	The proposed changes will have no impact on the heritage asset.
Minor Adverse	The proposed changes will have a slight adverse impact to the setting or overall character of a heritage asset. Change of this magnitude may be acceptable if suitable mitigation is carried out.
Moderate Adverse	The proposed changes will negatively alter the setting or overall character of the heritage asset.

Magnitude of Change / Impact	Description
	It will likely disturb key features and detract from the overall heritage significance. Change of this magnitude should be avoided where possible but can be minimised or neutralised through positive mitigation.
Major Adverse	The proposed changes will significantly damage the overall setting and/or character of heritage assets. They will cause a notable disruption to, or in some cases, complete destruction of, important features. Change of this magnitude should be avoided.

9.14. The overall significance of the effect on the heritage asset is determined by combining the value of the asset with the magnitude of impact, as outlined below in Table 9.4.

Table 9.4: Significance of Effect

Magnitude of Impact	Heritage value				
	Very High	High	Medium	Low	Negligible
Major	Very Large	Very Large / Large	Moderate / Large	Minor / Moderate	Minor
Moderate	Large / Very Large	Moderate / Large	Moderate	Minor	Neutral / Minor
Minor	Moderate / Large	Moderate / Minor	Minor	Neutral / Minor	Neutral / Minor
Negligible	Minor	Minor	Neutral / Minor	Neutral / Minor	Neutral
No Change	Neutral	Neutral	Neutral	Neutral	Neutral

Baseline Conditions

The Site

9.15. The Site encompasses land between Station Hill, Greyfriars Road, Friar Street and Station Road and currently includes a multi-storey car park, the site of a demolished bus station and commercial properties across a total area of 3.08ha. The commercial properties include Telecom House and Friars Walk Shopping Centre, which are currently undergoing demolition and Xafinity House which is currently being used as a construction compound by the contractors undertaking the demolition works.

9.16. The approximate centre of the Site is located at National Grid Reference (NGR) 471351 173699. A detailed description of the Site, including its current condition and its surrounding environment is presented in **Chapter 3: Existing Land Use** of the ES and in Sections 4.1 and 4.8 of the HEDBA (see **Technical Appendix 9.1**).

Designated Heritage Assets

9.17. There are no designated heritage assets present on the Site. However, there are 3 Conservation Areas, 1 Scheduled Monument and 35 Listed Buildings within the 250m study area.

Scheduled Monument

9.18. The Scheduled Monument encompasses the remains of The Cluniac and Benedictine monastery of Reading Abbey and Civil War earthwork [H1] and is located c. 250m east of the Site (at its closest point).

Listed Buildings

9.19. There are 35 Listed Buildings within 250m of the Site (1 Grade I, 1 Grade II* and 33 Grade II). There would be no direct physical impacts on any of the Listed Buildings but based on the results of the HEDBA, the settings of the following 24 buildings may be impacted by the Proposed Development:

- The Grade II Listed Statue of King Edward VII [H11] approximately 20m east of the Site;
- The Grade II Listed main building of Reading General Station [H31] approximately 20m north of the Site;
- The Grade II Listed Quadrant walls and railings to Former Number 64 (Greyfriars Vicarage) [H6] approximately 70m west of the Site;
- The Grade II Listed 13 and 15, Station Road [H12] approximately 70m east of the Site;
- The Grade II Listed Great Western House [H13] approximately 70m east of the Site;
- The Grade I Listed Greyfriars Church [H34] approximately 100m west of the Site;
- The Grade II Listed Mitre Inn [H27] approximately 100m south-west of the Site;
- The Grade II Listed Number 147 Friar Street [H7] approximately 115m south-east of the Site;
- The Grade II Listed Regent Place [H22] approximately 130m west of the Site;
- The Grade II Listed Numbers 1-31 Queen Victoria Street [H9] approximately 150m south-east of the Site;
- The Grade II Listed Numbers 29 and 31, Caversham Road [H21] approximately 150m west of the Site;
- The Grade II Listed Numbers 11 -15 Friars Street [H32, H3, H33, H4 and H5] approximately 170m east of the Site at their closest point;
- The Grade II Listed Number 154 Friar Street [H8] approximately 170m south-east of the Site;
- The Grade II Listed Walter Parsons Corn Stores [H28] approximately 220m east of the Site;
- The Grade II Listed Number 155 Friar Street [H29] approximately 220m south-east of the Site;
- The Grade II Listed Municipal Buildings Concert Hall [H17], art gallery and museum [H36] and School of Art {H14] approximately 240m east of the Site at their closest point;
- The Grade II Listed Queen Victoria Jubilee Statue [H2] approximately 240m south-east of the Site; and
- The Grade II* Listed Town Council Chamber, offices and Clock Tower [H16] approximately 250m south-east of the Site.

Conservation Areas

9.20. The Market Place/London Street Conservation Area is located approximately 150m east of the Site and St Mary's Butts/Castle Street Conservation Area is located approximately 230m south of the Site.

9.21. The character appraisal for Market Place/London Street indicates the area is of national importance demonstrating this area's importance as a market town in the medieval and post-medieval period. The majority of the Conservation Area consists of a tight knit urban area of continuous frontages of 2-, 3- and 4-storey buildings with streets of varying length and width.

9.22. The character appraisal for St Mary's Butts/Castle Street indicates the area is of national importance demonstrating this area's importance as the Anglo-Saxon centre of Reading and also includes the post-medieval Church of St. Mary and the surrounding post-medieval architecture.

Non-Designated Heritage Assets

9.23. There are 358 non-designated assets within the 500m study area which comprise 21 locally listed buildings, 266 non-designated monuments and 71 findspots.

9.24. In general, evidence for medieval and post-medieval activity is prominent across the study area, although there is also some evidence of prehistoric, Romano-British, early medieval and modern activity.

9.25. It is worth noting that Chapter 12 of the Reading Station Area Framework indicates that the Site lies within the 'Station Area' forming part of an area of archaeological potential (AAP), however, the boundary of this is not defined by the HER.[13]

Watching Brief Results (2019)

9.26. The recent Watching Brief within the North Site (see **Technical Appendix 9.2**) revealed that the existing Plots lie on artificially raised ground on the southern edge of the Thames Valley floodplain with chalk bedrock / drift geology sealed by alluvial deposits. The site of a possible palaeochannel within the western extent of the Watching Brief area suggests that the area may have been an open wetland landscape. Prehistoric activity was recovered in the form of deposited worked flint.

9.27. In contrast, the Watching Brief within the South Site (see **Technical Appendix 9.3**) revealed high levels of truncation caused by foundation and basements and indicates that survival of archaeological remains may be highest within the North Site.

Historical Overview

9.28. The full archaeological and historic background covering the Site and study area is provided in Section 4.6 of the HEDBA (see **Technical Appendix 9.1**), however, a summary for each time period is presented below.

Prehistoric (Palaeolithic to Iron Age) 500,000 BC to AD 43

9.29. Palaeolithic and palaeoenvironmental evidence have been recovered along the river terrace gravels of the River Kennet to the south-east of the Site which is known to be the focus of prehistoric settlement and activity from the Palaeolithic period through to the Iron Age.

9.30. The earliest archaeological evidence within the study area is of the Lower Palaeolithic period in the form of two handaxes [M304 and M306] approximately 90m to the west and 90m to the east of Site respectively and a Levalloisian flake [M305] approximately 160m west of the Site. These artefacts were findspots and indicate residual artefacts and not from *in situ* deposits

9.31. Mesolithic, Neolithic and Bronze Age evidence has also been identified in the form of findspots and it is not until the Iron Age that more substantial activity in the form of water management along the River Kennet [M127] is noted.

Romano-British AD 43 to AD 410

9.32. The Rural Settlement of Roman Britain Project indicates that Reading remained largely rural with a number of villa sites noted within the wider area. Documentary evidence recorded by the HER suggests that Reading may have served as a trading-port on the Thames for Calleva (Silchester) [M186].

9.33. Material evidence predominantly comes from findspots of Roman Ceramic Building Material (CBM) [M160, M330 and E36], pottery [M10, M11, M177, M14, M15, E1 and M312] and coins [M12, M13, M16, M17 and M18]. Further evidence of human remains from this period have also been recovered at Reading Waterfront [M126and E21] approximately 490m to the south-east of the Site.

Early medieval AD 410 to AD 1066

9.34. Reading is first documented in the Anglo-Saxon Chronicle for AD 870-871 as the site of a 'Danish winter camp' [M188]. The north of the Site is recorded as Vastern Meadows originating from the Old English word 'Faestern', meaning Stronghold. The HER records the possible line of the Danish defences (approximately 165m east of the Site at its closest point) [M145] which roughly follow the route of Station Road.

9.35. Reading may have been the site of a Late Saxon Borough [M189] in the 10th century, focused on the Old Market [M197], at the crossing point of the roads between Oxford, Winchester, London and Bath crossed near to St Mary's Church, approximately 275m south of the Site, with the town recaptured by the Danes in AD 1006. The northern extent of the Saxon town has been suggested to lie along the south side of Friar Street and the Site would therefore lie outside the settlement [M146].

Medieval AD 1066 to AD 1540

9.36. The Domesday Record indicates that Reading was a borough by AD 1066 named 'Radinges'. Although the majority of the Scheduled Monument is located outside of the study area, the western-most boundary of the scheduled Reading Abbey [H1] is approximately 240m to the east of the Site at its closest point and represents a key feature of Reading in this period.

9.37. A Franciscan Friary [M214] was built west of the Site at the west end of Friar Street in AD 1233. Parts of the land grant are located within the Site [M323], although appear to have not been developed. The friars applied to move the buildings approximately 90m to the south-west of the Site in the late 13th Century to 14th Century due to flooding. This suggests that the area may not have been heavily occupied during that time.

9.38. The medieval activity is in general centred around the core of the town, around the Market Place, Abbey, Greyfriars Church, St. Laurence Church and along roadways heading towards the Market such as Castle Street and London Street. Activity is represented by settlement, trade and places of worship to the west, south-west, south, south-east and east of the Site, approximately 30m to the south at their closest point along the southern side of Friar Street, predominantly following the suggested early medieval settlement boundary.

Post-medieval AD 1540 to AD 1900

9.39. In 1560 Elizabeth I confirmed the royal charter granted to Reading by Henry VII conferring greater powers of self-government and indicating the importance of Reading during the post-medieval period.

9.40. By 1611, Reading is noted to contain a population of over 5000 and is economically important due to its cloth trade. Due to its important position physically and economically, Reading played an

important role during the English Civil War between AD 1642 to 1651. The RHER indicates that east-west aligned northern Civil War defences of Reading [M174] may run through the middle of the Site along the path of Garrard Street, although the exact location or confirmation of this has so far not been possible.

9.41. Post-medieval activity has been uncovered in 68 investigations within the wider area and in general indicate the wealth and rapid growth of Reading from the Industrial Revolution onwards. Occupation activity in the form of walls, culverts, extant buildings, layers, surfaces, rubbish pits, robber cuts and residual artefacts have been identified surrounding the Site.

Modern AD 1900 to AD 2000

9.42. Modern activity within the study area indicates the further growth of Reading, with the buildings currently occupying the Site having been constructed after WWII following demolition of the post-medieval buildings indicated on historic mapping.

Statement of Heritage Value

9.43. The heritage assets potentially present within the Site include:

- Early medieval town and camp defences;
- The early medieval to medieval town;
- Franciscan activity and Greyfriars Church (medieval);
- Medieval and post-medieval buildings;
- Post-medieval Civil War defences.

9.44. Detailed statements of significance for the above can be found in Section 5 of the HEDBA (see **Technical Appendix 9.1**) and a summary is presented below.

Early medieval camp defences

9.45. The evidential and historical values of the early-medieval defences of the town are considered to be high. This is due to the Site lying close to the likely northern boundary of the early-medieval defences of the town which illustrate the defensive development of Reading. The aesthetic value of the town's defence remains is considered to be negligible while the communal value is low.

The early medieval to medieval town

9.46. The evidential value of the early medieval to medieval town is considered to be medium, while the historical value is medium to high based on the potential to illustrate changes to the town. The aesthetic value of the early medieval to medieval town remains is considered to be negligible while the communal value is low.

Franciscan activity and Greyfriars Church (medieval)

9.47. The evidential value of archaeological remains associated with Franciscan activity and Greyfriars Church is considered to be high as they would contribute to our understanding of the Franciscan order in the town. Due to this association, the historical value would be medium to high. While the Grade I listed Greyfriars Church is of high aesthetic value, associated archaeological remains would likely be of low aesthetic value. The communal value of such remains is considered to be low.

Medieval and post-medieval buildings

9.48. The evidential and historical values of medieval and post-medieval buildings is considered to be medium. The Site is likely to have contained residential and industrial buildings of medieval to post-medieval date which would reflect the commercial and residential changes of the Site. The aesthetic value of the medieval to post-medieval buildings is considered to be negligible while the communal value is low.

Post-medieval Civil War defences

9.49. The evidential and historical values of Civil War archaeology would be considered to be of medium value as they would provide evidence of and illustrate the defensive developments of the town. The aesthetic value of post-medieval civil war defence remains is considered to be negligible while the communal value is low.

Likely Significant Effects

Demolition and Construction

Archaeology

9.50. There is potential for all construction phases to severely truncate or completely remove any known (i.e. the Civil War defensive boundary [M174]), and / or unknown archaeological remains, which would be considered to be of low to high value depending on their condition, survival and extent.

9.51. Furthermore, the results of the recent Watching Briefs (see **Appendices 9.2 and 9.3**) indicate that there could be further as yet unknown buried prehistoric remains, particularly within the North Site.

9.52. Demolition and construction impacts would be considered to be of a **moderate adverse** scale leading to a **permanent, direct effect** of **moderate significance** as they would ultimately lead to the loss of the heritage asset, especially where preservation *in situ* is not feasible and / or practicable.

Built heritage

9.53. There will be no direct physical impacts to any of the identified Listed Buildings (see 'Baseline Conditions' above). However, due to demolition and construction activities, there may be temporary adverse settings impacts leading to overall effects of **minor significance** to the setting of the Listed Buildings outlined in the baseline section. This assessment is based on the likelihood that their setting may temporarily be altered in a negative way, for example, through increased traffic, air and noise pollution and by affecting a building's usual visibility and / or sightlines.

Interim Development Scenario

Archaeology

9.54. No intrusive ground works or activities are proposed as part of the Interim Development Scenario. As a result, this scenario would have no impact on buried archaeological remains.

Built heritage

9.55. In general, the character of the study area in which the Listed Buildings are primarily located comprises a heavily built up area with post-medieval, modern and recent developments of up to median heights of 5-6 storeys. During the Interim Development Scenario, the Site building stock

height across the completed Phases 1 and 2 would be between 5 and 18 storeys (16 storeys plus a two level podium), with a demolished Xafinity House and ground level car park area within Phase 3. Although the Proposed Development would exceed the heights of the buildings surrounding the Site, such heights are generally not uncommon within the wider skyline to the south of Reading train station. Therefore, the change in the skyscape of the wider area would not be out of character in comparison to other modern developments.

9.56. Based on the above in regard to built heritage, the Interim Development Scenario is considered to result in a **minor adverse** impact leading to a **permanent**, **direct** effect of **minor significance**.

Completed Development Scenario

Archaeology

9.57. No intrusive ground works or activities are proposed as part of the Completed Development Scenario. As a result, this scenario would have an insignificant impact on buried archaeological remains.

Built heritage

9.58. In addition to those Listed Buildings highlighted in the HEDBA likely to experience setting impacts, **Chapter 8: Townscape and Visual** presents a series of viewpoints ('VP') which have provided additional considered on potential setting impacts to Listed Buildings.

9.59. The below table (Table 9.5) presents those VPs which indicate likely setting impacts to Listed Buildings within the 250m study area once the Development has been completed. Detailed descriptions of the VPs can be found in **Chapter 8**.

Table 9.5: Summary of Viewpoints

Viewpoint	Listed Building	Likely Impact
VP10	Grade II listed 29 and 31 Caversham Road [H21]	This building faces Caversham Road. The Proposed Development would be visible immediately behind it. Due to the fact that the immediate setting of the building is primarily street facing (i.e. Caversham Road) and that the near and distant skyline has already been impacted by modern high rise and / or multi storey developments, the Proposed Development would result in a **minor adverse** impact on setting leading to a **permanent**, **direct** effect of **minor significance**.
VP12 and VP13	Grade I listed Greyfriars Church [H34]	Both VPs confirm that the Proposed Development will be visible from this group of 3 Listed Buildings on Greyfriars Road, Friar Street and West Street respectively.
	Grade II listed Quadrant walls and railings to former No 64 (Greyfriars Vicarage) [H6]	As the Proposed Development would form a visual continuation of the existing skyline which already includes buildings of up to 8 storeys in height (for example, immediately opposite Greyfriars), the Proposed Development would result in a **minor adverse** impact on setting leading to a **permanent**, **direct** effect of **minor significance**.
	Grade II listed The Mitre Inn [H27]	

Viewpoint	Listed Building	Likely Impact
VP23	Grade II listed Walter Parsons Corn Stores [H28]	This VP confirms that there would likely be long distance views towards the Proposed Development from this building. Considering that the skyline has already been altered by modern high rise and / or multi-storey developments towards Station Road that the building already has sight of, it is anticipated that the Proposed Development would not lead to additional adverse setting impacts and the effect of the Proposed Development is therefore **negligible**.
VP24	Grade II listed Town Council Chamber and Offices with Clock Tower [H16] Grade II listed Queen Victoria Jubilee Statue [H2] Grade II listed Municipal Buildings School of Art [H14]	This VP confirms that the Proposed Development would be visible from this group of Listed Buildings surrounding the listed St Laurence Church and council buildings. While the views towards the Site from the buildings have already been affected by modern developments, the Development would exceed current heights and alter the long distance views from this group of buildings. Considering that the buildings surrounding this group have generally retained an up to 3 to 4 storey skyline, the Proposed Development is considered to lead to a **permanent**, **direct adverse** effect of **minor significance**.
VP25	Grade II listed 13 and 15 Station Road [H12]	This VP confirms that this building would have some limited visibility towards the Proposed Development from the rear of the property. As the immediate setting of the building is primarily street facing (e.g. on Station Road), and surrounding modern developments already include high rise and / or multi-storey developments, the Proposed Development is not considered to lead to additional adverse setting impacts thus resulting in a negligible impact leading to a **negligible** effect
VP28	Grade II listed 55 and 55A St Mary's Butts [H10] Grade II listed The Allied Arms Inn [H24]	This VP confirms that the Proposed Development would be visible from this group of Listed Buildings surrounding the Church of St Mary (the church itself is not within the 250m study area). While the views towards the Site from these buildings have already been affected by modern developments, the Proposed Development would exceed current heights and alter the long distance views from this group of buildings. Considering that the buildings surrounding this group have generally retained an up to 3 to 4 storey skyline, the Proposed Development is considered to lead to a **permanent**, **direct adverse** effect of **minor significance**.

9.60. As discussed above (in the Interim Development Scenario Built Heritage section) the character of the study area in which the Listed Buildings are primarily located will remain the same during the Completed Development Scenario. Although the Proposed Development would exceed the heights of the buildings surrounding the Site and those of Phases 1 and 2, tall buildings are generally not uncommon within the wider skyline to the south of Reading train station. Therefore, the change in the skyscape of the wider area would not be out of character in comparison to other modern developments.

9.61. Based on the above, in regard to built heritage the Completed Development Scenario is considered to result in a minor **adverse impact** leading to a **permanent**, **direct** effect of **minor significance**.

Mitigation Measures and Likely Residual Effects

Demolition and Construction

9.62. Programmes of archaeological investigations have been proposed as part of all three construction phases (see **Chapter 6** of the ES). These will be undertaken once the relevant areas have been cleared of extant buildings such as Friars Walk Shopping Centre and Telecom House (to be demolished as part of Phase 1) and the NCP car park, the Temporary Events Space and Xafinity House (to be demolished during Phase 2).

9.63. Further consultation with Berkshire Archaeology will determine the scope of archaeological investigations which will be subject to a Written Scheme of Investigations (WSI).

9.64. Mitigation fieldwork would potentially contribute to our understanding of 'Reading Station' outlined in the Reading Station Area Framework as an AAP. Potential effects could therefore be reduced from a direct, permanent moderate adverse significance for as yet unknown buried archaeological remains to a direct, permanent, minor to moderate adverse significance.

9.65. In regard to built heritage, as the Proposed Development is not considered to substantially adversely alter the settings of the Listed Buildings, and no physical impacts are anticipated, no mitigation measures are proposed.

Interim and Completed Development Scenarios

9.66. No additional effects are expected from the Interim Development Scenario or Completed Development Scenario on buried archaeological remains, therefore, no mitigation is proposed. Additionally, neither the Interim Development Scenario or the Completed Development Scenario are considered to lead to substantial adverse effects on Listed Buildings, therefore, no mitigation measures are proposed.

Summary

9.67. A summary of effects of the Proposed Development are presented below in Table 9.6.

Table 9.6: Summary of Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Demolition and Construction			
Below ground heritage assets	**Moderate adverse** scale leading to a **permanent**, **direct** effect **of moderate significance**	Programme of archaeological investigation and recording	**Moderate adverse** scale leading to a **permanent**, **direct** effect of **minor** to **moderate significance**
Built heritage assets	**Minor adverse** scale leading to a **temporary**, **direct** effect of **minor significance**	None proposed	**Minor adverse** scale leading to a **temporary**, **direct** effect **of minor significance**
Interim Development Scenario			

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Below ground heritage assets	No additional impacts anticipated.	None proposed	No additional impacts anticipated.
Built heritage assets	**Minor adverse** scale leading to a **permanent**, **direct** effect of **minor significance**	None proposed	**Minor adverse** scale leading to a **permanent**, **direct** effect of **minor significance**
Completed Development Scenario			
Below ground heritage assets	No additional impacts anticipated.	None proposed	No additional impacts anticipated.
Built heritage assets	**Minor adverse** scale leading to a **permanen**t, **direct** effect of **minor significance**	None proposed	**Minor adverse** scale leading to a **permanent**, **direct** effect of **minor significance**

Comparison of Effects between this ES and the 2015 ES

9.68. In regard to archaeological remains, the 2015 ES concluded the following:

- Demolition and construction would lead to a **permanent**, **moderate adverse** effect on archaeological remains (especially those of prehistoric, early medieval, medieval and post-medieval date);
- The effect of the Completed Development on archaeological remains would be **negligible**.

9.69. In comparison to the 2015 ES therefore, the overall effect on archaeology during demolition and construction is considered to reduce slightly through investigation and recording of remains that will potentially further our understanding of this area and try to answer regional research framework questions.

9.70. In regard to built heritage, this was reported within the Townscape, Conservation and Visual Assessment which was appended to the 2015 ES rather than in a combined heritage chapter. The methodology used within the Townscape, Conservation and Visual Assessment in the 2015 ES is however not compatible with that of this assessment.

References

1 English Heritage, 2008. Conservation Principles Policies and Guidance for the sustainable management of the historic environment, accessible via https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/conservationprinciplespoliciesandguidanceapril08web/

2 Highways England, 2007. *Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 3 Environmental Topics, Part 2, HA 208/07 Cultural Heritage*, accessible via http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/ha20807.pdf

3 ICOMOS, 2010. Guidance on heritage impact assessment for Cultural World Heritage Properties, accessible via http://openarchive.icomos.org/266/

10. Air Quality

Introduction

10.1. This chapter, which was prepared by Waterman Infrastructure & Environment Ltd, presents an assessment of the likely air quality effects of the Proposed Development. Consideration is given in the assessment of pollution effects from changes in road traffic movements as a result of the operation of the Proposed Development, as well as potential effects from dust emissions generated during the site preparation and construction activities.

10.2. This chapter provides a description of the methods used in the assessment. This is followed by a description of the relevant baseline conditions of the Site and surrounding area, together with an assessment of the likely potential effects of the Proposed Development during the Site preparation and construction works and once the Proposed Development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

10.3. The chapter is accompanied by the following appendices, provided in ES Volume 2:

- **Technical Appendix 10.1: Air Quality Assessment Detailed Methodology**.

Assessment Methodology and Significance Criteria

Assessment Methodology

10.4. This air quality assessment has been undertaken using a variety of information and procedures, and professional judgement. The methodology was as follows:

- Review of Reading Borough Council's (RBC's) air quality review and assessment documents, published as part of the Local Air Quality Management (LAQM) regime, to determine baseline conditions around the Site;
- A review of the Proposed Development and local area to identify potentially sensitive receptor locations, both existing and proposed, that could be affected by changes in air quality that result from the Proposed Development;
- Review and use of relevant traffic flow data from the Applicant's transport consultant (PBA part of Stantec (PBA)) which has been provided for the baseline, without and with development scenarios for the future years of 2022, once Phases 1 and 2 are complete and operational (the Interim Development Scenario), and 2026, once all phases have been constructed (the Completed Development Scenario) and a 2026 Cumulative Scenario;
- Dispersion modelling of pollutant emissions using the ADMS-Roads model[1] to predict the likely pollutant concentrations at the Site and surrounding area; and the likely effect of the complete and operational Development on local air quality in terms of traffic emissions generated. The latest NO_2 from NO_X Calculator available from the LAQM Support website[2] has been applied to derive the road-related NO_2 concentrations from the modelled NO_X concentrations;
- Comparison of the predicted air pollutant concentrations with RBC monitored concentrations and adjustment of modelled results where necessary (model verification details are provided in **Technical Appendix 10.1**;
- Determination of the likely significant effects of Site preparation and construction works and activities, and consideration of the environmental management controls likely to be employed during the construction works;

- Determination of the likely significant effects of the completed and operational phase of the Development on air quality, based on the application of the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM)[3] significance criteria to modelled results; and
- Identification of mitigation measures, where appropriate.

10.5. The UK Air Quality Strategy (AQS) identifies the pollutants associated with road traffic emissions and local air quality as:

- Nitrogen oxides (NOx);
- Particulate matter (as PM_{10} (particles with a diameter up to 10µm) and $PM_{2.5}$ (particles with a diameter up to 2.5µm));
- Carbon monoxide (CO);
- 1, 3-butadiene (C_4H_6); and
- Benzene (C_6H_6).

10.6. Emissions of total NO_x from motor vehicle exhausts comprise nitric oxide (NO) and nitrogen dioxide (NO_2). NO oxidises in the atmosphere to form NO_2. The most significant pollutants associated with road traffic emissions, in relation to human health, are NO_2 and particulate matter (PM_{10} and $PM_{2.5}$).

10.7. If exceedences of any of the pollutants listed above are considered likely, the local authority must declare an Air Quality Management Area (AQMA). RBC has declared an AQMA for annual mean NO_2 attributable to road traffic emissions. This assessment therefore focuses on NO_2 and particulate matter (PM_{10} and $PM_{2.5}$).

Construction Assessment Methodology

Dust Emissions

10.8. The assessment of the effects of the construction activities in relation to dust has been based on the guidance published by the IAQM[4] and the following:

- A consideration of planned construction activities and their phasing; and
- A review of the sensitive uses in the area immediately surrounding the Site in relation to their distance from the Site.

10.9. The IAQM guidance identifies that receptors within 350m of the Site boundary, and within 50m of construction routes would be sensitive to emissions and nuisance dust from construction activities. For clarification, **Figure 10.1** shows the area surrounding the Site, where sensitive receptors could be affected, considering the IAQM guidance.

10.10. Following the IAQM guidance, construction activities can be divided into the following four distinct activities:

- Demolition – any activity involved in the removal of an existing building;
- Earthworks – the excavation, haulage, tipping and stockpiling of material, but may also involve levelling the site and landscaping;
- Construction – any activity involved with the provision of a new structure; and
- Trackout – the movement of vehicles from unpaved ground on a site, where they can accumulate mud and dirt, onto the public road network where dust might be deposited.

10.11. The IAQM guidance considers three separate dust effects, with the proximity of sensitive receptors being taken into consideration. These are:

- Annoyance due to dust soiling;
- Potential effects on human health due to significant increase in exposure to PM_{10}; and
- Harm to ecological receptors.

10.12. A summary of the four-step process which has been undertaken for the dust assessment of construction activities, as set out in the IAQM guidance, is presented in Table 10.1.

Table 10.1: Summary of the IAQM Guidance for Undertaking a Construction Dust Assessment

Step		Description
1	Screen the Need for a Detailed Assessment	Simple distance based criteria are used to determine the requirement for a detailed dust assessment. An assessment will normally be required where there are 'human receptors' within 350m of the boundary of the site and / or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance or 'ecological receptors' within 50m of the boundary of the site and/or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance.
2	Assess the Risk of Dust Effects	The risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological effects should be determined using three risk categories: low, medium and high based on the following factors: • the scale and nature of the demolition and construction works, which determines the risk of dust arising (i.e. the magnitude of potential dust emissions) classed as small, medium or large; and • the sensitivity of the area to dust effects, considered separately for ecological and human receptors (i.e. the potential for effects) defined as low, medium or high.
3	Site Specific Mitigation	Determine the site-specific measures to be adopted at the site based on the risk categories determined in Step 2 for the four activities. For the cases where the risk is 'negligible' no mitigation measures beyond those required by legislation are required. Where a local authority has issued guidance on measures to be adopted these should be taken into account.
4	Determine Significant Effects	Following Steps 2 and 3, the significance of the potential dust effects should be determined, using professional judgement, taking into account the factors that define the sensitivity of the surrounding area and the overall pattern of potential risks.

Construction Vehicle Exhaust and Plant Emissions

10.13. IAQM's construction dust guidance on assessing construction impacts states that

"*Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant effect on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur. For site traffic on the public highway, if it cannot be scoped out, then if should be assessed using the same methodology and significance criteria as operational traffic impacts*".

10.14. Given the size of the Site (approximately 25,600m^2) and the estimated number of construction related vehicle movements (35 per day), in accordance with IAQM's construction dust guidance, it is considered that a quantitative assessment of the exhaust emissions from construction plant and traffic is not required, and a qualitative assessment is appropriate.

Complete and Operational Development

ADMS Model

10.15. The likely impacts on local air quality from traffic movements generated from the complete and operational Development have been assessed using the atmospheric dispersion model ADMS-Roads.

10.16. Traffic data for the local road network were provided by PBA. The baseline year of 2018 was assessed together with the 'without Development' and 'with Development' scenarios for the years 2022 and 2026 which represent the anticipated year of completion of the various phases of the Proposed Development. The traffic data was used within the ADMS-Roads model to assess the potential for significant impacts from additional traffic movements generated by the Proposed Development on future local air quality at both on and off-site receptor locations.

10.17. The ADMS-Roads dispersion model predicts how emissions from roads combine with local background pollution levels, taking account of meteorological conditions, to affect local air quality. The ADMS-Roads model has been run for the completion years, 2022 and 2026, using 2022 and 2026 background data and 2022 and 2026 vehicle emission rates as inputs. For the 2018 verification assessment, 2018 background data and 2018 vehicle emission rates have been used, which would be higher than the 2022 and 2026 data. The model output allows pollution levels to be quantified at specific receptor locations which facilitates the assessment of impacts at potentially sensitive receptor locations.

10.18. Full details of the dispersion modelling study, including the road traffic data, verification and background data, are presented within **Technical Appendix 10.1**.

Model Uncertainty

10.19. Analyses of historical monitoring data by Defra[5] have identified a disparity between actual measured NO_x and NO_2 concentrations and the expected decline associated with emission forecasts which form the basis of air quality modelling as described above. The reason is related to the on-road performance of certain vehicles compared to calculations based on Euro emission standards which inform emission forecasts.

10.20. The note 'Projecting NO_2 Concentrations'[6] published by Defra provides alternative approaches that can be followed in air quality assessments in relation to the modelling of future NO_2 concentrations, considering that future NO_x / NO_2 road-traffic emissions and background concentrations may not reduce as previously expected. This includes the use of revised background pollution maps, alternative projection factors and revised vehicle emission factors. However, the Defra note does not form part of statutory guidance and no prescriptive method is recommended for use in an air quality assessment.

10.21. Given that the Development is anticipated to be completed in 2026, this air quality assessment has utilised revised emissions data and background concentrations using the Air Quality Consultants Ltd Calculator Using Realistic Emissions for Diesels (CURED) spreadsheet[7]. The spreadsheet has been designed to provide a reasonable worst-case assumption for future vehicle emissions.

10.22. The UK government's announcement in July 2017 that no new diesel or petrol sole fuelled vehicles will be sold in the UK from 2040 reflects the national measures being taken to improve background air quality.

Background Pollutant Concentrations

10.23. To estimate the total concentrations due to the contribution of any other nearby sources of pollution, background pollutant concentrations need to be added to the modelled concentrations. Full details of the background pollution data used within the air quality assessment are included in **Technical Appendix 10.1**.

Model Verification

10.24. Model verification is the process of comparing monitored and modelled pollutant concentrations and, if necessary, adjusting the modelled results to reflect actual measured concentrations, to improve the accuracy of the modelling results. The model has been verified by comparing the predicted annual mean NO_2 concentrations for the baseline 2018, with the 2018 results from RBC's diffusion tubes located in the vicinity of the Site and the RBC automatic monitor located on Caversham Road. The verification and adjustment process are described in detail in **Technical Appendix 10.1**.

Approach to Assessment of the Interim Development Scenario

10.25. As part of the Interim Development Scenario a total of 290 car parking spaces are proposed for the future residents within Plots E and F and office workers within Plot G. This is made up of 165 car parking spaces within the car park in Phase 1 (Plots E and F) and 122 car parking spaces within the podium forming part of Phase 2 (Plot G).

10.26. As part of Phase 2, the NCP car park and Xafinity House will be demolished. This will result in an immediate loss of public car parking spaces from the NCP car park during construction. At the time of preparing the traffic flows it was envisaged that additional car parking spaces would be delivered temporarily on the area of Phase 3 to be used for public parking (a further 362 spaces were assumed). This is no longer proposed as part of the current applications but may come forward in the future.

10.27. The traffic data provided for the air quality assessment of the Interim Development Scenario allocated car parking spaces to the proposed on Site uses. It also accommodated for the re-distribution of the remaining traffic currently using the NCP car park to other surrounding public car parks. The level of re-distributed traffic was based on the existing demand recorded at the NCP car park.

10.28. As the level of car parking being proposed in the Interim Development Scenario has reduced since the traffic data was provided there would be an increase in traffic being re-distributed to other surrounding car parks. However, PBA consider that the additional level of re-distributed traffic to other surrounding car parks would not materially alter the daily traffic data provided on which the Air Quality Assessment was undertaken.

Approach to Outline Assessment

10.29. As part of Phase 3 of the Proposed Development, up to an additional 713 car parking spaces would be provided in the podium car park including the basement podium which could extend across Phase 2 and Phase 3. In order to provide a worst case assessment, it was assumed that the full amount of car parking was delivered and the associated trip generation of the on Site uses was calculated on this basis. As discussed above the remaining traffic currently using the NCP car park which wasn't assumed to be retained on Site was re-distributed to other local car parks.

Approach to Future Baseline

10.30. Traffic anticipated to be generated by the future baseline scheme at the former Coopers BMW site was included within the baseline traffic data provided by PBA. This traffic was added to the baseline traffic flows, which were monitored in 2018 using automatic traffic counts and traffic surveys.

Potentially Sensitive Receptors

10.31. The approach adopted by the UK AQS is to focus on locations at, and close to, ground level where members of the public (in a non-workplace area) are likely to be exposed over the averaging time of the objective in question (i.e. over 1-hour, 24-hour or annual periods). Objective exceedances principally relate to annual mean NO_2 and PM_{10}, and 24-hour mean PM_{10} concentrations, so that associated potentially sensitive locations relate mainly to residential properties and other sensitive locations (such as schools) where the public may be exposed for prolonged periods.

10.32. Table 10.2 presents existing sensitive receptors likely to be affected by the Proposed Development. These were selected due to their proximity to the road network. Table 10.2 also presents future sensitive receptor locations which are representative of sensitive uses within the Proposed Development itself. The future sensitive receptor locations represent areas of the Proposed Development exposed to the worst-case air quality conditions, such as closest to roads. The location of the selected existing and future sensitive receptors assessed are presented in **Figure 10.2**.

Table 10.2: Selected Receptor Locations

ID	Receptor Location	Receptor Type	OS Grid Reference	Height Above Ground (m)
1	1st Floor Flat, 4 Friar Street	Residential	471634, 173582	3
2	107 Castle Hill	Residential	471041, 173009	0
3	Alms House Castle Street	Residential	471222, 173110	0
4	88 Queens Road	Residential	472250, 173270	0
5	Grantley Heights	Residential	472203, 173315	0
6	90 Kings Road	Residential	472103, 173398	0
7	Forbury Gardens Day Nursery	Nursery	472008, 173642	0
8	119 Caversham Road	Residential	471279, 174212	0
9	20-30 New Bright Street	Residential	471261, 172934	0
10	Blenheim Place, Castle Street	Residential	471061, 173018	0
11	162 Castle Hill	Residential	470835, 172992	0
12	31a Vastern Road	Residential	471416, 174134	0
13	68 George Street	Residential	471913, 174490	0
14	10 Trinity Place	Residential	470738, 173433	0
15	33 Caversham Road	Residential	471123, 173734	0
16	**Proposed**: Phase 1 Plot E	Residential	471360, 173587	0
17	**Proposed**: Phase 1 Plot F	Residential	471399, 173690	0
18	**Proposed**: Phase 3 Plot A	Residential	471282, 173776	0
19	**Proposed**: Phase 3 Plot B	Residential	471327, 173792	0

Note: Ground floor assumed to be 0m to represent worst-case assessment of exposure as it is the closest location of the receptor to the tailpipe vehicle emissions

Limitations and Assumptions

10.33. For the purposes of the assessment of dust nuisance during construction works it has been assumed activities would be carried out at the boundary of the Proposed Development to provide a worst-case assessment.

10.34. Currently there is no methodology to assess and determine the impact of a development against the EU Limit Values. In addition, compliance with the EU Limit Values is a UK Government responsibility given that national measures (such as vehicle scrappage schemes and increased diesel fuel prices) would be required to meet compliance. As such the effect of the Proposed Development has been assessed against the UK AQS objectives rather than the EU Limit Values. To demonstrate that the Proposed Development has a positive influence on air quality a summary of measures which are likely to lead to a benefit to air quality have been outlined.

10.35. There is no standard or recognised methodology to predict the reduction in pollutant concentrations from all air quality mitigation measures or measures likely to have a positive impact of local air quality (such as cycle spaces, electric charging points, sustainable transport options, green infrastructure etc) as these measures are either based on holistic behavioural changes and/or there is a lack of real-world quantifiable data (in $\mu g/m^3$). However, the mitigation measure and measures that would benefit air quality included as part of the Proposed Development are consistent with those identified by RBC in their Air Quality Action Plan. As such the results presented in the assessment are worst-case.

10.36. The limitations with regards to the air quality model are discussed in **Technical Appendix 10.1** and where necessary appropriate model refinement, including a model verification, has been undertaken.

Significance Criteria

Construction

10.37. The significance of effects of demolition and construction activities on air quality have been assessed based on professional judgement and with reference to the criteria set out in the IAQM guidance. Appropriate Site-specific mitigation measures that would need to be implemented to minimise adverse effects have also been considered. Details of the assessor's experience and competence to undertake the dust assessment is provided in **Technical Appendix 10.1**.

Dust Emissions

10.38. The assessment of the risk of dust effects arising from each of the construction activities, as identified by the IAQM guidance, is based on the magnitude of potential dust emissions and the sensitivity of the area. The risk category matrix for each of the activity types, taken from the IAQM guidance, are presented in Table 10.3 to Table 10.6.

Table 10.3: Risk Category from Demolition Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 10.4: Risk Category from Earthworks Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 10.5: Risk Category from Construction Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 10.6: Risk Category from Trackout Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

10.39. The risk category determined for each of the construction activity types is used to define the appropriate level of mitigation measures that should be applied. The IAQM guidance recommends that significance is only assigned to the effect after considering mitigation because it assumes that all actions to avoid or reduce the environmental effects are an inherent part of a development, and that, in the case of demolition / construction, mitigation measures (secured through planning conditions, legal requirements or required by regulations) would ensure that likely significant adverse residual effects will not occur.

10.40. However, to maintain consistency with the structure of this ES, as outlined in **Chapter 2: Methodology**, pre-mitigation significance criteria as outlined in Table 10.7 have been applied which are based on professional judgement.

Table 10.7: Pre-Mitigation Significance Criteria for Demolition and Construction

Significance Criteria	Definition
Adverse effect of major significance	Receptor is less than 20m from an active construction site.
Adverse effect of moderate significance	Receptor is 20m to 100m from an active construction site.
Adverse effect of minor significance	Receptor is between 100m and 350m from an active construction site.
Negligible effect	Receptor is over 350m from an active construction site.

10.41. The IAQM outlines that experience of implementing mitigation measures for construction activities demonstrates that total mitigation is normally possible such that residual effects would not be

'significant'. Therefore, it follows that, within this assessment, no post-mitigation matrix of significance criteria are provided for the likely residual effects of the demolition and construction works.

Construction Vehicle Exhaust and Plant Emissions

10.42. The significance of the effects of construction vehicle exhaust emissions on air quality were based on professional judgement.

Complete and Operational Development

10.43. The EPUK / IAQM guidance provides an approach to assigning the magnitude of changes as a result of a development as a proportion of a relevant assessment level, followed by examination of this change in the context of the new total concentration and its relationship with the assessment criterion to provide a description of the impact at selected receptor locations.

10.44. Table 10.8 presents the IAQM framework for describing the impacts (the change in concentration of an air pollutant) at individual receptors. The term Air Quality Assessment Level (AQAL) is used to include air quality objectives or limit values, where these exist. The Limit Values and Air Quality Strategy[8] objectives of air pollutants relevant to this assessment are summarised in Table 10.9.

Table 10.8: Impact Descriptors for Individual Receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Note: AQAL may be an air quality objective, EU limit value, or an Environment Agency 'Environmental Assessment Level (EAL)'

The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers. Changes of 0% (i.e. less than 0.5%) are described as Negligible.

The table is only to be used with annual mean concentrations

Table 10.9: National Air Quality Strategy Objectives (England)

Pollutant	Objective		Date by Which Objective is to be Met
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200µg/m^3	1-hour mean not to be exceeded more than 18 times per year.	31/12/2005.
	40µg/m^3	Annual mean.	31/12/2005.
Particulate Matter (PM_{10}) [(a)]	50µg/m^3	24–hour mean not to be exceeded more than 35 times per year.	31/12/2004.
	40µg/m^3	Annual mean.	31/12/2004.

Pollutant	Objective		Date by Which Objective is to be Met
	Concentration	Measured as	
Particulate Matter ($PM_{2.5}$) [b]	Target of 15% reduction in concentrations at urban background locations.	Annual mean.	Between 2010 and 2020.
	Variable target of up to 20% reduction in concentrations at urban background locations[c]	Annual mean.	Between 2010 and 2020.
	25µg/m^3	Annual mean.	01/01/2020.

Notes: (a) Particulate Matter with a mean aerodynamic diameter of less than 10µm (micrometres or microns).
(b) Particulate Matter with a mean aerodynamic diameter of less than 2.5µm.
(c) Aim to not exceed 18µg/m3 by 2020.

10.45. The approach set out in the EPUK / IAQM guidance provides a method for describing the impact magnitude at individual receptors only. The guidance outlines that this change may have an effect on the receptor depending on the severity if the impact and other factors that may need to be considered. The assessment framework for describing impacts can be used as a starting point to make a judgement on significance of effect. However, whilst there may be 'slight', 'moderate' or 'substantial' impacts described at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

10.46. Following the approach to assessing significance outlined in the EPUK / IAQM guidance, the significance of likely residual effects of the Proposed Development on air quality has been established through professional judgement and the consideration of the following factors:

- The geographical extent (local, district or regional) of effects;
- Their duration (temporary or long term);
- Their reversibility (reversible or permanent);
- The magnitude of changes in pollution concentrations;
- The exceedance of standards (e.g. AQS objectives); and
- Changes in pollutant exposure.

Baseline Conditions

Reading Borough Council Review and Assessment Process

10.47. On completion of RBC's Stages 1 to 3 Review and Assessment of air quality in 2000, RBC concluded that the air quality objectives would be met for all pollutants and that there would be no requirement to consider the designation of AQMAs.

10.48. The RBC Updating and Screening Assessment (USA) published in 2003[9] concluded that, although it was necessary to undertake further investigation into roadside locations where concentrations of NO_2 were close to objective levels, no further action was required with regard to other pollutants.

10.49. The USA 2003 Supplement[10] identified potential 'hot spots' for NO_2 and PM_{10} which were further examined with the use of the Design Manual for Roads and Bridges (DMRB) air quality screening model. Of relevance to the Site was that Caversham Road (200m west of the Proposed Development) was predicted to have NO_2 levels close to objective levels in 2004. An Air Quality Progress Report published in 2004[11] found that there were numerous diffusion tube monitoring locations which recorded levels of NO_2 exceeding the annual mean Air Quality Objectives throughout the Borough.

10.50. A Detailed Assessment of Air Quality was completed by RBC in December 2005[12]. This included a detailed dispersion modelling assessment that identified twelve areas in the Borough where one or both of the NO_2 air quality objectives were predicted to be exceeded in 2005. As a result of these findings, six AQMAs were declared across the Borough. The nearest AQMA was located approximately 200m west of the Site (Tudor Road and Caversham Road between Tudor and Vachel Roads). The Detailed Assessment predicted NO_2 annual mean concentrations of 37- 40 µg/m^3 at the Site (40µg/m^3 being the objective level).

10.51. Additionally to these findings, the 2006 USA and the Detailed Assessment in 2008[13] recommended that an AQMA be declared for NO_2 along Oxford Road, which is likely to extend from 744 Oxford Road (close to the Oxford Road/Beresford Road/Edinburgh Road junction) to the Oxford Road/Chatham Street junction, which at its closest part, is located approximately 220m south-west of the Site.

10.52. Following the 2008 Further Assessment[14] RBC declared a new AQMA in 2009 which encompasses the whole town centre and the major roads within the town. The AQMA covers a greater area than the area of known exceedences by covering the major transport routes throughout the district to address the possibility of moving hotspots from one area to another following implementation of the Air Quality Action Plan (AQAP). This AQMA replaces the six previously declared AQMAs.

10.53. The Site is located within the Reading AQMA.

10.54. The 2009 USA[15], 2010 Progress Report [16] and 2011 Progress Report[17] did not find any significant changes within the Borough to suggest the likelihood of further exceedences outside of the new AQMA declaration.

10.55. The 2012 USA[18] highlighted a concern over the daily mean PM_{10} objective in the Caversham Road area, although the data used in the report was still provisional and because of the low data capture rate the data should be used with caution. Additionally, there had been no exceedences in the previous five years and RBC concluded that the nearby work to widen Cow Lane Bridges as part of the Reading Mainline Station expansion work was responsible for the increase in PM_{10}. RBC concluded that it was not necessary to progress immediately to a Detailed Assessment but if the trend was found to continue in 2012 a Detailed Assessment would be completed.

10.56. The 2017 Annual Status Report concluded that AQS Objectives for all pollutants would be met, except for NO_2 and that no new areas of exceedence have been identified since the last round of Review and Assessment.

Local Monitoring

10.57 RBC conducts an extensive air quality monitoring programme throughout the Borough measuring roadside and background concentrations of PM_{10} and NO_2. There are four automatic monitoring stations within the Borough as follows:

- Caversham Road Roadside, located 0.7km from the centre of the Site;
- New Town, AURN, Urban Background, located 2.1km from the centre of the Site;
- London Road Roadside, located 2.4km from the centre of the Site; and
- Oxford Road, Roadside, located 2.7km from the centre of the Site.

10.58 The results from the most recent PM_{10} and NO_2 monitoring from the Caversham Roadside monitor are presented in Table 10.10.

Table 10.10: Annual Mean NO_2 and PM_{10} at the Caversham roadside automatic monitor (µg/m^3)

Pollutant	Averaging Period	AQS Objective	2015	2016	2017	2018
NO_2	Annual Mean (µg/m^3)	40µg/m^3	38	39	37	40
	Hourly (No. of Hours)	200µg/m^3 not to be exceeded more than 18 times a year	1	0	0	7
PM_{10}	Annual Mean (µg/m^3)	40µg/m^3	28	20	22	24
	24 Hour Mean (µg/m^3)	50µg/m^3 not to be exceeded more than 35 times per year	8(41)	5	8	3

Source: 2015-2018 Data taken from RBC's 2019 LAQM Annual Status Report 2019, June 2019
Notes: Exceedances of the objective are shown in **bold**
If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

10.59 The results shown in Table 10.10 indicate that the annual mean NO_2 objective has been close to the objective between 2015 and 2018. There have been no exceedances of the 1-hour mean NO_2 objective or the annual mean and 24-hour mean PM_{10} objectives.

10.60 The 12 RBC diffusion tube monitoring results, closest to the centre of the Site are presented in Table 10.11.

Table 10.11: Measured NO_2 Concentrations at 12 RBC Diffusion Tubes closest to the centre of Site

ID	Site	Classification	Distance to centre of Site (km)	NO_2 Concentration (µg/m^3)				
				2014	2015	2016	2017	2018
DT41	Station Hill (Near Bus stop WN)	Roadside	**0.11**	-	-	**50**	**47**	35
DT39	Friar St (Nandos)	Roadside	**0.14**	**53**	**47**	**52**	**50**	**42**
DT37	Vachel Rd	Roadside	**0.19**	38	33	35	34	35
DT36	Sackville Street	Roadside	**0.20**	**43**	**40**	37	37	38
DT42	33 Caversham Rd	Roadside	**0.24**	**51**	**48**	**43**	**45**	**44**
DT43	59A Caversham Rd	Roadside	**0.25**	**47**	**42**	**41**	**43**	**41**
DT40	Station Hill (Near Taxi Station)	Roadside	**0.31**	-	-	**47**	**49**	33
DT35	Picture House, Thorn St	Roadside	**0.34**	34	30	32	30	31
DT52	31a Vastern Rd	Roadside	**0.42**	40	36	37	38	33
DT51	108 Caversham Rd	Roadside	**0.53**	**48**	**41**	**41**	40	**42**
DT53	131 Caversham Rd	Roadside	**0.53**	**47**	40	36	36	35
DT46	Railway Depot	Roadside	**0.56**	**42**	39	35	34	27

Note: 2014-2017 Data taken from RBC's 2018 Air Quality Annual Status Report, June 2018
2018 Data received directly from RBC.2018 diffusion tube data has not yet been distance corrected
Exceedences of the objective are presented in **BOLD**

10.61 The NO_2 roadside annual mean concentrations in Table 10.11 indicate that concentrations have been exceeded at all monitoring locations between 2014 and 2018 except Vachel Road (DT37) and Picture House (DT35) which is consistent with the RBC AQMA declared for the whole of the town centre in respect to NO_2. Overall there has been a downward trend in concentrations between 2014 and 2018.

Likely Significant Effects

Demolition and Construction

Nuisance Dust

10.57. Construction activities in relation to the Proposed Development have the potential to affect local air quality via Earthworks, Construction and Trackout activities.

10.58. As there are existing and proposed receptors within 350m of the boundary of the Site, and within 50m of the routes that would be used by construction vehicles on the public highway, it is considered that a detailed qualitative assessment is required to determine the likely dust effects, as recommended by the IAQM guidance on construction dust. Results of this assessment are provided for each main activity (Demolition, Earthworks, Construction and Trackout).

10.59. The sensitivity of the area to each main activity has been assessed based on the number and distance of the nearest sensitive receptors to the activity, and the sensitivity of these receptors to dust soiling, human health and ecological effects. Based on the criteria set out in Table 2 to Table 4 in the IAQM guidance document, Table 10.12 presents the sensitivity of the area.

Table 10.12: Summary of the Sensitivity of the Area

Potential Effect	Sensitivity of the Surrounding Area
Dust Soiling.	High
Human Health.	High
Ecological.	Low

Demolition

10.60. The estimate for the total volume of buildings to be demolished is greater than 50,000m^3. Based on this and considering the IAQM criteria, the potential dust emissions during demolition activities would be of a **large** magnitude.

Earthworks

10.61. As noted earlier in this Chapter, considered together the area of the Site is approximately 2.56ha, or 25,600m^2. Based on this and considering the IAQM criteria, the potential dust emissions during earthworks activities would be of a **large** magnitude.

Construction

10.62. The estimate for the total volume of buildings to be constructed (including the basement) is greater than 100,000m^3. Based on this and considering the IAQM criteria, the potential dust emissions during construction activities would be of a **large** magnitude.

Trackout

10.63. In line with **Chapter 6: Demolition and Construction**, it is estimated that the average construction traffic would be 35 vehicles per day. Based on this and considering the IAQM criteria, the potential for dust emissions due to trackout activities would be of a **large** magnitude.

Summary

10.64. On the basis of the above, a summary of risk during each stage of the demolition and construction works has been set out in Table 10.13. This demonstrates that the demolition and construction works are considered to be **high risk**, in particular due to dust soiling and human health effects. Therefore, site-specific mitigation measures (described later in this Chapter) would be required to address these risks.

Table 10.13: Summary of Risk

Potential Effect	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	High	High	High	High
Ecological	Low	Low	Low	Low

Vehicle Emissions

10.65. Plant operating on the Site and construction related vehicles entering and egressing the Site from / to the local road network would have the potential to increase local air pollutant concentrations, particularly in respect of NO_2 and particulate matter (both PM_{10} and $PM_{2.5}$).

10.66. It is estimated that the average construction traffic would be 35 vehicles per day. Therefore, emissions from construction traffic would be relatively small compared to existing road traffic emissions. Further details on existing traffic flows are contained within **Technical Appendix 10.1**. Taking into account the current traffic movements and background pollutant concentrations around the Site it is considered that the likely effect of construction vehicles entering and egressing the Site on air quality would, in the worst-case, give rise to a **temporary**, **short-term**, **local** effect of **minor adverse significance**.

10.67. Emissions from plant operating on the Site would be very small in comparison to the emissions from traffic movements on the roads adjacent to the Site. It is therefore considered that even in the absence of mitigation, their likely effect on local air quality would be of **negligible significance**.

Interim Development Scenario

10.68. Effects on local air quality associated with the Interim Development Scenario would likely result from changes to traffic flows. Table 10.15 and Table 10.16 present the concentrations predicted by the ADMS Roads air quality modelling at relevant receptors surrounding the Site, and receptors introduced as part of the Interim Development Scenario. These locations represent the worst-case air quality conditions that would likely result.

Nitrogen Dioxide

Table 10.14: Results of the Nitrogen Dioxide ADMS-Roads Modelling

ID	2018 Baseline	2022 Without Interim Development	2022 With Interim Development	Change	Impact Descriptor
1	32.7	27.2	27.2	0.0	Negligible
2	34.2	29.2	29.2	0.0	Negligible
3	31.0	26.7	26.7	0.0	Negligible

ID	2018 Baseline	2022 Without Interim Development	2022 With Interim Development	Change	Impact Descriptor
4	50.6	40.9	41.0	0.1	Negligible
5	36.6	30.6	30.6	0.0	Negligible
6	28.9	25.1	25.2	0.1	Negligible
7	33.8	28.7	28.7	0.0	Negligible
8	38.5	32.0	32.0	0.0	Negligible
9	33.3	28.3	28.3	0.0	Negligible
10	35.3	30.0	30.0	0.0	Negligible
11	31.8	27.4	27.4	0.0	Negligible
12	36.9	30.9	31.0	0.1	Negligible
13	34.3	29.3	29.3	0.0	Negligible
14	35.1	29.8	29.8	0.0	Negligible
15	35.2	29.6	29.6	0.0	Negligible
16	-	-	26.9	-	-
17	-	-	25.7	-	-

10.69. The results in Table 10.15 indicate that for 2018, annual mean NO_2 concentrations are predicted to meet the objective at all receptor locations except Receptor 4. As discussed in **Technical Appendix 10.1**, the hourly mean objective for NO_2 is unlikely to be exceeded at a roadside location where the annual-mean NO_2 concentration is less than 60µg/m^3 and therefore the 1-hour mean is unlikely to be exceeded at any of the receptor locations.

10.70. In 2022 'without' and 'with' the Interim Development Scenario in place concentrations are predicted to meet the NO_2 annual mean objective value of 40µg/m^3 at all receptor locations except Receptor 4. Table 10.15 illustrates that 'without' and 'with' the Interim Development Scenario in place the highest predicted annual mean NO_2 concentration (of 41.0µg/m^3 at Receptor 4 'with' the Interim Development Scenario) is much less than 60µg/m^3 and as such the hourly objective is likely to be met at all receptors.

10.71. Using the magnitude of change descriptors outlined in Table 10.8, the Interim Development Scenario is predicted to result in an 'negligible' impact on annual mean NO_2 concentrations at all receptor locations. Based on the significance of impact criteria the effect of the Interim Development on NO_2 concentrations is not significant.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Table 10.15: Results of the Particulate Matter ADMS-Roads Modelling

ID	Annual Mean PM_{10} (µg/m^3)				24-Hour Mean PM_{10} (No. of Days)				Annual Mean $PM_{2.5}$ (µg/m^3)			
	2018 Baseline	2022 Without Development	2022 With Development	Change	2018 Baseline	2022 Without Development	2022 With Development	Change	2018 Baseline	2022 Without Development	2022 With Development	Change
1	16.1	15.4	15.4	0.0	0	0	0	0	10.9	10.2	10.2	0.0
2	18.4	17.8	17.8	0.0	2	1	1	0	16.2	15.4	15.5	0.1
3	16.1	15.4	15.5	0.1	0	0	0	0	14.8	14.1	14.1	0.0
4	26.3	25.6	25.7	0.1	16	14	14	0	21.1	20.0	20.0	0.0
5	18.5	17.8	17.8	0.0	2	1	1	0	16.3	15.5	15.5	0.0
6	14.7	14.1	14.1	0.0	0	0	0	0	14.0	13.3	13.3	0.0
7	18.0	17.5	17.5	0.0	1	1	1	0	16.0	15.3	15.3	0.0
8	20.8	20.3	20.3	0.0	5	4	4	0	17.7	16.8	16.9	0.1
9	17.6	17.0	17.0	0.0	1	1	1	0	15.7	15.0	15.0	0.0
10	19.1	18.5	18.5	0.0	2	2	2	0	16.6	15.8	15.9	0.1
11	16.7	16.2	16.2	0.0	1	0	0	0	15.2	14.5	14.5	0.0
12	19.7	19.2	19.3	0.1	3	3	3	0	17.0	16.3	16.3	0.0
13	18.8	18.2	18.2	0.0	2	2	2	0	16.4	15.6	15.7	0.1
14	18.8	18.2	18.3	0.1	2	2	2	0	16.4	15.7	15.7	0.0
15	18.8	18.2	18.2	0.0	2	2	2	0	16.4	15.6	15.7	0.1
16	-	-	15.3	-	-	-	0	-	-	-	14.0	-
17	-	-	14.4	-	-	-	0	-	-	-	13.5	-

10.72. As shown in Table 10.16, the concentrations of PM_{10} are predicted to be well below the annual and daily mean objective values in 2018 and in 2022 both 'with' and 'without' the Interim Development Scenario in place at all the receptor locations.

10.73. Using the magnitude of change descriptors outlined in Table 10.8, the Interim Development Scenario is predicted to result in an 'negligible' impact in annual mean PM_{10} levels at all receptor locations. Based on the significance of impact criteria, the effect of the Interim Development Scenario on annual mean PM_{10} concentrations is not significant.

10.74. There are no significance criteria in relation to daily mean PM_{10} concentrations (see the Significance Criteria section). However, given the predicted concentrations are well below the daily mean PM_{10} objective, and no change is predicted at all receptor locations, it is considered that the effect of the Interim Development Scenario on daily mean PM_{10} levels is not significant.

10.75. The results in Table 10.16 indicate that the annual mean $PM_{2.5}$ objective of 25µg/m^3 is predicted to be met in all scenarios modelled, i.e. 2018 and 2022 both 'with' and 'without' the Interim Development Scenario in place. Based on the significance of impact criteria outlined in Table 10.8, a **negligible** impact is predicted at all receptor locations on annual mean $PM_{2.5}$ levels the effect on annual mean $PM_{2.5}$ concentrations is not significant.

Completed Development Scenario

10.76. Effects on local air quality associated with the Completed Development Scenario would likely result from changes to traffic flows Table 10.17 and Table 10.18 present the concentrations predicted by the ADMS Roads air quality modelling at relevant receptors surrounding the Site, and receptors introduced as part of the Proposed Development. These locations represent the worst-case air quality conditions that would likely result.

Nitrogen Dioxide

Table 10.16: Results of the Nitrogen Dioxide ADMS-Roads Modelling

ID	2026 Without Development	2026 With Development	Change	Impact Descriptor
1	24.8	24.8	0.0	Negligible
2	27.3	27.3	0.0	Negligible
3	24.9	24.9	0.0	Negligible
4	37.3	37.4	0.1	Negligible
5	28.2	28.3	0.1	Negligible
6	23.5	23.5	0.0	Negligible
7	26.6	26.6	0.0	Negligible
8	29.5	29.6	0.1	Negligible
9	26.3	26.4	0.1	Negligible
10	28.0	28.0	0.0	Negligible
11	25.6	25.7	0.1	Negligible
12	28.6	28.7	0.1	Negligible
13	27.4	27.5	0.1	Negligible
14	27.7	27.8	0.1	Negligible
15	27.4	27.4	0.0	Negligible
16	-	24.7	-	-
17	-	24.0	-	-
18	-	27.3	-	-
19	-	23.7	-	-

10.77. In 2026 'without' and 'with' the Proposed Development in place concentrations are predicted to meet the NO_2 annual mean objective value of 40µg/m^3 at all receptor locations. Table 10.17 illustrates that 'without' and 'with' the Proposed Development in place the highest predicted annual mean NO_2 concentration (of 37.4µg/m^3 at Receptor 4 'with' the Proposed Development) is much less than 60µg/m^3 and as such the hourly objective is likely to be met.

10.78. Using the magnitude of change descriptors outlined in Table 10.8, the Proposed Development is predicted to result in an 'negligible' change in annual mean NO_2 concentrations at all receptor locations. Based on the significance of impact criteria outlined in Table 10.8, the effect of the Proposed Development on NO_2 concentrations is not significant.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Table 10.17: Results of the Particulate Matter ADMS-Roads Modelling

ID	Annual Mean PM_{10} (µg/m^3)			24-Hour Mean PM_{10} (No. of Days)			Annual Mean $PM_{2.5}$ (µg/m^3)		
	2026 Without Development	2026 With Development	Change	2026 Without Development	2026 With Development	Change	2026 Without Development	2026 With Development	Change
1	15.1	15.1	0.0	0	0	0	9.9	9.9	0.0
2	17.6	17.7	0.1	1	1	0	11.3	11.4	0.1
3	15.2	15.3	0.1	0	0	0	10.0	10.0	0.0
4	25.6	25.7	0.1	14	14	0	15.8	15.9	0.1
5	17.6	17.7	0.1	1	1	0	11.3	11.4	0.1
6	13.8	13.8	0.0	0	0	0	9.2	9.2	0.0
7	17.3	17.3	0.0	1	1	0	11.1	11.2	0.1
8	20.2	20.3	0.1	4	4	0	12.7	12.8	0.1
9	16.8	16.9	0.1	1	1	0	10.9	10.9	0.0
10	18.4	18.5	0.1	2	2	0	11.7	11.8	0.1
11	16.0	16.0	0.0	0	0	0	10.4	10.4	0.0
12	19.1	19.2	0.1	2	2	0	12.1	12.2	0.1
13	18.1	18.2	0.1	1	2	1	11.6	11.6	0.0
14	18.1	18.2	0.1	1	2	1	11.6	11.6	0.0
15	18.0	18.1	0.1	1	1	0	11.5	11.6	0.1
16	-	15.0	-	-	0	-	-	9.9	-
17	-	14.2	-	-	0	-	-	9.4	-
18	-	17.5	-	-	1	-	-	11.2	-
19	-	14.0	-	-	0	-	-	9.3	-

10.79. As shown in Table 10.18, the concentrations of PM_{10} are predicted to be well below the annual and daily mean objective values in 2026 both 'with' and 'without' the Proposed Development in place at all the receptor locations.

10.80. Using the magnitude of change descriptors outlined in Table 10.8, the Proposed Development is predicted to result in a 'negligible' impact on annual mean PM_{10} levels at all receptor locations. Based on the criteria outlined in Table 10.8, a **negligible** impact is predicted at all receptor locations on annual mean PM_{10} levels because of the Proposed Development.

10.81. There are no significance criteria in relation to daily mean PM_{10} concentrations (see the Significance Criteria section). However, given the predicted concentrations are well below the daily mean PM_{10} objective, and no change is predicted at all receptor locations, it is considered that the effect of the Proposed Development on daily mean PM_{10} levels is not significant.

10.82. The results in Table 10.18 indicate that the annual mean $PM_{2.5}$ objective of 25µg/m^3 is predicted to be met in all scenarios modelled, i.e. 2018 and 2022 both 'with' and 'without' the Proposed Development in place. Based on the criteria outlined in Table 10.8, a **negligible** impact is predicted at all receptor locations on annual mean $PM_{2.5}$ levels and the effect of the Proposed Development is not significant.

Mitigation Measures and Likely Residual Effects

Demolition and Construction

Nuisance Dust

10.83. A range of environmental management controls would be developed with reference to the IAQM guidance. These would be detailed in a Construction Environmental Management Plan (CEMP) with the objective to prevent the release of dust entering the atmosphere and/or being deposited on nearby receptors. Such measures, which would be adopted and secured through planning obligations and/or appropriate planning conditions, would include:

- Damping down surfaces during dry weather;
- Erecting appropriate hoarding and/or fencing to reduce dust dispersion and restrict public access;
- Sheeting of chutes, skips and vehicles removing construction wastes;
- Appropriate handling and storage of materials, especially stockpiled materials;
- Restricting drop heights onto lorries and other equipment;
- Effective vehicle washing facilities to be provided for vehicles leaving the Site;
- Fitting all equipment (e.g. for cutting, grinding, crushing) with dust control measures such as water sprays wherever possible;
- Prevention of dust-contaminated run-off water from the Site;
- Using gas powered generators rather than diesel if possible (these are also quieter) and ensuring that all plant and vehicles are well maintained so that exhaust emissions do not breach statutory emission limits;
- Prohibiting fires on the construction site; and
- Ensuring that cleaning equipment is available to clean mud from hard standing roads and footpaths.

10.84. Particular attention would be paid to operations that would take place close to the Site boundary due to their proximity to surrounding properties.

Vehicle Emissions

10.85. Construction traffic logistics would be agreed with RBC in advance of the works commencing. In determining construction traffic routing, consideration has been, and would be, given to the location of sensitive routes (i.e. residential roads etc.). Where practicable, use of roads during peak hours will be limited. Where possible, construction vehicles with low diesel emissions (i.e. the latest Euro Emission standards) would be used. It is anticipated that with appropriate construction logistics, the likely residual effect of emissions from construction vehicles entering and egressing the Site is not significant and no further mitigation is required.

Construction Plant Emissions

10.86. No mitigation measures are required as no significant adverse impacts from construction plant are predicted.

Interim Development and Completed Development Scenarios

10.87. As identified above, the Interim Development and Completed Development scenarios are predicted to have a negligible impact on local air quality and therefore the effect would be not significant. However, a Travel Plan would be prepared to encourage car sharing and reduce the number of car trips associated with the Proposed Development and encourage walking and cycling and use of public transport, which would also reduce emissions to air. The Proposed Development will also include the provision of electric vehicle charging points which will also have a benefit to air quality by encouraging the switch to low emission vehicles. These would be secured by means of a planning condition on any future planning consent.

Summary

Table 10.18: Summary of Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Demolition and Construction			
Dust emissions from construction activities	**Temporary, local and of minor adverse significance**	CEMP	**Negligible**
Emissions from construction plant	**Negligible**	None required	**Negligible**
Emissions from construction vehicles	**Temporary local minor adverse**	Traffic Logistics Plan	**Negligible**
Interim Development Scenario			
NO_2, PM_{10} and $PM_{2.5}$ emissions from traffic associated with the completed Interim Development	**Negligible**	Travel Plan Electric vehicle charge points	**Negligible**
Completed Development			
NO_2, PM_{10} and $PM_{2.5}$ emissions from traffic associated with the Completed Development	**Negligible**	Travel Plan Electric vehicle charge points	**Negligible**

Comparison of Effects between this ES and the 2015 ES

10.88. The effects presented in this ES are consistent with those presented in the 2015 ES.

References

1 Cambridge Environmental Research Consultants Ltd, ADMS-Roads, 2018, Version 4.1.1.
2 AEA, NOx to NO_2 Calculator, http://laqm1.defra.gov.uk/review/tools/monitoring/calculator.php Version 6.1, 17 October 2017
3 Environmental Protection UK & Institute of Air Quality Management (2017), 'Land-Use Planning & Development Control: Planning for Air Quality', EPUK & IAQM, London.
4 Institute of Air Quality Management (2014) 'Guidance on the Assessment of dust from demolition and construction.'
5 http://laqm.defra.gov.uk/faqs/faqs.html.
6 Defra, 2012, Local Air Quality Management: Note on Projecting NO2 Concentrations.
7 Air Quality Consultants Ltd (2017) Calculator Using Realistic Emissions for Diesels (CURED) Spreadsheet. CURED V3A December 2017
8 Defra, 2007, 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'.
9 Reading Borough Council, 2003 Updating and Screening Assessment
10 Reading Borough Council, 2003 Updating and Screening Assessment Supplement
11 Reading Borough Council, 2004 Progress Report
12 Reading Borough Council, 2006 Detailed Assessment
13 Reading Borough Council, 2008 Detailed Assessment
14 Reading Borough Council, 2008 Further Assessment
15 Reading Borough Council, 2009 Updating and Screening Assessment
16 Reading Borough Council, 2010 Progress Report
17 Reading Borough Council, 2011 Progress Report
18 Reading Borough Council, 2012 Updating and Screening Assessment

11. Noise and Vibration

Introduction

11.1. This chapter addresses the likely significant noise and vibration effects of the Proposed Development on human receptors and listed buildings and structures. It considers the potential impacts of noise and vibration during the construction works and on completion of the Proposed Development upon existing sensitive receptors.

11.2. A description of the methods used in the assessment are presented together with a description of the baseline conditions of the Site and surrounding area. Likely potential effects are presented, and mitigation measures identified where appropriate to avoid, reduce or offset adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

11.3. Determination of the acceptability of internal noise and vibration levels within the Proposed Development itself is considered a design issue and does not form part of the EIA process. This has however, been addressed in a separate report by the Acoustic Design consultants Hoare Lea.

11.4. The chapter is accompanied by the following appendices, provided in **ES Volume 3**:

- **Technical Appendix 11.1:** Glossary of Acoustic Terms;
- **Technical Appendix 11.2:** Baseline Noise Survey;
- **Technical Appendix 11.3:** Construction Noise and Vibration Assessment;
- **Technical Appendix 11.4:** Road Traffic Noise Assessment;
- **Technical Appendix 11.5**: Design Note by Hoare Lea, document reference Note-1010694-2F-TH-20190201-Station Hill, Phase 1 – Plots E&F dated 1st February 2019;
- **Technical Appendix 11.6**: Station Hill North, Reading - Environmental Noise Survey Phase 2 Detailed Planning Application, December 2019; and
- **Technical Appendix 11.7**: Station Hill North, Reading - Environmental Noise Survey Phase 3 Outline Planning Application, December 2019.

Assessment Methodology and Significance Criteria

Assessment Methodology

11.5. The assessment of likely significant noise and vibration effects has involved the following:

- identifying potentially existing and future sensitive receptors (SRs) within the surrounding area of the Site;
- establishing the baseline noise and vibration conditions currently existing at the Site and at existing SRs surrounding the Site using survey data undertaken by Hoare Lea in September 2018;
- assessing likely noise and vibration levels generated during the construction works associated with the proposed Development;
- establishing design aims for plant and services associated with the Proposed Development;
- assessing likely noise levels from the completed and operational Proposed Development;
- formulating proposals for mitigation (where appropriate); and
- assessing the likely significance of any residual noise and vibration effects.

Demolition and Construction Noise

11.6. As noted in **ES Chapter 6: Development and Construction**, demolition and construction works would occur in 3 Phases. Phase 1 has already commenced with completion anticipated in 2022. Phase 2, including demolition of Xafinity House is planned to commence late 2019/early 2020 with completion anticipated in late 2022. Phase 3 would commence after completion of Phases 1 and 2, with completion anticipated in 2026. Exact timing will be determined dependant on a number of external factors. Noise levels associated with these works have been estimated based upon the plant typically used for such a development and are based on source noise levels contained within BS 5228-1:2009+A1:2014[1] 'Code of practice for noise and vibration control on construction and open sites –Part 1: Noise'.

11.7. The demolition and construction works which are considered to be the nosiest can be divided into the following main activities:

- Demolition;
- Earthworks;
- Piling;
- Concreting; and
- Pavement Works.

11.8. To assess the likely significant effects construction works on existing SRs surrounding the Site and future SRs the 'ABC Method' provided in BS 5228-1:2009+A1:2014, has been used.

11.9. The ABC method defines category threshold values which are determined by the time of day and existing prevailing ambient noise levels. The noise generated by construction activities is then compared with the threshold value. If the construction noise level exceeds the 'threshold value', a significant effect is deemed to occur.

11.10. Noise threshold levels have been established for the relevant existing SRs based upon the prevailing baseline noise levels. Noise levels associated with the construction works have been predicted using the calculation methodology detailed within BS 5228-1:2009+A1:2014. Calculations representing a worst-case scenario over a one-hour period with plant operating at the closest point to the nearest SR and in the absence of mitigation are presented. In practice, noise levels would tend to be lower owing to greater separation distances, screening effects and periods of plant inactivity.

Demolition and Construction Vibration

11.11. There are two aspects of vibration that require consideration:

- Potential vibration effects on people or equipment within buildings; and
- Potential vibration effects on buildings.

11.12. There are currently no British Standards that provide a methodology for predicting levels of vibration from construction activities other than BS 5228-2[2] '*Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'*, which relates to percussive, or vibratory, rolling and piling only. As stated in BS 5228-2, and as generally accepted, the threshold of vibration perception for humans in residential environments is typically in the peak particle velocity (PPV) range 0.15 to 0.3 mm/s at frequencies between 8 Hertz (Hz) and 80Hz with complaints likely at 1 mm/s. Based on historical field measurements undertaken by Waterman and having regard to information contained within BS 5228-2, Table 11.1 details the distance at which certain activities may give rise to 'just perceptible' levels of vibration.

Table 11.1: Distance at Which Vibration May Just be Perceptible

Construction Activity	Distance from Activity when Vibration may Just be Perceptible (metres)[1]
Heavy vehicles	5 – 10
Excavation	10 – 15
CFA Piling	15 – 20
Rotary Bored Piling	20 – 30
Vibratory Piling	40 – 60

Note: [1]Distances for perceptibility are only indicative and dependent upon a number of factors, such as the radial distance between source and receiver, ground conditions, and underlying geology.

11.13. Table 11.2 presents typical levels of vibration with distance from continuous flight auger (CFA) and rotary bored vibration.

Table 11.2: Typical Levels of Vibration Resultant from CFA/Rotary Bored Piling

Distance (m)	Peak Particle Velocity[1] (PPV) mm/s
5	0.54
10	0.38
20	0.30
30	0.03

Note: [1]Indicative. Dependent on ground conditions and underlying geology.

11.14. It is a widely held belief that if vibration can be felt, then damage to property is inevitable. However, vibration levels at least an order of magnitude higher than those for human disturbance are required to cause damage to buildings. It is generally accepted that building damage would not arise at PPV levels below 12.5 mm/s.

11.15. At this stage the detail of the methods and equipment to be used during the construction works is unconfirmed as they will be established as the design and construction management plans progress. Consequently, the significance of vibration effects from demolition and construction work has been assessed qualitatively rather than quantitatively, based on typical plant used and distance of works to the SRs. Vibration level data was drawn from BS5228 Part 2.

Demolition and Construction Road Traffic Noise

11.16. Assessment of noise level changes arising from demolition and construction traffic was undertaken using the calculation methodology detailed within the Calculation of Road Traffic Noise[3] (CRTN). This involved the use of the forecast construction traffic flow data (as set out in **Chapter 6: Demolition and Construction**) and the baseline traffic data provided by the project's construction consultant (Cast).

Completed Development: Fixed External Plant & Building Services

11.17. The guidance provided in BS 4142:2014+A1:2019[4] 'Methods for rating and assessing industrial and commercial sound', has been used to recommend noise limits from fixed plant and building services associated with the Proposed Development. Regard has also been given to the requirements of Reading Borough Council (RBC).

Completed Development: Road Traffic Noise

11.18. The changes in noise levels, attributable to changes in road traffic flows and volumes, resulting from the Proposed Development have been calculated using traffic data provided by the Applicant's transport consultants (Peter Brett Associates). Traffic flow data has been provided for the 'with' and 'without' Proposed Development scenarios for the anticipated year of completion 2026, and includes traffic associated with future committed schemes.

11.19. Basic Noise Levels (BNLs) have been calculated for the road links covered by the Transport Assessment using the calculation methodology of the Calculation of Road Traffic Noise (CRTN)[5]. The calculations use the 18-hour Average Annual Weekday Traffic (AAWT) flow, % HGV composition and average vehicle speed for each road link. The BNLs were calculated using the calculation methodology provided in the CRTN. The likely effects of changes in road traffic noise were evaluated by consideration of the estimated changes in $L_{A10,(18\ hour)}$ road traffic noise level on the local highway network.

Servicing and Delivery

11.20. In the absence of guidelines for assessing the effects of service and delivery noise, a qualitative assessment was undertaken based on a review of the potential delivery and servicing locations.

Non-Residential Uses

11.21. Specific details concerning the end users of the commercial elements of the Proposed Development are not known at this stage and would be dependent on the future tenants. As such, a qualitative assessment has been undertaken of noise sources associated with the commercial elements of the Proposed Development including, amongst others, break-out noise.

Car Parking Noise

11.22. There are currently no guidelines in the United Kingdom for the assessment of noise from car park activity. The interaction of potential noise sources such as engines operating at low speeds, closing of car doors and other unquantifiable noise (e.g. people talking) is, by its nature, poorly defined.

11.23. Therefore, a qualitative assessment was undertaken, based on the number and location of car parking spaces proposed within the Proposed Development.

Approach to Assessment of the Interim Development Scenario

11.24. As part of the Interim Development Scenario a total of 290 car parking spaces are proposed for the future residents within Plots E and F and office workers within Plot G. This is made up of 165 car parking spaces within the car park in Phase 1 (Plots E and F) and 122 car parking spaces within the podium forming part of Phase 2 (Plot G).

11.25. As part of Phase 2, the NCP car park and Xafinity House will be demolished. This will result in an immediate loss of public car parking spaces from the NCP car park during construction. At the time of preparing the traffic flows it was envisaged that additional car parking spaces would be delivered temporarily on the area of Phase 3 to be used for public parking (a further 362 spaces were assumed). This is no longer proposed as part of the current applications but may come forward in the future.

11.26. The traffic data provided for the noise assessment of the Interim Development Scenario allocated car parking spaces to the proposed on Site uses. It also accommodated for the re-distribution of the remaining traffic currently using the NCP car park to other surrounding public car parks. The level of re-distributed traffic was based on the existing demand recorded at the NCP car park.

11.27. As the level of car parking being proposed in the Interim Development Scenario has reduced since the traffic data was provided there would be an increase in traffic being re-distributed to other surrounding car parks. However, PBA consider that the additional level of re-distributed traffic to other surrounding car parks would not materially alter the daily traffic data provided on which the noise assessment was undertaken.

Approach to Outline Assessment

11.28. As part of Phase 3 of the Proposed Development, up to an additional 713 car parking spaces would be provided in the podium car park including the basement podium which could extend across Phase 2 and Phase 3. In order to provide a worst case assessment, it was assumed that the full amount of car parking was delivered and the associated trip generation of the on Site uses was calculated on this basis. As discussed above the remaining traffic currently using the NCP car park which wasn't assumed to be retained on Site was re-distributed to other local car parks.

Approach to Future Baseline

11.29. Traffic anticipated to be generated by the future baseline scheme at the former Coopers BMW site was included within the baseline traffic data provided by PBA. This traffic was added to the baseline traffic flows, which were monitored in 2018 using automatic traffic counts and traffic surveys.

Significance Criteria

Demolition and Construction Noise and Vibration

11.30. As outlined above, to assess the significance of effects from demolition and construction noise on existing and future SRs, 'The ABC Method' provided in BS 5228-1:2009+A1:2014 was used. The vibration assessment has been made against the criteria for human perception as presented in BS 5228-2:2009.

11.31. The criteria in Table 11.3 were adopted to provide transparency in the definition of the significance of identified effects. Full details are provided in **Technical Appendix 11.3**.

Table 11.3: Significance Criteria for the Assessment of Construction Noise and Vibration

Significance	Level Above Threshold Value dB(A)	Level of Vibration	Definition
Negligible	≤ 0 to 2.9	< 0.14mm/s	The effect is not of concern
Adverse effect of minor significance	3.0 to 4.9	>0.14mm/s to <1mm/s	The effect is undesirable but of limited concern
Adverse effect of moderate significance	5.0 to 10.0 Maximum construction noise value of 75dB $L_{Aeq,T}$	1mm/s to 3mm/s	The effect gives rise to some concern but is likely to be tolerable depending on scale and duration
Adverse effect of major significance	>10	>3mm/s	The effect gives rise to serious concern and it should be considered unacceptable

11.32. With regard to potential damage to utilities and listed buildings/structures, provided vibration is ≤7.5mm/s (derived from BS5228-2 advice) the potential effect is negligible. For all other buildings, a vibration level of ≤10mm/s is negligible with regard to building damage.

Demolition and Construction Traffic Noise

11.33. The criteria proposed for road traffic noise generated by the Proposed Development as detailed in Table 11.4 would be appropriate for demolition and construction road traffic noise and has accordingly been adopted in the qualitative assessment.

Completed Development: Fixed Mechanical Plant and Building Services

11.34. The guidance provided in BS 4142: 2014+A1:2019 and the requirements of RBC have been used to determine noise limits for items of fixed plant introduced as part of the Proposed Development to ensure effects are negligible.

11.35. RBC require that "*noise from new plant will be lower than the existing background noise level and therefore will not impact on the existing noise climate*".

Completed Development: Road Traffic Noise

11.36. The Design Manual for Roads and Bridges, Volume 11 Section 3 Part 7-'*Traffic Noise and Vibration*' (DMRB)[6] provides significance criteria for changes in road traffic noise levels which are reproduced in Table 11.4 and have been used in this assessment.

11.37. The DMRB states that "*a change in road traffic noise of 1 dB $L_{A10,18h}$ in the short term (e.g. when a project is opened) is the smallest that is considered perceptible. In the long term (typically 15 years after project opening) a 3dB $L_{A10,18h}$ change is considered perceptible*". Notwithstanding this, it is generally accepted by acoustic practitioners that subjectively, an increase of 3dB in environmental noise is just noticeable, whereas an increase of 10dB, a tenfold increase in intensity, is judged by most people as a doubling of loudness.

Table 11.4: Significance Criteria for Road Traffic Noise Assessment

Significance	Short Term Change or Difference in Noise Level, dB(A)
Negligible	0 to 0.9
Adverse effect of minor significance	1.0 to 2.9
Adverse effect of moderate significance	3.0 to 4.9
Adverse effect of major significance	≥ 5

Servicing and Delivery

11.38. In the absence of published guidelines for assessing the effects of noise from servicing and delivery, the significance criteria in Table 11.5, which are based on the predicted change in the prevailing noise level, have been adopted. The criteria are widely used by acoustic practitioners and are based on human perception and response to changes in environmental noise levels.

Table 11.5: Significance Criteria for Non-Residential and Servicing Noise Assessment

Significance	Change in Prevailing Noise Level dB(A)	Definition
Negligible	< 3.0	The effect is not of concern
Adverse effect of minor significance	3.0 to 4.9	The effect is undesirable but of limited concern
Adverse effect of moderate significance	5.0 to 9.9	The effect gives rise to some concern but is likely to be tolerable depending on scale and duration

Significance	Change in Prevailing Noise Level dB(A)	Definition
Adverse effect of major significance	≥ 10	The effect gives rise to serious concern and it should be considered unacceptable

11.39. Where specific details are unknown then a qualitative assessment is undertaken based on available information.

Non-Residential Uses

11.40. In the absence of published guidelines, the significance criteria and approach used to assess noise from servicing and delivery has been applied to that arising from non-residential uses.

Car Parking Noise

11.41. In the absence of published guidelines, the significance criteria and approach used to assess noise from servicing and delivery has been applied to that arising from car parking noise.

Limitations and Assumptions

Demolition and Construction

11.42. The BS 5228 calculation methodologies allow accurate noise levels to be determined for various demolition and construction activities. However, at this stage specific detail on the construction plant and machinery to be used (make/model) is not known. A number of assumptions have therefore been made regarding the number and type of plant to be utilised, their location, and detailed operating arrangements. Some of this information will be clarified as the detailed design progresses and later when resources are mobilised and the contractor is appointed, but other information (such as exactly where the plant operates and for how long) would remain uncertain, even after works have commenced. As a result, construction noise levels have been based on generic plant detail contained within BS5228-1:2009+A1:2014 and as detailed in **Chapter 6: Demolition and Construction**. The available information is considered sufficient to undertake a noise assessment of the demolition and construction work, focussing on key activities operating at the Site, with the aim of identifying whether a significant, albeit temporary, adverse noise effect is likely to arise at the nearest sensitive receptors.

11.43. Full details of assumed plant complement and distance to receptors are presented within **Technical Appendix 11.3.** In this respect, a medium to high degree of confidence is assigned to the predicted significance of the potential effects.

Baseline

11.44. This assessment is based upon noise monitoring conducted at the Site boundaries in September 2018 by Hoare Lea. The measured noise levels reflect the 'baseline' conditions at the Site, which is dominated by transportation noise sources, in particular road traffic noise. Given that the baseline survey was conducted relatively recently and for an extended period of time during suitable weather conditions, a high degree of confidence is assigned to the significance of the potential effects determined.

Fixed Plant and Building Services

11.45. At this stage of the scheme design, the specific type and configuration of fixed plant are not defined although locations are indicated for the detailed element of the scheme (Plots E, F and G).

Consequently, it is not possible to undertake predictions to determine whether appropriate standards would be met, so instead appropriate plant noise emission limits have been set.

Baseline Conditions

Receptors

11.46. Existing receptors within the vicinity of the Site are identified in Table 11.6 and **Figure 11.1**. These receptors are the nearest to the Proposed Development and therefore there is the potential for short-term temporary adverse noise and vibration effects due to the demolition and construction works to occur together with the potential for permanent effects once the Proposed Development is completed and operational.

Table 11.6: Sensitive Receptors

SR Ref (Figure 11.1)	Description of NSR	Distance from Site Boundary (approximate in metres)[1]
A	Three Guineas Public House, Grade II listed building, Station Hill.	30m North
B	Summit House (Serviced Apartments), Greyfriars Road.	12m West
C	The Gateway Public House, Greyfriars Road, with residential use at first floor level	14m West
D	Terrace housing on Stanshawe Road. Oblique view of Site and intervening buildings between Site and SRs.	35m West
E	Terrace housing on Vachel Road. Oblique view of Site and intervening buildings between Site and SRs.	65m South-West
F	Novotel and Ibis Hotels, Friar Street. Intervening buildings between hotels and Site.	70m East
G	Malthouse Public House, Greyfriars/Tudor Road junction, residential 1st and 2nd floor levels.	14m West
H	Garrard House, 30 Garrard Street	Adjacent (10 m)[2]
I	Merchant's Place (Projection East and West) and Icon House	20m Southeast (shortest distance)
J	First Floor Flat, 125 Friar Street	20m South
K	Future On Site SRs	10m[2]
L	Future residential 52-55 Friar Street and 12 Greyfriars Road (Application 162210)	Adjacent West (10m)[2]

Note: [1] Approximate distance. [2] Assumed distance from works.

Environmental Baseline Noise Survey

11.47. A baseline noise survey was undertaken by Hoare Lea in September 2018, the details of which are presented within **Technical Appendices 11.6 and 11.7**.

11.48. Monitoring was undertaken at three key locations for a period of 14 days from Monday 17th September 2018 to Monday 1st October 2018. The monitoring locations are illustrated in **Figure 11.1** and are:

- LT1 – western boundary with Greyfriars Road (façade at 2nd floor level);
- LT2 – northern boundary with Station Hill (free-field above hoarding 2.5m above ground level); and
- LT3 – southern boundary with Friar Street (façade at 2nd floor level).

11.49. Weather conditions encountered between Monday 17th September and Saturday 22nd September were not conducive for valid noise measurements, with wind speeds regularly above 5 m/s. Also during Monday 17th and Tuesday 18th September Greyfriars Road was closed resulting in atypical noise levels. Data during this measurement period has been removed from subsequent analysis.

11.50. Table 11.7 provides a summary of the measured noise levels with time history plots presented within **Technical Appendix 11.2**. Measured noise levels during the weekday and weekend periods were generally comparable, except at LT1 (Greyfriars Road) where higher daytime (07:00-19:00) noise levels where measured during the weekday when compared with measured weekend levels. The majority of locations exhibited diurnal variation in noise levels with lower levels during the night-time period when road traffic movements and human activity are lower. However, at LT3 (Friar Street) the average measured levels for all time periods were comparable.

Table 11.7: Summary of Baseline Noise Measurements (dB)

ID	Description	Period[1]	L_{Aeq}[2]	L_{A90}[3]	L_{AFmax}[3]	L_{A10}[3]	Min $L_{A90,15min}$
LT1	Western Site Boundary (**façade level**): Weekday	Day	68	56	85	70	51
		Eve	63	52	81	67	49
		Night	61	46	80	62	36
	Weekend (Sat/Sun **façade level**)	Day	64	52	81	67	42
		Eve	63	52	79	67	48
		Night	60	44	81	61	36
LT2	Northern Site Boundary (**free-field level**)	Day	58	54	80	59	49
		Eve	57	53	80	59	49
		Night	51	44	71	52	37
	Weekend (Sat/Sun **free-field level**)	Day	58	53	81	59	42
		Eve	58	53	81	59	47
		Night	52	43	71	52	37
LT3	Southern Site Boundary (**façade level**)	Day	66	57	87	69	52
		Eve	66	57	85	68	52
		Night	66	58	87	68	45
	Weekend (Sat/Sun **façade level**)	Day	66	55	86	68	47
		Eve	65	56	85	68	48
		Night	66	55	87	67	43

Note: [1]Period Day (0700-1900), Eve (1900-2300), Night (2300-0700). [2] Logarithmic average. [3] Arithmetic average. [4] 90th Percentile. [4]Arithmetic average.

Likely Significant Effects

11.51. Table 11.8 presents the predicted un-mitigated noise levels at the selected receptors listed in Table 11.6 during the likely demolition and construction works associated with the Proposed Development, together with the significance of this. Noise levels presented are representative of a worst-case scenario when works are undertaken at the closest point to the receptors, taken as being either the Site boundary, or the closest existing structure to be demolished/dismantled.

11.52. As demolition and construction of the Proposed Development is phased, part of the Site would be built out and occupied whilst works are on-going, as indicated within **Chapter 6: Demolition and Construction**. To take account of this, calculations for future receptors which form part of the Proposed Development were based on a minimum distance of 15m from construction works to determine the likely significant impacts. This is considered to be a conservative approach as in most cases it is likely that works would be undertaken at greater distance.

11.53. Given the short distance between demolition works and sensitive receptors, it is likely that 'quieter' deconstruction methods rather than traditional demolition methods would be adopted. For completeness the potential effects potentially arising from both methods are presented (in columns 2 and 8 of Table 11.8 below). Full details of the calculations undertaken are presented in **Technical Appendix 11.3**.

11.54. Given that the demolition and construction noise assessment is based on a worst-case scenario, when works are being undertaken at the shortest distance from the SRs, the likely significance of effects are taken as being the same for all phases of the Proposed Development and would in any case be no worse.

11.55. All **adverse effects** identified from demolition and construction works are **temporary, local and short-term**.

11.56. It should be noted that, in reality, construction works would be transient in nature, with works for the most part taking place at locations significantly removed from the receptor. Nonetheless, given that adverse effects have been predicted, mitigation measures would be required to reduce noise levels from the demolition and construction phase of the Proposed Development.

Table 11.8: Demolition & Construction Noise Assessment (Un-Mitigated)

SR Ref (Threshold Level)	Demolition	Earthworks	CFA Piling	Sheet Piling (Driven)	Concreting	Pavement	Deconstructive Demolition
A (65)	82 Major	74 Moderate	76 Major	80 Major	74 Moderate	72 Moderate	74 Moderate
B (75)	90 Major	82 Moderate	84 Moderate	88 Major	82 Moderate	80 Moderate	82 Moderate
C (75)	89 Major	81 Moderate	82 Moderate	87 Major	80 Moderate	78 Minor	81 Moderate
D (65)	81 Major	73 Moderate	74 Moderate	79 Major	72 Moderate	70 Moderate	73 Moderate
E (65)	75 Moderate	68 Minor	69 Minor	74 Major	67 Negligible	65 Negligible	68 Minor

SR Ref (Threshold Level)	Demolition	Earthworks	CFA Piling	Sheet Piling (Driven)	Concreting	Pavement	Deconstructive Demolition
F (70)	75 Moderate	67 Negligible	68 Negligible	73 Minor	66 Negligible	64 Negligible	67 Negligible
G (75)	89 Major	81 Moderate	82 Moderate	87 Major	80 Moderate	78 Minor	81 Moderate
H (70)	92 Major	84 Major	85 Major	90 Major	83 Major	81 Major	84 Major
I (70)	86 Major	78 Moderate	79 Moderate	84 Major	77 Moderate	75 Moderate	78 Moderate
J (70)	86 Major	78 Moderate	79 Moderate	84 Major	77 Moderate	75 Moderate	78 Moderate
K (70)	92 Major	84 Major	85 Major	90 Major	83 Major	81 Major	84 Major
L (70)	92 Major	84 Major	85 Major	90 Major	83 Major	81 Major	84 Major

Demolition and Construction Vibration

11.57. Demolition and construction of the Proposed Development would necessitate the use of piling. Assessment is based on the CFA piling method being implemented which gives rise to lower vibration levels when compared to driven or impact piling. The use of CFA piles has been proposed by the structural engineer for the project, Ramboll.

11.58. Given the distance from CFA piling works to existing and future residential receptors, it is considered that the effects would be negligible based on works being undertaken at distances of ≥10m. Vibration arising from other construction activities are not anticipated to give rise to perceptible vibration at the residential SRs due to the type of activities expected and the distance between SRs and location of works. The potential effect on existing and future residential receptors is therefore considered to be **negligible**. Should CFA piling be undertaken at a distance of less than 10m then it is recommended that monitoring is undertaken to ensure threshold levels, agreed with RBC are not exceeded.

11.59. The potential for damage to buildings based on CFA piling, where works are undertaken at a distance of ≥10m, is considered to be **negligible**.

11.60. It is noted that sheet piling is proposed for the basement works. Where works are proposed within 15m of a building/structure then the structural engineers, Ramboll have indicated that the pressed method would be adopted. This would give rise to **negligible effects**. Should driven sheet piling be used where the distance from buildings/structures is less than 15m, there is the potential for the vibration to be perceptible that may give rise to **temporary**, **short-term**, **local effects** of up to **moderate adverse significance** although damage to buildings is considered to be **negligible**.

Demolition and Construction Traffic

11.61. The daily demolition and construction HGV movements are forecast to peak at 35 HGVs (70 two-way movements) when there is an overlap between demolition and construction works. When

account is taken of the existing volumes of traffic and percentage of HGVs (2018 data) on the surrounding road networks; namely Greyfriars Road, Friar Street, Station Road and Garrard Street, this additional flow would only cause a slight increase in existing flows and %HGVs, both less than 3%. Given that a 25% increase in road traffic volume is required for a 1dB increase in road traffic noise, changes of this magnitude would have **negligible** effect upon the existing ambient noise climate.

11.62. Vibration arising from construction vehicles should not be any greater than can presently arise from existing local HGV vehicle movements. As such, it is considered that construction related traffic vibration is **negligible**.

11.63. Notwithstanding the above, mitigation measures would be implemented through the Construction Environmental Management Plan, as discussed in **Chapter 6: Demolition and Construction**, to reduce levels to as low are reasonably achievable.

Interim Development Scenario

11.64. Effects from the following areas are the same for the Interim Development Scenario as for the Completed Development Scenario and are covered in the Completed Development Scenario section below :

- Fixed Mechanical Plant and Building Services;
- Servicing & Delivery;
- Non-Residential Uses ;
- Car Parking.

Road Traffic Noise

11.65. The predicted change in road traffic noise levels during the Interim Development Scenario in 2022 are less than 1dB for all links except Garrard Street where an increase of +1.3dB is predicted as a result of changes in road traffic. The effects are therefore **negligible** on all links except Garrard Street where **temporary**, **local**, **minor adverse** effects are predicted. An increase in road traffic noise levels of this magnitude is not however a cause for concern. A gradual increase in road traffic noise of this magnitude is not normally discernible. Full calculation details are within **Technical Appendix 11.4**.

Completed Development Scenario

Fixed Mechanical Plant and Building Services

11.66. Any items of fixed plant installed as part of the Proposed Development have the potential to generate noise. At this stage, details of the proposed nature, type and number of such plant are unavailable. It is appropriate therefore, to specify suitable limits to which any such plant should conform. These limits would include any corrections for acoustic characteristics.

11.67. Plant located within basements would give rise to negligible effects on nearby SRs, including future residents within the Proposed Development. This assumes that appropriate acoustic control measures are integral to the design, such as isolation of plant from the building structure, enclosure of plant, sufficient sound reduction afforded by wall / floors / doors and acoustic louvres. Roof mounted plant would have to be located sensitively with additional mitigation measures provided where required.

11.68. A plant noise emission limit has therefore been set as presented Table 11.9, based on the lowest representative measured background noise level in the 2018 baseline survey, (over a 1-hour period for the day and 15-minute period for the night), and assuming that all plant would operate continuously throughout the year. The limits have been set in based on guidance within BS4142 and what are understood to be the requirements of RBC (a 10dB reduction compared with the lowest background measured noise level).

Table 11.9: Plant Noise Emission Limit At Sensitive Receptors

Period	Lowest Measured Background Noise Level dB	Plant Noise Limit dB $L_{Ar, Tr}$
Daytime (07:00-23:00)	43 dB LA90, 1 hour	33
Night-Time (23:00-07:00)	36 dB LA90, 15 minutes	26

11.69. Should the plant noise limits presented within Table 11.9 be achieved, it is considered that the potential effects of the Proposed Development's plant and building services noise would be **negligible**. However, should plant noise limits exceed the prevailing background noise levels, there would be the potential for **permanent**, **local**, **adverse** effects of **minor** to **moderate** significance. However, it should be borne in mind that the above plant noise limits which have been set on the basis of RBCs requirements, may be hard to achieve and are considerably below that which would cause sleep disturbance should break-in occur through an open window during the night-time period or disturbance during the daytime period. On this basis there is the potential for noise levels from plant to be above the plant noise limits presented within Table 11.9 and still have negligible effects on SRs. This should be a consideration as the design develops further as already stated, the low noise limits presented within Table 11.9 may not be achievable or necessary to protect residential amenity.

Road Traffic Noise

11.70. The predicted change in operational road traffic noise levels when the Proposed Development is fully completed and operational in 2026 are less than 1dB for all links assessed, except for Greyfriars Road and Garrard Street, and is therefore **negligible**. On Greyfriars Street and Garrard Street an increase of +1.2dB and +2.6dB is predicted based which are of **permanent**, **local**, **minor adverse** significance. However, given the predicted change in road traffic noise is likely to be gradual, noise level increases of this magnitude are unlikely to be discernible. Full calculation details are within **Technical Appendix 11.4**.

Servicing and Delivery

11.71. Servicing and delivery vehicles would access the Site via dedicated access points at lower ground level from Garrard Street. Noise from service vehicles entering the access point has the potential to generate noise and should be a consideration where there are noise sensitive rooms (e.g. bedrooms and living rooms) directly above the access point. On street delivery would also occur on Greyfriars Road, Garrard Street and Friar Street. The prevailing daytime noise levels on these road links are relatively high and likely to mask noise from servicing and delivery.

11.72. The potential effects from servicing and delivery associated with Blocks E and F is predicted to be **negligible**, as illustrated in Design Note by Hoare Lea, document reference Note-1010694-2F-TH-20190201-Station Hill, Phase 1 – Plots E&F dated 1st February 2019. This in part is due to operational hours being daytime only and forecast increases in HGV movements on Garrard Street and Friar Street.

11.73. At this stage in the design process for the remaining areas, it is not possible to accurately quantify the number of delivery vehicles that may be associated with the Proposed Development as they are likely to vary in accordance with the 'end user' of the retail units located at ground floor level within the Building Plots. However, it is the intention of the Applicant to liaise with RBC during the detailed design and reserved matters stage to ensure that new and existing SRs are protected from such activities to ensure the effect of service vehicles and servicing activities is **negligible**.

Non-Residential Uses

11.74. There are a number of proposed uses associated with the completed, occupied development which may generate noise, namely:

- Retail uses (A1, A2, A3, A4 and A5);
- Leisure (D2); and
- Office (B1).

11.75. The exact nature of the retail uses is not yet known because this is dependent on occupiers being secured. However, it is assumed that consideration would be given to noise prior to occupation and operation of the above elements to ensure that the amenity of surrounding uses is protected. Noise break-out from any of the proposed buildings, which may include retail uses (bars/cafes/restaurants) and the proposed leisure use, would, however, be negligible provided adequate sound insulation is afforded by the building façade. Such insulation would be inherent in the detailed scheme design. The expectation is that insulation provided by the new construction would be more than adequate to attenuate internally generated noise to below the existing ambient noise levels in the vicinity of the Site.

11.76. Standard controls, which could be secured through planning conditions or obligations relating to opening hours and use of outside space, would also minimise the potential noise effects on sensitive receptors.

Car Park Noise

11.77. On completion of the Proposed Development, car parking would be located within a lower ground and mezzanine level for Plots E and F and within the podium for the North Site (Plots A to D and G). Similar to servicing and delivery vehicles, the car parks would be accessed via dedicated access points from Garrard Street (for Phases 1 and 2) and Greyfriars Road (for Phase 3).

11.78. As the car parks would be internal, noise from car-park usage would predominantly be screened. The main noise source would be at the point of ingress/egress and provided noise sensitive rooms (e.g. bedrooms and living rooms) are not located directly above the access point, it is considered this would give rise to negligible effects. With regard to Plots E and F where residential use is above the point of ingress/egress to the car park, this would be effectively addressed within the acoustic design of these apartments by the acoustic design consultant. This would be secured by means of suitable planning conditions and therefore the effects are assumed to be negligible.

Mitigation Measures and Likely Residual Effects

Demolition and Construction

11.79. As detailed in **Chapter 6: Demolition and Construction**, a Construction Environmental Management Plan (CEMP) would be formulated in consultation with RBC, incorporating relevant legislation and other relevant guidance. The CEMP would set out a range of mitigation measures and environmental controls which would include the management of demolition and construction

related noise and vibration. The Site would also be registered for the Considerate Constructors Scheme. Control measures to minimise noise would include:

- Use of hoarding to the required height and density appropriate to the noise sensitivity of the Site;
- Use of modern, quiet and well maintained machinery such as electric powered plant, where possible and hoists should use the Variable Frequency Converter drive system;
- Vehicles and mechanical plant used for the works would be fitted with exhaust silencers, which would be maintained in good and efficient working order and operated in such a manner as to minimise noise emissions in accordance with the relevant EU / UK noise limits applicable to that equipment or no noisier than would be expected based the noise levels quoted in BS 5228. Plant should be properly maintained and operated in accordance with manufacturers' recommendations. Electrically powered plant would be preferred, where practicable, to mechanically powered alternatives;
- Where required, monitoring of noise and vibration levels;
- Changing, where possible, methods and processes to keep noise and vibration levels low, (use of pressed in sheet piling rather than driven);
- Positioning plant as far away from residential property as physically possible;
- Limiting works to the specified hours (refer to **Chapter 6: Demolition and Construction**) which would be subject to agreement with RBC. Hours worked on noisy operations would be limited;
- Avoidance of HGV deliveries during rush hour, routing of HGV traffic to minimise adverse effects on the local road network and phasing of deliveries over the course of the working day ('just-in time basis'); and
- Liaison with the occupants of adjacent properties most likely to be affected by noise or vibration from activities on the Site. The occupants should be informed of the nature of the works, proposed hours of work and anticipated duration prior to the commencement of activities.

11.80. With regards to traffic management during the demolition and construction works, as detailed in **Chapter 6: Demolition and Construction**, all traffic logistics would be agreed between RBC, the contractors and the Applicant through a Demolition Management Statement and Construction Management Statement.

Demolition and Construction Noise

11.81. Accounting for the implementation of mitigation, as set out above, which should afford a 10dB(A) reduction, the likely residual noise levels associated with the demolition and construction works are presented in Table 11.10 with significance of residual effects provided. All effects would be **localised short-term** and **temporary** in nature.

11.82. As discussed earlier in this Chapter, where receptors are within 15 metres of demolition works then 'quieter' deconstruction methods should be adopted. This would be specified within the CEMP secured by means of a planning condition. Even with the deconstructive approach, the assumption is that further mitigation could be applied to reduce noise further from this type of works.

11.83. With mitigation, residual effects are predicted to reduce. The significance of effects would range from **negligible** to **temporary**, **local**, **adverse** effects of up to **moderate** significance, on the assumption that where traditional demolition methods would result in major adverse effects, deconstructive demolition techniques would be used. It should be borne in mind that the assessment is worst case based on when works are being undertaken at the shortest distance to the receptors.

Table 11.10: Demolition & Construction Noise Assessment (Mitigated)

SR Ref (Threshold Level)	Demolition	Earthworks	CFA Piling	Sheet Piling (Driven)	Concreting	Pavement	Deconstructive Demolition
A (65)	72 Moderate	64 Negligible	66 Negligible	70 Moderate	64 Negligible	62 Negligible	64 Negligible
B (75)	80 Moderate	72 Negligible	74 Negligible	78 Minor	72 Negligible	70 Negligible	72 Negligible
C (75)	79 Minor	71 Negligible	72 Negligible	77 Minor	70 Negligible	68 Negligible	71 Negligible
D (65)	71 Moderate	63 Negligible	64 Negligible	69 Minor	62 Negligible	60 Negligible	63 Negligible
E (65)	65 Negligible	58 Negligible	59 Negligible	64 Negligible	57 Negligible	55 Negligible	58 Negligible
F (70)	65 Negligible	57 Negligible	58 Negligible	63 Negligible	56 Negligible	54 Negligible	57 Negligible
G (75)	79 Minor	71 Negligible	72 Negligible	67 Negligible	70 Negligible	68 Negligible	71 Negligible
H (70)	82 Major [1]	74 Minor	75 Moderate	80 Moderate	73 Minor	71 Negligible	74 Minor
I (70)	76 Moderate	68 Negligible	69 Negligible	74 Minor	67 Negligible	65 Negligible	68 Negligible
J (70)	78 Moderate	71 Negligible	72 Negligible	76 Moderate	70 Negligible	68 Negligible	70 Negligible
K (70)	68 Negligible	60 Negligible	61 Negligible	66 Moderate	59 Negligible	57 Negligible	60 Negligible
L (70)	82 Major [1]	74 Minor	75 Moderate	80 Moderate	73 Minor	71 Negligible	74 Minor

[1] Deconstruction demolition method to be used when works conducted at shortest distance to receptor.

Demolition and Construction Vibration

11.84. With the implementation of the vibration related mitigation measures as detailed above, human perception residual effects are likely to be predominantly **negligible** and at worst, **temporary**, **local, intermittent adverse** effects of **minor significance.** The residual effect on existing buildings would remain as per the likely effects, that is **negligible**.

Demolition and Construction Traffic

11.85. As described in the likely effects section, the effects of demolition and construction traffic are considered likely to be **negligible**. However, implementation of a management plan would control demolition and construction traffic routing and demonstrate the Applicant's commitment to the management of demolition and construction traffic.

Interim Development Scenario

11.86. As the mitigation measures and residual effects of the Interim Development Scenario and Completed Development Scenario are the same, these have been reported together below.

Interim and Completed Development Scenario

Fixed Mechanical Plant and Building Services

11.87. Mitigation for building services and fixed plant would be determined at the detailed design stage and secured by means of a suitably worded condition. However, mitigation may include the following measures:

- Procurement of 'quiet' non-tonal plant;
- Locating plant and air vents away from SRs;
- Provision of acoustic enclosures;
- Provision of in-duct attenuators;
- Provision of acoustic louvres; and
- Isolation of plant from building structures.

11.88. The incorporation of appropriate attenuation, to achieve agreed plant noise limits would result in **negligible** residual effects.

Road Traffic Noise

11.89. Given that the predicted change in operational road traffic noise levels when the Proposed Development is fully completed and operational in 2026 are less than 1dB for all links assessed, except Greyfriars Road (+1.2dB) and Garrard Street (+2.6) where slight increases in road traffic noise levels are predicted, mitigation is not proposed, and residual effects are **negligible** to **permanent**, **local adverse effect** of **minor significance**. This Interim Development Scenario is comparable but only with **temporary**, **local adverse effect** of **minor significance** on Garrard Street (+1.3dB) with **negligible** on all other links. However, a gradual increase in noise level of this magnitude is unlikely to be discernible.

Servicing and Delivery

11.90. Required mitigation measures would be developed at detailed design and reserved matters stage to safeguard residential amenity. A requirement for such mitigation would be secured by means of a suitably worded planning condition. Regarding Plots E, F and G, servicing areas are effectively screened due to their location at lower ground or within the podium. Daytime on-street deliveries on Greyfriars Road, Garrard Street and Friar Street should be acceptable based on the relatively high prevailing noise levels from road traffic noise. On this basis residual effects resultant from servicing and delivery would be **negligible**.

Proposed Uses

11.91. Negligible effects have been predicted from proposed uses on the basis that adequate noise attenuation measures would be inherent in the building design. On this basis no further mitigation measures are required, and residual effects are **negligible**.

Car Parks

11.92. Negligible effects have been predicted due to the location of car parks (internal at lower ground, mezzanine and podium) and on the basis that, where sensitive locations are above ingress/egress locations, potential adverse noise effects would be controlled to acceptable levels through design. This would be secured by means of a suitably worded planning condition. Residual effects from car parks are considered to be **negligible**.

Summary

11.93. An assessment of the effects of the demolition and construction works, together with the Completed Development, was undertaken. The potential effects, mitigation measures and resulting residual effects (accounting for mitigation) are summarised in Table 11.11.

Table 11.11: Summary of Noise and Vibration Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Demolition & Construction All Scenarios			
Noise	**Negligible to temporary, local and of major adverse significance**	CEMP	**Negligible to temporary, local and of moderate adverse significance**
Vibration	**Negligible to temporary, local and of moderate adverse significance**	CEMP including CFA and pressed in sheet piling where works are undertaken within 15m of SRs.	**Negligible**
Traffic	**Negligible**	Demolition Management Statement and Construction Management Statement	**Negligible**
Interim Development Scenario Effects from fixed external plant and building services, servicing and delivery, non residential uses and car parking are the same as the Completed Development and therefore are not presented separately.			
Road traffic noise	**Negligible** on all links except Garrard Street where effects of **temporary, local and minor adverse significance** are predicted.	None required	**Negligible** on all links except Garrard Street where **temporary, local and minor adverse significance**.
Completed Development			
Fixed external plant and building services	**Negligible**	Plant noise limit secured through planning condition.	**Negligible**
Road traffic noise	**Negligible** on all links except Greyfriars Road and Garrard Street where **permanent, local and minor adverse significance**.	None required	**Negligible** on all links except Greyfriars Road and Garrard Street where **permanent, local and minor adverse significance**.
Servicing and delivery	**Negligible**	Building envelope and management plan.	**Negligible**
Non-residential uses	**Negligible** (on the assumption that planning controls are in place))	Building envelope, operational hours and management plan.	**Negligible**
Car parks	**Negligible**	Building envelope.	**Negligible**

Comparison of Effects between this ES and the 2015 ES

11.94. The effects presented in Table 11.11 are comparable to those identified in the 2015 ES except that negligible to minor beneficial effects (Station Hill only) were identified for road traffic noise in the 2015 ES. The changes are as a result of changes in the forecast traffic data. The other effects remain unchanged – in many cases, this is because they would be controlled through planning conditions which results in the same residual effects.

References

1 British Standard (BS) (2014) 5228:1 +A1 2014: Code of practice for noise and vibration control on construction and open sites, Part one: Noise, BSI, Great Britain

2 British Standard (BS) (2019) 5228:2 Code of practice for noise and vibration control on construction and open sites, Part Two: Vibration, BSI, Great Britain.

3 DoT (1988) Calculation of Road Traffic Noise, HMSO

4 British Standard (BS) (2014) BS414 'Methods for rating and assessing industrial and commercial sound. BSI. Great Britain.

5 DoT (1988) Calculation of Road Traffic Noise, HMSO

6 Highways Agency (2011) Design Manual for Road and Bridges, Volume 11 Environmental Assessment, Section 3, Environmental Assessment Techniques, Part 7 Noise and Vibration, The Stationery Office.

12. Ground Conditions and Contamination

Introduction

12.102. This chapter, prepared by Waterman Infrastructure & Environment Limited (Waterman), presents an assessment of the effects of the Proposed Development upon and from ground conditions. In particular, consideration is given in the assessment to likely significant effects of ground contamination on human health and the quality of surface and groundwaters.

12.103. This chapter provides a description of the methods used in the assessment. This is followed by a description of the relevant baseline conditions of the Site and surrounding area, together with an assessment of the likely potential effects of the Proposed Development during the Site preparation and construction works and once the Proposed Development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

12.104. The chapter is accompanied by the following Technical Appendices, provided in **ES Volume 3**:

- **Technical Appendix 12.1:** Station Hill, Geotechnical and Geo-environmental Desk Study (Ref. 1620004761-SHR-RAM-GE-001-Desk Study);
- **Technical Appendix 12.2**: Ramboll, Station Hill, Reading. Ground Investigation Report. April 2019. Ref. SHR-RAM-SB-XX-RP-G-000016;
- **Technical Appendix 12.3**: Ramboll Station Hill North Site, Reading Ground Investigation Report. December 2019. Ref. SHR-RAM-NB-XX-RP-G-000022.

Assessment Methodology and Significance Criteria

Assessment Methodology

Baseline Data Collection

12.4 The baseline conditions of the Site, in respect of the potential for contamination, were established through a review of the reports included as Technical Appendices and the Waterman, Station Hill, Reading Geo-Environmental Assessment, dated September 2014, Ref. EED12350-110-R-3.1.2-RM[1].

Assessment Approach

12.5 The assessment presented in this chapter was undertaken in accordance with current best practice guidance on the assessment of contaminated land, and the DEFRA Contaminated Land Report (CLR), CLR 11 'Model Procedures for the Management of Contaminated Land'[2] and the emerging Land Contamination: Risk Management. CLR11 advocates the use of a tiered approach to the assessment of contaminated land, whereby outline conceptual models are formulated at the desk study stage, which are refined through successive phases of site investigation, risk assessment and where appropriate remediation.

12.6 A Desk Study was carried out for the Site in 2018 by Ramboll. This study included a site walkover, review of historical maps and plans, review of borehole records from the BGS and a review of previous reports for the Site. This information was used to develop a preliminary contaminated land conceptual model for the Site. For the purposes of ground conditions assessment, the 'risk' presented by the Site is determined using a source-pathway-receptor model, in line with the

Contaminated Land (England) (Amended) Regulations 2012[3]. The Contaminated Land (England) (Amended) Regulations 2012 describe a risk assessment methodology in terms of 'significant pollutants' and 'significant pollutant linkages' within a 'source-pathway-receptor' conceptual model. The model comprises:

- The principal pollutant hazards (sources) associated with a site;
- The principal receptor(s) at risk from the identified hazards (for example, people, environmental assets, surface water and/or groundwater); and,
- The existence, or absence, of plausible pathways which may exist between the identified hazards and receptor(s).

12.7 For land to be determined as 'contaminated' in a regulatory sense, and therefore requiring remediation (or a change to less sensitive use), all three elements (source-pathway-receptor) of a significant pollutant linkage must be present. The legislation places a responsibility on the Local Planning Authority (LPA) to determine whether the land in its area is in such a condition, by reason of substances in, on or under the land that:

- *"significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused".*

12.8 A number of site investigations have been carried out at the Site by Waterman in 2014 and Ramboll in 2018 and 2019. The Waterman investigation was limited to the northern part of the Site, between Garrard Street and Station Hill and included 5No. shell and auger boreholes to a maximum depth of 25m below ground level (bgl), one continuous flight auger borehole to 12m bgl, 22No. window sample boreholes to a maximum depth of 5.45m bgl, and 7No trial pits up to 4.2m bgl.

12.9 The Ramboll ground investigation was undertaken in two phases, the first completed in 2018 and comprised 3No. shell and auger boreholes to a maximum depth of 25.50m bgl and 17No. dynamic sampling boreholes to a maximum depth of 6.45m bgl. The second phase of the Ramboll ground investigation completed in 2019 and comprised 5No cable percussive boreholes with rotary follow-on coring to a maximum depth of 40.50m bgl, 5No. window sample probeholes to a maximum depth of 6.45m bgl and 7No. trial pits.

Approach to Outline Assessment

12.10 The assessment of the Proposed Development was based on the ‘maximum extent’ of landscape areas, maximum depth and extent of excavation, and maximum foundation depths. As such, it is considered that the assessment represents the ‘worst case’. Owing to the small differences between the maximum and minimum parameters for building footprints, it is considered that there would be no material change in the predicted effects between the maximum and minimum parameters of the Development.

Approach to Future Baseline

12.11 It is assumed that the construction works associated with the future baseline scheme would be carried out in accordance with legislation and best practice and therefore the potential for contamination of the ground or groundwater at the Site is low. The future baseline scheme is for residential uses and therefore has limited potentially contaminative uses associated with it. It is assumed that potential contamination sources, such as fuel for backup generators, would be appropriately stored in accordance with current legislation and therefore the potential for them to result in a contamination of the ground or groundwater at the Site is low. It is therefore considered

that the 'future baseline' conditions would remain consistent with those of the current baseline conditions on the Site and therefore the future baseline schemes have not been considered further within this chapter.

Significance Criteria

12.12 The significance of the environmental effect that could result from a contamination risk is considered to be dependent on the value of the resource, the sensitivity of the receptor and the ways in which the Proposed Development could provide a contamination pathway to the receptor. The significance of the effect is also governed by the timescales involved and the extent of the area affected. The significance criteria used in this assessment are set out in Table 12.1.

Table 12.1 Significance Criteria for Ground Conditions Assessment

Significance Criteria	Description
Major adverse	High risk site classification – acute or severe chronic effects to human health and/or animal/plant populations predicted. Effect on a *potable groundwater* or surface water resource of regional importance e.g. principal aquifer, public water reservoir or inner protection zone of a public water supply borehole.
Moderate adverse	Medium risk site classification and proven (or likely significant) pollutant linkages with human health and/or animal/plant populations, with harm from long-term exposure. Effect on a potable groundwater or surface water resource at a local level e.g. effect on an outer groundwater source protection zone. Temporary alteration to the regional hydrological or hydrogeological regime or permanent alteration to the local regime.
Minor adverse	Medium risk site classification and potential pollutant linkages with human health and/or animal/plant populations identified. Reversible, localised reduction in the quality of groundwater or surface water resources used for commercial or industrial abstractions, minor aquifer, etc.
Negligible	Low risk site classification – No appreciable effect on human, animal or plant health, potable groundwater or surface water resources.
Minor beneficial	Risks to human, animal or plant health are reduced. Local scale improvement to the quality of groundwater or surface water resources used for commercial or industrial abstraction.
Moderate beneficial	Significant reduction in risks to human, animal or plant health, to acceptable levels. Significant local improvement to the quality of potable groundwater or surface water resources. Significant improvement to the quality of groundwater or surface water resources used for public water supply.
Major beneficial	Major reduction in risks to human, animal or plant health. Significant regional scale improvement to the quality of potable groundwater or surface water resources.

Consultations

12.13 A Scoping Report was prepared by Waterman IE in May 2019 and submitted to RBC, together with a request for a formal Scoping Opinion. A Scoping Opinion was received in July 2019; there were no additional comments in relation to ground conditions. In preparing their Scoping Opinion, RBC consulted the EA. The EA confirmed that the proposed scope of the Ground Conditions and Contamination Chapter was satisfactory.

12.14 Waterman EED (now Waterman IE) also consulted the planning and contaminated land departments of Reading Borough Council (RBC) in support of the Preliminary Environmental Risk Assessment, which was prepared in February 2013.

Limitations and Assumptions

12.15 The Ramboll ground investigation was completed whilst the existing buildings remain on the Site, constraining access to areas of the Site.

12.16 As stated in **Chapter 2: EIA Methodology**, the assessment of demolition and construction effects is based upon the indicative demolition and construction timetable, phasing and methodologies as provided by the project team and agreed by the Applicant (refer to **Chapter 6: Demolition and Construction**).

Baseline Conditions

Site Walkover Observations

12.17 As described in **Chapter 3: Land Uses and Sensitive Receptors**, the existing Site occupies an area of approximately 2.56 hectares. Garrard Street and Station Hill fall in a westerly direction from 44.0m AOD to 38.4m AOD and from 43.5m AOD to 39.3m AOD, respectively. Levels in the south of the Site rise from 38.4m AOD at Garrard Street to 45.8m AOD along Friar Street.

12.18 The Site comprises a variety of land uses and approximately 70% of the area is covered by built form, roads or areas of hard standing. Land uses within the Site broadly comprise:

- A temporary events space in the north western part of the Site. This area was constructed following the demolition of the Western Tower and associated retail parade;
- A vacant gravelled plot of land behind construction hoardings. This is located in the central part of the North Site and was formerly occupied by the bus station and bingo hall. A large stockpile of crushed building materials is located in this plot;
- Xafinity House, a six storey office block located in the north east of the Site;
- An NCP Car Park, located to the south of the Temporary Events Space; and
- Friars Walk Shopping Centre and Telcom House located to the south of Garrard Street. Friars Walk Shopping Centre comprises vacant retail and office space and Telecom House comprises a five storey vacant office. Both Friars Walk Shopping Centre and Telecom House are currently being demolished.

Geology and Ground Conditions

Geology

12.19 The BGS Geological Map for Reading shows that the Site is underlain by Made Ground overlying Alluvium, over Taplow Gravel Formation and the Seaford Chalk Formation. The exploratory holes from the intrusive investigations undertaken within the North Site revealed that this area of the Site is underlain by up to 5.0m of Made Ground over up to 2.8m of alluvium. Sands and gravels of the Taplow Gravel Formation up to 5.7m in thickness were encountered underlying the alluvium. The Upper Chalk bedrock was encountered at depths from 3.60m bgl to 9.50m bgl.

12.20 The ground conditions at the South Site differ from those of the North Site, with Seaford Chalk recorded at shallower depths of between 1.0m and 2.70m bgl. Made Ground was recorded between 0.35m and 1.85m bgl. A limited thickness of Clay was recorded in three locations between 1.20

and 2.65m bgl. Sands and Gravels of the Taplow Formation were not consistently recorded across the Site, but where present were typically recorded between 0.50m and 2.70m bgl.

12.21 A summary of the Site's geology is provided in Table 12.2:

Table 12.2: Site Geology

Stratum	Area Covered	Depth (m bgl)	Thickness (m)	Typical Description
Made Ground	Whole Site	0 – 1.80	Up to 6.0	Made Ground including reinforced concrete slab, tarmac over concrete, concrete paving slab, or topsoil, blacktop, cemented sand, sub-base, sandy clayey gravel, sandy / gravelly / silty clay with either brick cobbles, flint gravel, concrete cobbles, ashy material, occasional organic material, slate, rare metal, charcoal, porcelain, clay pipe, or weathered chalk fragments.
Alluvium	Discontinuous across the Site	1.50 - 6.60	0.60 to 2.80	Soft to stiff, low to medium strength orange brown mottled greenish grey to black organic silty or sandy gravelly CLAY. Gravel is fine to medium of subrounded flint.
Taplow Gravel Formation	Discontinuous across the Site	3.00– 8.00	1.40 to 5.70	Medium dense becoming loose, yellowish brown gravelly sometimes clayey or silty fine to coarse SAND. Medium dense fine to coarse sandy GRAVEL. Medium dense orange brown to dark grey fine to coarse SAND and GRAVEL. Gravel is fine to coarse subrounded flint and fine to medium rounded quartz.
Upper Chalk	Whole Site	1.00 – 9.50	Unproven	Recovered as fine to coarse, very weak to moderately strong density subangular CHALK gravel with abundant coarse to cobble sized flint gravel.

Hydrology and Hydrogeology

Surface Water

12.22 There are no surface water sources or bodies on the Site. The River Thames, at its closest point, flows about 420m north-east of the Site in an easterly direction. The River Kennet is located approximately 500m south-east of the Site and also flows in an easterly direction.

12.23 The Environment Agency has classified both the River Thames and River Kennet surface water bodies in accordance with the General Quality Assessment (GQA) scheme as River Quality B.

12.24 The Envirocheck Report (refer to **Appendix B of Technical Appendix 12.1**) identifies that there are three surface water abstractions within 1km of the Site. The permits are held by The Oracle Shopping Centre and RBC, the nearest of which is located 483m south of the Site at the St Giles Street at Oracle Shopping Centre and is understood to be utilised to support lake and pond through flow within the shopping centre. The other surface water abstraction licences are registered to RBC and involve the abstraction of surface water for non-remedial river / wetland support approximately 660m north of the Site.

Groundwater

12.25 According to the EA Groundwater Vulnerability Map, Sheet 39 (West London) the Alluvium and Taplow Gravel Formation are classed as a Secondary A Aquifer and the Seaford Chalk Formation is a Principal Aquifer. An assessment of the hydrogeological properties of main geological units underlying the Site is shown in Table 12.3.

Table 12.3: Summary of Hydrogeological Properties of the Main Geological Strata

Stratum	Environment Agency Classification	Hydrogeological significance
Made Ground	Not classified	May contain small quantities of perched water.
Alluvium	Secondary A Aquifer	Small quantities of water of importance for baseflow to Rivers and local abstraction.
Taplow Gravel Formation	Secondary A Aquifer	Small quantities of water of importance for baseflow to Rivers and local abstraction.
Seaford Chalk Formation	Principal Aquifer	Highly permeable strata, contains large quantities of groundwater for abstraction.

12.26 The Environment Agency online database[4] indicates that the Site is not located within a Groundwater Source Protection Zone (SPZ). However, the Envirocheck Report (refer to **Appendix B in Technical Appendix 12.1**) identifies that there are 12 groundwater abstractions recorded within 1km of the Site. The closest is located 0.16km to the south-west of the Site and relates to an abstraction from a single point licensed to Primark Stores that utilises the water for drinking, cooking, sanitary and washing (small garden) purposes. The abstraction stratum is not specified.

Potential Contamination Sources

Historical Land Uses

12.27 A review of historical maps since 1802 obtained from the Envirocheck Report (refer to **Appendix B in Technical Appendix 12.1**) has been undertaken in order to identify the presence of former potentially contaminative land uses at or near to the Site. This has assisted in determining the potential for ground contamination at the Site. Further details of the Site's early historical development are provided within **Chapter 9: Historic Environment**.

12.28 Table 12.4 summarises the historical land uses. Potential sources of contamination are indicated in bold.

Table 12.4: Summary of Historical Land Uses

Source	Site	Surroundings
OS Map		
1802	Gardens and undeveloped land with drainage ditch.	Residential buildings on Friar Street to the south and open fields to the north.
1879 1899	By 1879, the south west corner and southern boundary of the Site were occupied by terraced houses, with some larger houses and a ***timber yard*** located along the western boundary. A few	The Great Western ***railway***, situated approximately 60m north, ran parallel to the Site's northern boundary. A ***gasworks*** company was located approximately 100m south east and east of the Site and was no

Source	Site	Surroundings
	additional houses were also situated on the east side and to the south of the Site. Livery stables were noted to be present in the north east corner of the Site. A ***malt house*** and a ***coal yard*** were located in the central portion, with the remainder of the Site consisting of open fields and an area of woodland. A ***veterinary infirmary*** and ***stables*** are present in the south west of the Site. The 1899 Ordnance Survey map indicates the presence of an irregular oval feature in the centre of the Site.	longer operational by 1879. By 1879 the Royal Horse and Carriageway Depository was constructed approximately 60m south east of the Site. To the west of the Site, a ***cattle market*** is shown. A ***rifle factory*** was located approximately 12m north west. A ***timber yard*** is present approximately 20m to the west. Two ***coal yards*** are located approximately 80m to the northwest and 20m to the south west. Roughly 60m to the east of the Site, near to the station, a ***railway terminus*** had been erected. A ***brewery*** is marked approximately 80m west. Garrard Street was constructed by 1879. 1899 maps indicate a ***public house*** approximately 50m to the west. In addition, a further ***timber yard*** had been established approximately 170m to the north west.
1912 1931	The oval feature is no longer present by 1912. Additional buildings are located towards the centre of the Site. In 1931 a large building had been established in the centre of the Site. A separate building of unknown use was constructed in the east of the Site.	Further residential units, commercial facilities and trade units were constructed around the Site. Ordnance Survey maps indicate that by 1912 an ***iron works*** and ***iron foundry*** had been established approximately 280m northeast of the Site. The 1931 historical map indicates that a ***timber yard*** was operational on the site of the former iron works. A ***paint works*** is situated adjacent the timber yard. A ***smithy*** is located adjacent to the south eastern boundary.
1957 -1961 1962 -1972 1968 -1984 1980 -1988 1979 -1989 1986 -1991 1993 1994	In 1957 a ***factory*** is shown in the north west corner of the Site. The large building in the central part of the Site is shown to be a ***garage***. A ***smithy*** is present in the area of the former Veterinary Infirmary in the southwest. Two depositories are also marked in the south which had turned into warehouses by the early 1960s. By the early 1960s the central, unused area of the Site was made into a ***car park***.	By 1957 a ***garage*** resided on the site of the former paint works to the north east. ***Garages*** are also situated approximately 170m, 210m and 230m south west and 50m south east of the Site. ***Warehouse*** complexes had established approximately 20m and 100m north west of the Site. An ***engineering works*** was situated 115m north west. An extensive ***works*** site is marked roughly 150m north, whilst a smaller ***works*** unit was located approximately 220m east.
1957 -1961 1962 -1972 1968 -1984 1980 -1988 1979 -1989 1986 -1991 1993 1994 (Cont.)	By the late 1960s a ballroom had been constructed on the western portion of the car park along with a ***bus station***. A ***coal yard*** was present to the south of the Site. The Western Tower and its adjoining office block had been built along the northern boundary of the Site and a ***tank*** was located in the centre. The numerous structures in the southwest of the Site are now denoted as one large structure of unknown use, denoted as government offices by 1974. The garage, houses and factory were eventually demolished sometime before 1980 to make way for a multi-storey car park in the centre, an office building in the west and Friar's Walk Shopping	An ***engineering works*** occupied the site of the aforementioned ***paint works*** and a ***railway works*** occupied a portion of the extensive works site to the north. By the late 1960s a ***builders yard*** had established approximately 60m west and by 1984 ***electrical substations*** were evident 75m east, 25m south east, 50m southwest and 5m west.

Source	Site	Surroundings
	Centre in the south of the Site, including a roof top ***car park***. By 1986, the former ballroom was marked as a club.	
1996, 2011	No changes to the Site were noted.	
2018	The ballroom, bus station and shopping arcade in the north of the Site have been demolished.	No significant changes.

Recorded Contamination Events

12.29 Since 2001 there have been pollution incidents within the vicinity (up to 500m) of the Site, but none within the Site. These include:

- An entry into the Substantiated Pollution Incident Register located 467m to the southeast of the Site. This comprised the release of oils to water on 22 April 2006 and is considered a Category 2 (significant) effect. However, the entry records that there was no effect to the land or air environment; and
- 48 pollution incidents to controlled waters. The closest to the Site, located 12m to the north, occurred in 1993 and was associated with the release of unknown oils. The receiving water was not stated. The incident was classed as category 3 (minor).

Current Land Uses

12.30 As identified earlier within this Chapter, there are a number of potentially contaminative uses operating at the Site, principally relating to car parking, electricity substations, building fabrics, tanks and associated fuel lines.

12.31 The gravelled plot within the centre of the Site (formerly comprising the bus station and bingo hall), although vacant contains a large stockpile of site won (assumed) crushed building materials, which could pose a risk at the Site.

12.32 There are two records of historical landfill sites located within 1km of the Site. These entries relate to Richfield Avenue and Cow Lane located approximately 730m to the northwest and 970m to the west of the Site, respectively.

12.33 The Site does not lie in an area where radon protection measures would be required. There are also no radioactive substance authorisations to keep, use and dispose of radioactive materials within 1km of the Site.

12.34 No Environmental Permits are operated within 1km of the Site.

Type of Potential Ground Contamination

12.35 The information obtained through the desk-based study of the Site regarding the type and quantity of ground contamination, and potentially contaminative activities (historical and existing) are summarised in Table 12.5.

Table 12.5: Summary of Potential Sources of Contamination

Type of Contamination	Comment
Soil Contamination.	Made Ground, localised spillages in car parking, tanks and electrical substation areas, contamination associated with nearby railway tracks and Station.
Shallow Groundwater Contamination.	Contaminants present in Made Ground, leakages from drainage pipes and sewerage network.

12.36 Table 12.5 indicates that local hotspots of soil contamination are likely to exist within the Site. The ground investigation results and chemical analysis of soil samples collected as part of the intrusive Site Investigations (SI) undertaken to date, indicate hotspots of contamination are present at the Site. Exceedances identified within the soil samples included arsenic, lead, benzo(a)pyrene, benzo(b)fluoranthene, Di-benz(a.h)anthracene, indeno(1,2,3-cd)pyrene and total petroleum hydrocarbons (TPH) at concentrations exceeding the generic assessment criteria.

12.37 Groundwater samples collected as part of the SI recorded exceedances of TPH, Polyaromatic hydrocarbons (PAH) and tetrachloroethylene (PCE) together with sulphate and nickel. Widespread elevated VOC vapours were recorded on one groundwater monitoring round. The TPH, PAH and PCE are believed to be associated with the hydrocarbons recorded in the soils at this location and the location of a former garage.

12.38 Asbestos was identified within a number of samples as either loose fibres, asbestos insulating board or loose fibrous debris. Following quantification, it was determined that the percentages ranged between 0.001% and 0.024%.

12.39 Further detail regarding potential contamination sources is provided in **Technical Appendices 12.4 and 12.5**.

Conceptual Risk Assessment Model

12.40 The following section describes the current contamination risk posed to identified receptors on, or within the vicinity of the Site. On this basis, a framework is also set out to subsequently assess the contamination risks (and likely significant effects) of the Proposed Development, and to inform an appropriate mitigation strategy as necessary.

Current Site Occupiers and Users

12.41 The majority of the Site is covered with buildings, structures and hardstanding, with the exception of the vacant plots where the former Bingo Hall and Bus Station were located. As such, potential contamination within the Site soils is contained beneath hardstanding. However, the gravelled vacant areas and a number of existing potentially contaminative land uses on the Site together with a small area of landscaping present, as a worst case, a low to medium risk to current occupiers and users.

Water Resources and Drainage

12.42 The majority of the Site is covered in hardstanding, with the exception of the vacant gravelled plots, as previously described. However, the River Thames is located approximately 420m north of the Site, and the River Kennet approximately 500m southeast of the Site. Due to the large distance of these water courses from the Site there is a low risk of potential contaminants present beneath the Site migrating laterally through groundwater to the Rivers.

12.43 Given the potential age of parts of the existing drainage network and sewerage system, leaks could be expected. As a result, there is likely to be a low to medium risk associated with leaks from the drainage network into the underlying soils and groundwater at the Site.

12.44 The geology beneath the Site comprises Alluvium and the Taplow Gravel Formation (classed as Secondary A Aquifers) overlying the Seaford Chalk Formation (classed as Principal Aquifer). Vertical migration of potential contaminants is therefore considered possible. However, the presence of hardstanding offers some protection to the underlying aquifers. Based on the recorded soil contamination there is considered to be a low to medium risk for the contamination of groundwater.

Flora and Fauna

12.45 As noted previously, buildings and hard-standing cover the majority of the Site, with gravelled surfaces in the remaining areas. As the Site is largely hardstanding, it would help to form a barrier between contaminants in the soil and fauna. Flora identified at the Site in areas of soft landscaping appear unaffected by potential contamination in the underlying soils. On this basis and given the limited value of the Site to wildlife, the potential contamination risk to wildlife is considered to be low.

Buildings and Other Structures

12.46 Existing contamination beneath the Site has the potential to affect below ground infrastructure through chemical attack, particularly in the case of buried water pipes. However, given the age of the structures present and the significant areas of hardstanding with no evidence of subsidence or other disturbance it is considered unlikely that significant damage has been made to existing structures. Given that the existing structures remain in place and that no reports of drinking water contamination have been recorded, there is considered to be a low risk to buildings and other structures at the Site.

Summary of the Conceptual Risk Assessment Model

12.47 Overall, widespread significantly elevated concentrations of contaminants are not expected to be present on the Site. However, some hotspots of contamination are present as a result of historic activities including a number of hydrocarbon hotspots, asbestos fibres in the Made Ground soils and groundwater contamination to the centre of the Site, together with the presence of the large stockpile of site won crushed building materials.

12.48 On the basis of the above, the results of the Site Investigation, and taking a worst-case precautionary approach with regard to the area of the Site where buildings remain, it is considered that the Site currently poses a **low to medium** risk with respect to ground contamination and contaminative liabilities, as defined under Part IIA of the Environmental Protection Act, 1990.

Likely Significant Effects

Demolition and Construction

Disposal of Demolition and Construction Waste

12.49 Material will be generated as a result of the demolition of the remaining buildings on the Site, and as part of construction processes such as excavation of basements, foundations, services and potentially removal of contaminated soil hotspots. Excess material would be taken to an off-site waste management facility for re-use or disposal. All material to be excavated and removed off the

Site would be subject to waste classification sampling and analysis and necessary treatment would be undertaken, in accordance with the requirements of the Hazardous Waste Regulations[5] and the List of Wastes Regulations[6]. The receiving waste management site would be appropriately licensed and, assuming that legislative requirements are adhered to, the re-use or disposal of this material would result in a **negligible** effect in relation to contamination.

12.50 Should re-use of the material not be possible, the disposal of this material would result in a **permanent local minor adverse effect**.

Construction Workers and Public

12.51 In the absence of appropriate mitigation and the use of Personal Protective Equipment (PPE), contamination present in the soil and ground gas represents a potential risk to construction workers. However, worker safety is the subject of the mandatory requirements of the Control of Substances Hazardous to Health (COSHH) Regulations 2002[7] and associated Health and Safety Executive publications[8] and the Construction (Design and Management) Regulations 2015 (CDM)[9]. These regulations set out the extensive requirements for the protection of the workforce and stress the importance of appropriate procedures in the event of the workforce encountering pockets of unknown contamination. Precautions would include, where deemed appropriate:

- Personal Protective Equipment (PPE), including use of disposable overalls, gloves, respiratory personal protection and particulate filter masks;
- Adopting dust suppression methods, e.g. water spraying, wheel-washing facility for vehicles leaving the Site; and
- Regularly cleaning all on Site roads, access roads and the public highway.

12.52 Asbestos fibres were recorded in the Site soils at a number of locations with concentrations ranging from <0.001% to 0.024% with free fibrous, insulating board to fibrous debris recorded. An appropriate Plan of Work, Method Statements and Risk Assessments should be prepared by the groundworks contractor in accordance with the Control of Asbestos at Work Regulations, 2015 and the Control of Asbestos Regulations 2012: Interpretation for Managing and Working with Asbestos in Soil and Construction & Demolition materials: Industry Guidance (CAR:SOIL), procedures to ensure protection during earthworks and construction.

12.53 In addition to the above, an Asbestos Discovery Plan should also be prepared by the groundworks contractor, should further asbestos containing materials be encountered during the earthworks.

12.54 Adherence to the legislative requirements described above would significantly reduce the health and safety risk posed to construction site workers by minimising the risk of direct and/or indirect inhalation, ingestion or contact with contaminated soil, dust, groundwater or contaminated surface water run-off.

12.55 The potential contamination risks and effects of the demolition and construction works on site workers would therefore be **negligible**.

12.56 In respect of public safety, as indicated within **Chapter 6: Development Programme, Demolition and Construction**, the Site would be surrounded by hoarding and secured. The risk to individual members of the public during all demolition and construction works would therefore be **negligible**.

Soils and Groundwater – Removal of Potential Sources of Contamination

12.57 Below ground structures and tanks, together with hotspots of contamination, would be removed prior to piling, removing a potential source of contamination. This is considered to be a **permanent, local and minor beneficial effect**.

Groundwater – Introduction of New Pathways

12.58 Pile depths are expected to terminate in the Seaford Chalk Formation. As such, they would have the potential to create new pathways for contamination to be introduced into the regionally important Chalk aquifer. Whilst there would be the potential for the creation of a temporary pathway, typical pile installation times would be in the order of a few minutes and concreting would close this pathway very soon after it forms. It is therefore considered that, in the absence of a head of contaminated liquid, which has not been encountered to date, seepage of contamination is unlikely. Nevertheless, taking a precautionary approach to the assessment, in the absence of mitigation, the likely effect would be **temporary**, **local and of minor adverse** significance.

Soils and Groundwater – Accidental Spillages

12.59 During the construction works material or fuel spillages could occur. Measures to protect the quality soils and groundwater as part of a Construction Environmental Management Plan (CEMP) are described in the mitigation measures section below. Adoption of these measures would protect soil and water quality during the demolition and construction works. However, in the absence of the adoption of these methods, the potential for soil and groundwater contamination as a result of unforeseen accidental spillages would be **temporary**, **short-term**, **local** in effect and of **moderate adverse** significance.

Soil and Groundwater - Leaching of Contaminants

12.60 As previously described, the Site currently comprises predominantly of hardstanding and built form. This limits infiltration to the underlying soils following rainfall events. Removing the existing hardstanding and stock-piling potentially contaminated material, could result in leaching of contaminants to the Site soils following rainfall. The risks and effects associated with this are considered to be **temporary**, **short-term**, **local** and of **minor adverse** significance.

12.61 An area of the Site formerly comprising the Bus Station and Bingo Hall is a gravelled surface with a large stockpile of crushed building materials. This area of the Site in its interim use could results in the leaching of contaminants following rainfall. The risks and effects associated with this are considered to be **short-term, local** and **minor adverse** significance.

Surface Waters

12.62 There are no surface water receptors on the Site and the nearest surface water resource to the Site is the River Thames which is located 420m northeast of the Site. The effect of lateral migration of contamination or from accidental spillages would therefore be **negligible**. It is considered unlikely that leaking sewerage network and drainage systems would provide preferential pathways to such a degree that these water receptors would be significantly impacted by migration of on site contamination.

12.63 However, poor site practices including the unauthorised disposal of liquids to the foul water system together with accidental spillage of liquids result in liquids entering the existing drainage network.

Good site practices should mitigate against this, but in the absence of mitigation, effects would be temporary, **short-term** and **local** and of **moderate adverse** significance.

Flora and Fauna

12.64 Exposure of existing flora and fauna on the Site to potential contamination sources during the demolition and construction works is not considered to pose significant risks or effects as the Site is of low ecological value. As a result, the effect is considered to be **negligible**.

Interim and Completed Development Scenarios

12.65 The effects of the Interim Development Scenario and Completed Development Scenario will be the same and have therefore been considered together below.

Future Site Occupiers and Users

12.66 As described in **Chapter 5: Description of Development**, the Proposed Development would comprise predominantly residential, commercial and leisure uses. The potential risk posed to future Site users and occupants from exposure to contaminated soils would be very limited for the following reasons:

- The majority of the Site would be hard-surfaced, forming a barrier between end-users and contaminated soil, thus breaking the potential contaminant pathway between source and receptor;
- Further investigation of areas of soil and groundwater contamination will be undertaken prior to, and during the earthworks to ensure that the hotspots of contamination are suitably investigated and remediated if necessary;
- A large basement excavation is proposed to be undertaken as part of Phase 3 of the Proposed Development, which would remove a significant volume of the near surface soils and therefore removing the recorded contamination;
- Soft landscaped areas would be effectively capped from residual contamination risk due to their location at roof and Plaza level. A clean growth medium would be provided for all soft landscaped areas;
- The proposed buildings would be designed to incorporate appropriate ground gas protection measures, if required; and,
- Water supply pipes would be laid in appropriate clean medium with the pipe material agreed with Thames Water. The UK Water Industry Research (UKWIR) project steering group consider that barrier pipes provide sufficient protection for the supply of drinking water in all Brownfield site conditions[10].

12.67 On the basis of the above, it is considered that future occupants and Site users would not come into contact with contaminated soil, ground gas and groundwater. The effect on future occupants and Site users is therefore, considered to be **negligible**.

Water Resources

12.68 The majority of the operational Site would be hard-surfaced both during the Interim Development Scenario and once the Proposed Development is complete, thereby limiting rainfall infiltration.

12.69 Neither the Interim Development Scenario or the Completed Development would give rise to new sources of significant contamination. Spillages of oil-based fuels associated with the car parking

areas, tanks and substations cannot be discounted. However, the following would help protect the underlying soils from potential risks:

- The provision of hardstanding across the operational areas of the Site preventing potential spillages from entering the ground;
- Storage of chemicals and fuels in appropriate containers on hardstanding. In the unlikely event that fuels are stored outside the buildings, the fuel tanks would be appropriately bunded in accordance with current legislation (SI 2001/2954)[11];
- Installing hard standing and oil water interceptors in car parks to reduce environmental impact; and,
- Managing and maintaining substations in accordance with best practice.

12.70 The contamination risks and effects of the Proposed Development upon water resources would therefore be **negligible**.

Flora and Fauna

12.71 As noted above, all proposed landscaped areas would be effectively capped from underlying soils. In addition, soil and material utilised within soft landscaped areas would be certified as clean and suitable for use. As such, the potential contamination effects to flora and fauna associated with the Proposed Development would be **negligible**.

Mitigation Measures and Likely Residual Effects

12.72 This chapter has highlighted that the Site and its surrounds have the potential to contain areas of contamination. Whilst it is recognised that this is unlikely to mean that the Site is contaminated in terms of the Environmental Protection Act, the investigations undertaken by Ramboll have recorded hotspots of contamination in a number of locations in the soils and groundwater.

12.73 Further ground investigation to delineate the identified contamination and investigate areas which are currently occupied by buildings is recommended by Ramboll. This would be secured by means of a planning condition on a future planning consent. Following completion of the additional ground investigation, a further assessment of the risk from the soils and groundwater will be undertaken and remediation undertaken if deemed necessary. However, it was determined that, in view of the Proposed Development, potential pollutant pathways between contaminants in the Made Ground and the end-user may be broken by the presence of hardstanding and/or building footprints and / or removed as a result of basement excavation. As a result, the levels of contaminants within the soils would not pose a risk to human health following excavation and / or remediation.

12.74 Gas monitoring undertaken within the Site highlighted that the concentrations of methane were low whilst carbon dioxide was elevated in a few locations. Volatile organic carbons (VOCs) were generally low with the exception of one location. In addition, during one monitoring visits, VOCs were elevated in a number of locations. Further ground gas monitoring is proposed to characterise the conditions further, but it is currently anticipated that the Site would be classified as Characteristic Situation 2, and consequently low level protective measures are required.

Demolition and Construction

Disposal of Demolition and Construction Waste

12.75 A basement excavation is proposed at the Site, with approximately 9,000m^3 of material proposed for excavation as part of Phase 1 and up to a further 100,000m^3 excavated as part of Phase 3. The

basement excavation will remove a thickness of Made Ground and underlying natural soils the surface of the Site.

12.76 The adoption of appropriate measures to remove asbestos in buildings would be required prior to commencement of demolition work.

12.77 The demolition and construction contractor will be encouraged to minimise waste at source by implementing a Site Waste Management Plan. This would be secured by means of a planning condition on a future planning consent. Opportunities to re-use or recycle the material will also be investigated and where taken to a licensed waste disposal facility, the facility will be encouraged to identify opportunities to re-use or recycle the waste. The residual effect is therefore considered to be **negligible** to a **permanent, local and minor adverse effect** dependent on the extent of re-use and recycling of waste.

Site workers and the Public

12.78 On the basis that Health and Safety legislation is followed the likely effects of the demolition and construction works on site workers and the public is **negligible**. No further mitigation measures are therefore required. Prior to construction the contractor would provide a Safety Method Statement, which would show how the safety of the work force and the public would be managed.

Soil and Water Resources

Soils and Groundwater – Removal of Potential Sources of Contamination

12.79 As this is a likely **permanent, local minor beneficial** effect, no further mitigation is required.

Groundwater – Introduction of New Pathways

12.80 The Environment Agency guidance document on piling on contaminated land[12] describes various methods and scenarios for piling through contaminated land. The report recommends that a Foundation Works Risk Assessment (FWRA) is carried out in such cases. It is considered that with the application of an appropriate piling methodology identified through the FWRA, the risks to the deep aquifer from piling works penetrating through potentially contaminated land would be low and the residual effects **negligible**.

Soils and Groundwater – Accidental Spillages

12.81 The handling and storage of potentially hazardous liquids on-Site, e.g. fuels and chemicals, would be controlled through implementation of a CEMP. This would be secured by means of a condition on any future planning consent. Storage tanks and container facilities would be appropriately bunded within designated areas and sited as far as possible from surface water drains.

12.82 Spill kits would be available to contain and manage spillages should they occur.

12.83 Adoption of these measures would minimise the potential for effects to water quality during the demolition and construction works. However, as accidental spillages cannot be entirely ruled out, a residual **minor adverse, temporary, local effect** is considered to remain.

Soils and Groundwater – Leaching of Contamination

12.84 Contaminated soils / material containing ‘leachable’ (i.e. soluble or mobile) contaminants would be identified, segregated, stored on areas of hardstanding or other impermeable surface, suitably contained by bunding or other containment measures, and sheeted to prevent the release of

contaminated run off. Such measures would be required as part of a site specific CEMP to protect soil and groundwater resources resulting in a **negligible** effect.

Surface Water

12.85 Groundwater encountered within excavations would be pumped out and where necessary, passed via settlement and oil interception facilities prior to discharge to sewer. Discharge to sewer would be agreed in advance with Thames Water and undertaken in accordance with a Trade Effluent Consent. Should contaminated groundwater be encountered that is not suitable for disposal to sewer, this would be disposed of to a suitable licensed treatment facility in accordance with the Water Resources Act 1991 and other legislation, and to the satisfaction of the Environment Agency and/or Thames Water.

12.86 Spill kits would be available to contain and manage spillages should they occur. These would include drain covers to prevent spillages entering the drainage system.

12.87 Implementation of these measures would be set out within the CEMP and would result in a **negligible** residual effect.

Flora and Fauna

12.88 As the likely effects are **negligible,** no mitigation measures are required.

Interim and Completed Development Scenarios

12.89 As the likely effects during the Interim and Completed Development Scenarios are **negligible,** no further mitigation measures are required.

Summary

12.90 A summary of potential effects, mitigation measures and likely residual effects in relation to ground conditions is summarised below within Table 12.6.

Table 12.6: Summary of Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Demolition and Construction			
Disposal of contaminated spoil and demolition material (contamination effects).	**Negligible.**	Disposal in accordance with legislation at a suitably licensed waste disposal facility.	**Negligible.**
Disposal of contaminated spoil and demolition material (generation of waste)	**Permanent, local, minor adverse (if re-use or recycling is not possible)**	Demolition and construction contractor to implement a site waste management plan to minimise waste generation and maximise re-use and recycling of materials. Re-use and recycling of waste material to be identified as the preferred option to off site waste disposal operator.	**Negligible to permanent, local, minor adverse**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Site workers and public safety (dust).	**Negligible**	Compliance with legislative requirements and implementation of a CEMP which would stipulate the use of standard dust control and other construction site management measures.	**Negligible.**
Site Workers (ingestion and inhalation of contaminated soils and ground gas)	**Negligible**	Compliance with legislative requirements and implementation of a CEMP which would stipulate the use of standard dust control and other construction site management measures.	**Negligible**
Liberation of asbestos fibres in the soils during earth movements	**Negligible**	Compliance with legislative requirements and work practices in accordance with CAW, 2015 and CAR:SOIL 2015 to ensure potential fibre release is managed.	**Negligible.**
Soils and Groundwater – removal of existing potential sources of contamination	**Permanent, local** and of **minor beneficial** significance	Further ground investigation to be undertaken and remediation completed if necessary.	**Permanent, local** and of **minor beneficial** significance
Groundwater – introduction of new pathways through piling.	**Temporary**, **local** and of **minor adverse** significance	Preparation of a FWRA in consultation with the Environment Agency and RBC.	**Negligible**
Soils and Groundwater – accidental spillages	**Temporary**, **short-term**, **local** and of **moderate adverse** significance.	Implementation of best practice and a CEMP	Accidental Spillage - **Temporary**, **short-term**, **local** and of **minor adverse** significance.
Soils and Groundwater – leaching of contamination	**Temporary**, **short-term**, **local** and of **minor adverse** significance.	Implementation of a CEMP to minimise the risks of generating contaminated runoff.	**Negligible**
Surface water: lateral migration of contamination.	**Negligible**	None required	**Negligible.**
Surface water: discharges to drain	**Temporary**, **short-term**, **local** and of **moderate adverse** significance	Implementation of a CEMP to ensure appropriate site practices.	**Negligible**
Flora and fauna.	**Negligible**	None required	**Negligible**
Interim and Completed Development Scenario			
Future Occupiers (Ground Gas)	**Negligible**	The Site has been designated as Characteristic Situation 2 therefore ground gas protection measures will be incorporated into the building design.	**Negligible.**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Future Occupiers (Ground Conditions)	**Negligible**	Based on the outcome of the future ground investigation remediation may be necessary.	**Negligible.**
Water resources (groundwater and surface water).	**Negligible**.	Storage of fuel tanks for backup generators and cleaning chemicals etc on hardstanding or within appropriately bunded areas. Provision of oil water interceptors on the drainage system as required. Management and maintenance of electricity substations.	**Negligible**.
Flora and fauna.	**Negligible.**	None required.	**Negligible.**

Comparison of Effects between this ES and the 2015 ES

12.91. The scale of effects remains consistent with those of the 2015 ES.

References

1 Waterman, Station Hill, Reading Geo-Environmental Assessment, September 2014, Ref. EED12350-110-R-3.1.2-RM
2 DEFRA, The Model Procedures for the Management of Contaminated Land (Contaminated Land Report 11)
3 Contaminated Land (England) (Amended) Regulations 2012
4 Environment Agency (EA), Groundwater Source Protection Zones. Accessed August 2014. http://apps.environment-agency.gov.uk/wiyby/37833.aspx
5 HMSO (2005) Hazardous Waste Regulations 2005
6 HMSO (2005) The List of Wastes (England) Regulations 2005
7 Statutory Instruments, 2002 No. 2677. Control of Substances Hazardous to Health Regulations 2002
8
9 HSEP (2007). Construction (Design and Management) Regulations 2007 (CDM)
10 UK Water Industry Research (2011) Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. Ref. 10/WM/03/21
11 Control of Pollution (Oil Storage) (England) Regulations 2001. No. 2954. Crown Copyright 2001.
12 EA (2001). Environment Agency guidance document on piling on contaminated land

13. Wind

Introduction

13.1. This chapter, which was prepared by RWDI, presents an assessment of the likely Wind Microclimate effects of the Proposed Development. In particular, consideration is given in the assessment to the effects of the Proposed Development on the Site and the resulting changes in wind conditions relative to the intended use of sensitive locations in and around the Site in terms of pedestrian comfort and safety.

13.2. Key wind microclimate considerations associated with the Proposed Development are:

- The creation of undesirable wind conditions (resulting in adverse effects to pedestrian comfort and safety) at ground level within the Site, around buildings surrounding the Site and within nearby areas of public space during the demolition and construction works; and
- The creation of undesirable wind conditions at ground level (specifically at building entrances, pedestrian thoroughfares and within amenity spaces with outdoor seating) within the Site, at the Proposed Development's balcony and roof terrace levels, around buildings surrounding the Site and within nearby areas of public space once the Proposed Development is fully completed.

13.3. This chapter provides a description of the methods used in the assessment. This is followed by a description of the relevant baseline conditions at the Site and surrounding area, together with an assessment of the likely potential effects of the Proposed Development during the site preparation and construction works and once the Proposed Development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

13.4. The chapter is accompanied by the following appendices, provided in ES Volume 3:

- **Technical Appendix 13.1:** Pedestrian Level Wind Microclimate Assessment, Plots E and F;
- **Technical Appendix 13.2:** Pedestrian Level Wind Microclimate Assessment (North Site).

13.5. The information pertaining to the South Site is based on the Pedestrian Level Wind Microclimate Assessment submitted in support of the 2019 Section 73 Applications for these plots (as presented in Technical Appendix 13.1). Whilst this assessment also covered development on the North Site, the proposals for the North Site assessed at this time were the maximum parameter 2016 Consented Scheme. Given the changes to the Proposed Development on the North Site, a new wind microclimate assessment was undertaken for this area (as presented in Technical Appendix 13.2). This assessment of the revised North Site proposals therefore supersedes the wind assessment for the areas to the north of the northern facades of Plots E and F. Areas to the south of the northern facades of Plots E and F including Friars Walk, Friar Street, Merchant's Place and Greyfriars Road (south) as well as the terraces and courtyard conditions at Plots E and F remain as presented in Technical Appendix 13.1. The changes to the North Site are not considered to impact on the findings of the Plot E and F wind microclimate assessment for these areas. Figures 13.2, 13.3, 13.7, 13.8, 13.9, 13.16, 13.17 and 13.18 are extracts of the wind microclimate assessment presented in **Technical Appendix 13.1** showing the probe locations considered to remain relevant to the assessment of the South Site. These figures have been referred to throughout this chapter.

Assessment Methodology and Significance Criteria

Assessment Methodology

Current Baseline Conditions

13.6. The baseline conditions across the existing Site and surroundings have been defined using wind tunnel testing to provide a detailed, quantitative assessment. Mean and peak wind speeds have been measured at locations across the existing Site and at other surrounding buildings, paths, roads and areas of open spaces for all wind directions within an appropriate proximity (wind tunnel model 'Configuration 1: Existing Site with Existing Surrounding Buildings'). Measurements have been taken for both the windiest season (normally winter in the UK) to show the worst case scenario, and summer season for amenity spaces. Amenity spaces are assessed during the summer season as these areas are expected to be used most frequently during this period with an expectation of calmer conditions compared to other times of the year.

13.7. The results have been combined with long-term meteorological climate data from London Heathrow Airport. The meteorological data shown in Figure 13.1, has been used in this assessment as this is deemed to provide the best representation of the local wind microclimate for the Reading area.

Likely Evolution of the Baseline Conditions including consideration of the Future Baseline

13.8. The wind conditions for the evolution of the baseline, should the Proposed Development not come forward, have been qualitatively considered; the commentary provided on the evolution of the baseline has, however, been informed by the baseline wind tunnel testing ('Configuration 1: Existing Site with Existing Surrounding Buildings') and the wind tunnel testing of the Proposed Development with the relevant cumulative schemes (Configuration 4 to Configuration 7). Wind conditions at the Site in the future, in the absence of the Proposed Development, are expected to be similar to or calmer than the wind conditions of Configuration 1, as the cumulative schemes are not within the prevailing south-westerly wind direction and they would not substantially change the wind microclimate at the Site.

13.9. The future baseline scheme at the former BMW Garage, Napier Road is too far from the Site to be included within the wind tunnel model. As such, development of the Napier Road scheme would not be expected to substantially change from the baseline wind conditions on, or surrounding, the Site.

Impact Assessment

Demolition and Construction

13.10. The potential wind microclimate impacts and likely effects during demolition and construction have not been directly assessed by the wind tunnel tests, as this is a temporary condition and would be highly variable as the existing building is demolished and the Proposed Development is constructed.

13.11. The potential microclimate effects during the demolition and construction works have been assessed using the professional judgement of an experienced wind engineer, based on an assessment of the background wind climate at the Site and an understanding of the effects of wind in the built environment. This approach is taken assuming that the activity on-Site during this time (i.e. construction activity) is less sensitive to wind conditions (due to protection from site hoarding, and site access being restricted to site workers) than when the Proposed Development is completed

and occupied (with public access and sensitive areas such as entrances and amenity space, for example).

13.12. A qualitative assessment of the wind microclimate during demolition and construction has therefore been undertaken and is based on professional judgement (informed by an assessment of the background wind microclimate in the area), the results of the tested configurations for the baseline and Completed Development Scenarios, and RWDI's experience of assessing wind in the built environment.

Completed Development

13.13. To predict the local wind environment associated with the Proposed Development, and the resulting pedestrian comfort within and immediately surrounding the Site, wind tunnel testing of the Proposed Development has been undertaken.

13.14. A comparison is made to the baseline conditions and any existing safety exceedances if areas have become windier than desired at surrounding sensitive locations.

13.15. The methodology for quantifying the pedestrian level wind environment is outlined below within four steps. Full details of the assessment methodology can be obtained by reference to **Technical Appendix 13.1: Wind Microclimate Technical Report Plots E and Technical Appendix 13.2: Wind Microclimate Technical Report (North Site).**

- Step 1: The subject site's induced wind speeds are measured for the appropriate configuration(s) at the appropriate pedestrian level(s) in the wind tunnel;
- Step 2: Standard meteorological data is adjusted to account for conditions at a subject site (for this assessment, meteorological data from London Heathrow airport has been utilised);
- Step 3: Data from Step 1 and Step 2 is combined to obtain the expected frequency and magnitude of wind speed for the appropriate configuration(s) and at the appropriate pedestrian level(s); and
- Step 4: The results of Step 3 are compared with the Lawson Comfort Criteria and where relevant, the change in the wind microclimate conditions between appropriate test configuration(s) to 'grade / score' the conditions within and around a subject site. This is shown in Table 13.1 below.

Table 13.1: Lawson Comfort Criteria

Colour	Comfort Category	Wind Speed	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 wind 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/entrances	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.

Approach to Outline Assessment

13.16. Wind conditions within and surrounding a site would be very sensitive to changes in building configurations. The maximum parameter building model does not incorporate gaps between the buildings because the precise location of these gaps would be subject to detailed design. In addition, it would not be possible to build out to the maximum height of the buildings across the area of the Site subject to the outline application (Phase 3) because this would exceed the maximum floor space area permitted. As a result, a series of 'Development Options' have been assessed within the maximum parameter model. These identify ways in which the Development could be built out and to assist in identifying mitigation measures that could be incorporated at future detailed design stage to ensure a suitable wind environment within and surrounding the Site.

Configurations Tested

13.17. The assessment of the wind microclimate is based on the results from a series of wind tunnel model tests to provide a detailed, quantitative assessment. In order to test the baseline, Interim Development Scenario, Maximum Parameter Completed Development Scenario and Development Options, seven configurations have been tested within the wind tunnel, as set out below:

- Configuration 1: Existing Site with the Existing Surrounding Buildings;
- Configuration 2: Interim Development Scenario (Phase 1 and Phase 2) with the Existing Surrounding Buildings;
- Configuration 3: Maximum Parameter Development with the Existing Surrounding Buildings;
- Configuration 4: Maximum Parameter Development with the Cumulative Surrounding Buildings;
- Configuration 5: Development Option 1 with the Cumulative Surrounding Buildings;
- Configuration 6: Development Option 2 with the Cumulative Surrounding Buildings; and
- Configuration 7: Development Option 3 with the Cumulative Surrounding Buildings.

13.18. Configuration 2 incorporated the Phase 2 draft landscaping scheme at ground and Plaza level ('*SHRN-LDA-S2-ZZ-PL-L-100-101.pdf*" provided by LDA Design on 24/10/2019). Configurations 5, 6 and 7 included the draft landscaping scheme for Phase 2 and illustrative landscaping for Phase 3 (*6516_Illustrative Plan Whole Site _190827.jpg*' provided by CRTKL 05/09/2019).

13.19. Further to the configurations listed above, wind mitigation measures were developed through a series of wind mitigation workshops to improve wind conditions and reduce the occurrence of strong winds where necessary. The final wind mitigation strategy and results of these assessments have also been discussed in this chapter.

13.20. A cumulative impact assessment has been undertaken to determine the effect of the Proposed Development in conjunction with known cumulative schemes located within a 360 m radius of the centre of the Site. As such the following developments were included within the wind tunnel model surrounding context in Configurations 4, 5, 6 and 7:

- 80 Caversham Road [182252/OUT];
- 29 – 35 Station Road [181930];
- 52 – 55 Friar Street and 12 Greyfriars Road [162210];
- Bristol and West Arcade, Market Place [180358];
- Land Between Weldale Street and Chatham Street [170326]; and
- Broad Street [182137].

13.21. Developments beyond a 360 m radius of the centre of the Site would not be expected to substantially alter the wind conditions at the Site. As such, the cumulative scheme at Kenavon Drive [170509] was not been included on the wind tunnel model.

13.22. The Former Scottish and Southern Energy Site on Vastern Road has yet to be submitted for planning and therefore details are unavailable at time of testing. In any event, this Site would fall beyond the 360m radius of the centre of the Site.

Strong Winds

13.23. The assessment of the wind microclimate also identifies stronger winds as specified by Lawson. The 'strong winds' are defined as wind speeds in excess of 15m/s for more than 0.025% of the time (approximately 2.2 hours per year). Exceedance of the 15m/s threshold would indicate a need for remedial measures and careful assessment of the expected use of that location; e.g. is it reasonable to expect cyclists or elderly or very young pedestrians to be present at the location? Wind speeds that exceed 20m/s for more than 0.025% of the time (approximately 2.2 hours per year) would represent a safety issue for all members of the population and would require mitigation to provide an appropriate wind environment.

13.24. Strong winds are generally associated with areas which would be classified by the Lawson Comfort Criteria as being suitable for 'walking' or as 'uncomfortable', however, they are occasionally concurrent with areas suitable for 'strolling' use. In a mixed-use urban development, 'walking' and 'uncomfortable' conditions would not usually form part of the 'target' wind environment in terms of pedestrian comfort and would usually require mitigation to reduce the frequency of, or even eliminate, any strong winds.

13.25. In accordance with Lawson's methodology it is RWDI practice to report incidence when wind speeds exceed 15m/s or 20m/s for more than 0.025% of the time (approximately two hours of the year).

13.26. Further details of the methodology please refer to **Technical Appendix 13.1 and 13.2.**

Assumptions and Limitations

13.27. It assumed that access to the Site would be restricted to construction workers during demolition and construction, and therefore windier conditions would be tolerable as the area is not for typical pedestrian use where the tolerable wind speed threshold would be lower.

13.28. The effect of the phased construction of the Proposed Development is assessed qualitatively and no wind tunnel tests were performed as it is expected that the worst-case scenario would be represented by the Completed Development with all the buildings of the Proposed Development in place.

13.29. The wind tunnel studies involve the use of physical models of the Proposed Development and surrounding buildings. Therefore, the accuracy of the drawing information supplied is one of the key factors for the consistency of wind tunnel results. Changes in the geometry or massing of buildings can affect the wind tunnel results.

13.30. The instrumentation used in this study provides a quantification of wind conditions at discrete points around the Proposed Development. The location and number of measurement points have been chosen to cover all key and frequently used areas in the baseline and around the Proposed Development. However, if the pedestrian activities or intended uses change over time, it is important to ensure that the conditions are re-assessed, or additional measurements are carried out to adequately assess the pedestrian-level wind conditions.

13.31. The assessment within the wind tunnel is based on worst-case wind speeds, expected to be encountered during the winter season (December, January and February) in the UK.

13.32. Additional consideration has been made for summer wind conditions due to the presence of outdoor amenity spaces and rooftop terraces. This complies with the standard methodology set out by Lawson for wind microclimate assessments. It is expected that use of outdoor amenity spaces and rooftop terraces for sitting will be limited to the summer season. During the windiest season, it would be expected that these spaces would typically become windier by one category, which would make them suitable for standing use.

Significance Criteria

13.33. Most assessments within this ES broadly define the sensitivity of the receptors that could be affected by the Proposed Development and the magnitude of impact or change from the baseline conditions to derive the resultant scale and nature of effect. However, in line with the standard, industry accepted methodology for wind microclimate assessments, the scale and nature of effect is determined by the suitability of the location for its intended use.

Receptor Sensitivity for Intended Uses

13.34. The anticipated on-Site wind conditions are compared with the intended pedestrian use of the that area because this assessment takes into account changes in pedestrian activities that occur as a result of the Proposed Development. Lawson does not specify suitability of wind conditions for cycle use beyond the safety criteria discussed above relating to the occurrence of strong winds (13.24).

13.35. With respect to the Site, sensitive receptors include the users of the following locations with the required wind conditions specified for each use:

- thoroughfares – targeting strolling wind conditions in all seasons;
- entrances – targeting standing wind conditions in all seasons;
- seating areas – targeting sitting wind conditions during the summer season;
- amenity spaces – targeting sitting to standing wind conditions during the summer season. This is windier than other amenity spaces, as large mixed-use amenity spaces users can choose to sit in ‘calmer’ areas, with ‘windier’ spaces considered acceptable for more active pursuits;
- terraces – targeting sitting wind conditions during the summer season;
- balconies – targeting sitting to standing wind conditions during the summer season for private amenity spaces.

13.36. For seasonal usage (such as spill-out seating) it may be necessary to consider locations for different uses for the windiest and the summer season.

13.37. In addition, the wind conditions in the surrounding area are considered within the area that would potentially be influenced by the Proposed Development. For sensitive receptors surrounding the Site, consideration has been given to the users of the areas listed above where appropriate, as well as:

- bus stops – targeting standing wind conditions in all seasons;
- pedestrian crossings – targeting walking wind conditions in all seasons; and
- amenity spaces – targeting sitting wind conditions in the summer season.

13.38. It is acknowledged that a direct comparison with the baseline conditions is also useful where possible to understand changes from the existing (baseline) wind conditions across the Site as a result of the Proposed Development. This is not necessarily possible for on-Site locations where the Proposed Development would change the intended use of an area, however, off-Site locations are compared with the baseline scenario.

13.39. Wind conditions have on the platforms at Reading Station have not been directly assessed due to the distance from the Proposed Development.

Effect Significance

13.40. For assessing the potential and residual wind effects of the Proposed Development, the criteria used to determine the scale and nature of the effect has been based upon the relationship between the desired pedestrian use (as defined by the Lawson Comfort Criteria) at a particular location, and the modelled wind conditions at this same location. It should be noted that all adverse effects are considered to be significant and would therefore require mitigation. Negligible and beneficial effects are not considered significant. Accordingly, the following seven-point scale of effect, as set out in Table 13.2, has been used within this assessment.

13.41. The geographical impact of the wind microclimate would be expected to be within the North Site and its immediate surroundings, i.e. a local impact, for all measurement locations. Additionally, all operational impacts would be permanent and long term.

13.42. It should be noted that off-Site locations would only be deemed to have an adverse effect should conditions be windier than suitable by the criteria. As discussed above, these effects would be significant. Off-Site locations would only be deemed to have a beneficial effect if the wind conditions were to be improved relative to the criteria because of the Proposed Development. In line with on-Site effects, beneficial effects would not be significant.

13.43. Strong winds which have the potential to affect pedestrian safety, are not scaled to major/moderate/minor in accordance with the above method but are reported separately within this chapter. It is RWDI's practice to report incidence, but as all occurrences of strong winds can be considered to be significant, where strong winds occur, remedial measures will be identified, alongside careful assessment of the expected use.

Table 13.2: Scale and Nature of Effect

Scale of Significance and Effect	Description
Major Beneficial	Wind conditions are three categories calmer than required
Moderate Beneficial	Wind conditions are two categories calmer than required
Minor Beneficial	Wind conditions are one category calmer than required
Negligible	Wind conditions are the same or similar to those required
Minor Adverse	Wind conditions are one category windier than required
Moderate Adverse	Wind conditions are two categories windier than required
Major Adverse	Wind conditions are three categories windier than required

Baseline Conditions

Meteorological Data

13.44. The UK Meteorological Office supplies records of the number of hours that wind occurs for ranges of wind speeds (using the Beaufort Scale) and by direction. Meteorological data from London Heathrow airport, shown in Figure 13.1, was used in this assessment as this is deemed to provide the best representation of the local wind microclimate for the Reading area.

13.45. The meteorological data obtained for Reading indicates that the prevailing wind throughout the year is from the south-west (i.e. 210 to 240 degrees on the compass). This is typical for many areas of south-eastern England. There is a secondary peak from the north-east during the late spring and early summer. The winds from the north-east are not as strong as the prevailing winds from the south-west.

13.46. The meteorological data were 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 BREVe3.2 software package which models the wind characteristics caused by changes in the terrain roughness at the stated reference height of 120m above the surface.

Baseline Assessment

Configuration 1: Existing Site with the Existing Surrounding Buildings

13.47. Discussion of the wind conditions at the existing Site with the existing surrounding buildings is based on the results presented in Figure 13.2 and Figure 13.4 for the windiest season and Figure 13.3 and Figure 13.5 for the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians at the North Site are presented in Figure 13.7.

South Site

Pedestrian Comfort

13.48. During the windiest season (Figure 13.2) wind conditions around the existing South Site range from suitable for sitting to strolling use. Wind conditions on thoroughfares and at existing entrance locations would be suitable for the intended uses.

13.49. During the summer season (Figure 13.3) wind conditions around the existing South Site range from suitable for sitting to standing use.

Thoroughfares

13.50. Wind conditions on thoroughfares around the Site to the south of Garrard Street would have conditions suitable for strolling use at the eastern end of Friar St (measurement locations 1 and 4) and sitting and standing use elsewhere during the windiest season (Figure 13.2).

Entrances

13.51. Entrances to existing buildings would have conditions suitable for sitting to standing use during the windiest season (Figure 13.2).

Strong Winds

13.52. There would be no instances of winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) around the existing South Site.

North Site

Pedestrian Comfort

13.53. During the windiest season (Figure 13.4) wind conditions range from suitable for sitting to strolling use at the existing North Site.

13.54. During the summer season (Figure 13.5) wind conditions are predominantly suitable for sitting to standing use, with localised strolling use conditions to the south of Thames Tower on Garrard Street.

Thoroughfares

13.55. Wind conditions on thoroughfares at and surrounding the existing North Site range from suitable for sitting to strolling use during the windiest season (Figure 13.4). Strolling use conditions are located to the south and west of Thames Tower on Garrard Street (measurement locations 79, 87 and 88), at the north-western corner of Thames Tower (measurement location 169), between Reading Station and Thames Tower (measurement locations 73, 74 and 247), at the eastern end of Tudor Road (measurement location 14) and to the south of the junction of Garrard Street and Greyfriars Road (measurement location 18). Other thoroughfares surrounding the North Site have conditions suitable for sitting and standing use.

Entrances

13.56. Entrances to the existing buildings surrounding the North Site (measurement locations 3 – 8, 10, 12, 13, 15 – 17, 50, 66, 68, 72, 77) have wind conditions suitable for sitting or standing use during the windiest season (Figure 13.4).

Amenity Space

13.57. During the summer season (Figure 13.5), when amenity spaces would be most frequently used, wind conditions in the seating steps north of Thames Tower (measurement location 167, 168) and within the outdoor seating related to the Three Guineas (measurement location 70) would be suitable for standing and sitting use respectively.

Strong Winds

13.58. There are instances of winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) on Garrard Street (Figure 13.6), to the south of Thames Tower (measurement locations 79, 87 and 88). These winds have the potential to be a safety concern for cyclists and more vulnerable pedestrians.

Likely Significant Effects

Demolition and Construction

Interim Development Scenario

13.59. Wind conditions during the construction works would be expected to gradually adjust from those of the existing North Site (Configuration 1), to those presented for the Proposed Development.

13.60. The wind environment during the construction of the Proposed Development is likely to be variable and as such, all effects would be **temporary**. As construction progresses, wind conditions adjusting to those presented for the Interim Development Scenario (Configuration 2) would represent a temporary **negligible** (not significant) effect.

13.61. However, strong winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) with the potential to be a safety concern to cyclists and more vulnerable pedestrians would occur on Garrard Street until the installation of the landscaping scheme and wind mitigation measures (refer to Mitigation section below). Strong winds at the north-western corner of Plot G (measurement location 150) and at Plot G roof terrace levels would be acceptable for a construction site where access would be restricted, and an appropriate health and safety procedure is in place.

Completed Development Scenario

13.62. As construction of the remainder of the Proposed Development (Configuration 3) progresses, wind conditions adjusting from those of the Interim Development Scenario (Configuration 2) would represent a **moderate adverse** (significant) effect on thoroughfares and entrances at the north-western corner of the North Site and **minor adverse** (significant) effect on Garrard Street and at off-Site entrances on Greyfriars Road. Conditions on-Site would represent a **negligible** (not significant) effect as these areas would only be accessible to construction workers.

13.63. Strong winds exceeding 20m/s for more than 0.025% of the time (approximately 2.2 hours per year) with the potential to be a safety concern to all pedestrians would occur off-Site at the north-western corner of the North Site on Station Hill as the superstructures of the Proposed Development near completion. Strong winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) with the potential to be a safety concern to cyclists and more vulnerable pedestrians would occur off-Site at the north-western corner of the Site on Station Hill as well as on Garrard Street and Greyfriars Road until the installation of the landscaping scheme and wind mitigation measures.

Configuration 2: Interim Development Scenario with Existing Surrounding Buildings

13.64. Discussion of the wind conditions during the Interim Development Scenario with the existing surrounding buildings is based on the results presented in Figure 13.7 for the South Site and Figure 13.10 for the ground and terrace levels during the windiest season at the North Site. Figure 13.8 and Figure 13.9 present wind conditions at the South Site during the summer season for ground and terrace levels respectively. Figure 13.11 presents the ground and terrace levels at the North Site during the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians at the North Site are presented in Figure 13.12.

13.65. Configuration 2 considered the approved Reserved Matters Phase 1 and Phase 2 (Plot G) of the Proposed Development in detail in the context of a cleared Phase 3 site and the existing surrounding buildings with the proposed landscaping scheme (‘*SHRN-LDA-S2-ZZ-PL-L-100-*

101.pdf" provided by LDA Design on 24/10/2019). Measures to reduce the residual effects of wind conditions on Site users have been detailed below under the mitigation section.

South Site

Pedestrian Comfort.

13.66. During the windiest season (Figure 13.7), wind conditions at the South Site would range from suitable for sitting to strolling use conditions. On-Site entrance locations would have conditions representing a **negligible** (not significant) to **minor beneficial** (not significant) effect and conditions at existing entrance locations would represent a **negligible** (not significant) effect.

13.67. Wind conditions during the summer season would be suitable for sitting and standing use at ground (Figure 13.8) and roof terrace (Figure 13.9) levels.

Thoroughfares

13.68. Wind conditions at the junction of Friar Street and Station Road (locations 1, 2 and 4 in Figure 13.7) would be suitable for strolling use during the windiest season. Wind conditions on remaining thoroughfares through and around the Site south of Garrard Street would be suitable for sitting and standing use. As such, wind conditions on proposed thoroughfares would represent a **minor beneficial** (not significant) to **moderate beneficial** (not significant) effect. On existing thoroughfares, wind conditions would represent a **negligible** (not significant) effect.

Entrances

13.69. Wind conditions at on-Site entrance locations would have conditions representing a **negligible** (not significant) to **minor beneficial** (not significant) effect during the windiest season. Conditions at existing entrance locations would represent a **negligible** (not significant) effect.

Plaza Amenity Space

13.70. Wind conditions within the Plaza amenity spaces would range from suitable for sitting use during the summer season (Figure 13.8). These conditions would represent a **negligible** (not indicant) effect.

Roof Terrace Amenity Space

13.71. Wind conditions at Plot E roof level would be suitable for standing use during the summer season (Figure 13.9). These conditions would represent a **minor adverse** (significant) effect prior to the application of wind mitigation measures. All other roof terrace amenity spaces would have conditions representing a **negligible** (not significant) effect.

Strong Winds

13.72. There would be no instances of wind exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) at the South Site.

North Site

Pedestrian Comfort

13.73. During the windiest season (Figure 13.10), wind conditions in the Interim Development Scenario would range from suitable for sitting to walking use.

13.74. Wind conditions during the summer season (Figure 13.11) would be suitable for sitting to strolling use.

Thoroughfares

13.75. Wind conditions to the south of Plot G, on Garrard Street, and at the junction of Garrard Street and Greyfriars Road would be windier than in the baseline scenario during the windiest season (Figure 13.10). All off-Site thoroughfares would, however, remain suitable for strolling use or calmer. These conditions would be acceptable for pedestrian thoroughfare use and would represent a **negligible** (not significant) effect.

13.76. Wind conditions to the north of Plot G (measurement location 155 and 259) would be suitable for walking use, one category windier than suitable for the intended pedestrian use. Walking use conditions on a pedestrian thoroughfare would represent a **minor adverse** (significant) effect. All remaining on-Site thoroughfares would have conditions suitable for strolling use or calmer. Strolling and standing use conditions would represent a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Entrances

13.77. Wind conditions at off-Site entrance locations would be suitable for standing use or calmer during the windiest season (Figure 13.10), acceptable conditions for entrance use. These conditions would represent a **negligible** (not significant) effect.

13.78. Entrances to Plot G (measurement locations 83, 141, 142, 146, 171) would have wind conditions suitable for standing or sitting use during the windiest season (Figure 13.10). These conditions would be suitable for, or one category calmer than, required for entrance locations and would therefore represent a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Ground Level Amenity Space

13.79. During the summer season (Figure 13.11), wind conditions at off-Site amenity space (measurement location 70) would be similar to existing conditions, suitable for sitting use, and as such would represent a **negligible** (not significant) effect.

13.80. Outdoor seating provision to the north of Thames Tower (measurement location 167) would be suitable for standing use during the summer season, similar conditions to those in the baseline scenario. Conditions at the amenity space at the north-western corner of Thames Tower (measurement location 168) and south of the entrance in the western undercut of Plot G (measurement locations 141 – 143 and 146) would be suitable for sitting use during the summer season (Figure 13.11). These conditions would be suitable for amenity use and would represent a **negligible** (not significant) effect. Note: no seating is intended to the north of the entrance on the western elevation of Plot G where strolling conditions are expected.

Terrace Level Amenity Space

13.81. Wind conditions at Plot G terraces levels during the summer season (Figure 13.11, inset) would be suitable for standing use. Standing use conditions would be one category windier than suitable for seating use at terrace levels. Standing conditions at terrace levels would therefore represent a **minor adverse** (significant) effect.

Strong Winds

13.82. Winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) would occur to the south of Plot G on Garrard Street (measurement locations 89, 90), at the south-eastern corner of Thames Tower (measurement location 79), to the west and north of Plot G (measurement location 149, 155, 157, 259) and at upper terrace level on Plot G (measurement location 176). Strong winds at these locations (Figure 13.12) would have the potential to be a safety concern for cyclists and / or more vulnerable pedestrians.

Configuration 3: Completed Development Scenario – Maximum Parameter Development with Existing Surrounding Buildings

13.83. Discussion of the wind conditions at the Maximum Parameter Development with the existing surrounding buildings is based on the results presented in Figure 13.13 for the ground and terrace levels during the windiest season and Figure 13.14 for the ground and terrace levels during the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians are presented in Figure 13.15.

13.84. Configuration 3 considered the approved Reserved Matters Phase 1 and Phase 2 (Plot G) of the Proposed Development in detail and Phase 3 of the Proposed Development in a maximum permitted parameter massing in the context of the cumulative surrounding buildings.

13.85. Changes to the massing of Phase 3 of the Proposed Development would have the potential to substantially change wind conditions at and surrounding the Site. Following an iterative process to optimise the massing of Phase 3, wind conditions on three Development Options have been assessed below to identify likely massing and mitigation options that would result in wind conditions suitable for the intended use with no instances of strong winds. The outcome of these assessments is detailed under 'Mitigation' below. Wind conditions at the Maximum Parameter Development detailed for Configuration 3 would be expected to represent a worst-case scenario for the completed development in the context of the existing surrounding buildings.

South Site

Pedestrian Comfort

13.86. Wind conditions at the South Site in the context of the maximum parameter development of the North Site would be expected to remain similar to those discussed for the South Site in the context of the maximum parameter 2016 Consented Scheme detailed for Configuration 2 above. As such, wind conditions during the windiest season (Figure 13.7) would represent a **negligible** (not significant) to **moderate beneficial** (not significant) effect.

13.87. During the summer season, wind conditions at the South Site Plot E roof terrace (Figure 13.9) would be expected to remain similar to those discussed in Configuration 2 and would represent a **minor adverse** (significant) effect without wind mitigation measures. Plaza and Plot F roof terrace amenity spaces (Figure 13.8) would have conditions representing a **negligible** (not significant) effect.

Strong Winds

13.88. There would be no instances of winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) at the South Site.

North Site

Pedestrian Comfort

13.89. During the windiest season (Figure 13.13), wind conditions in the Completed Development Scenario (Maximum Parameter) would range from suitable for sitting use to being uncomfortable for all pedestrian use.

13.90. Wind conditions during the summer season (Figure 13.14) would range from suitable for sitting to walking use.

Thoroughfares

13.91. Wind conditions at the north-western corner of the Proposed Development, on Greyfriars Road (measurement locations 29, 33, 36, 38), Station Hill (measurement locations 39 – 41, 43, 46) and Tudor Road (measurement location 14) would be suitable for walking use or uncomfortable for all pedestrian use during the windiest season (Figure 13.13), respectively one and two categories windier than suitable for pedestrian thoroughfare use. Walking use conditions on Garrard Street south of Plot B (measurement location 98) would be one category windier than suitable for pedestrian thoroughfares. These conditions would represent a **moderate adverse** (significant) to **minor adverse** (significant) effect.

13.92. Wind conditions on the other parts of Garrard Street, Station Hill, Tudor Road and Greyfriars Road not highlighted above and on Station Road and Stanshawe Road would be suitable for strolling use or calmer during the windiest season (Figure 13.13), acceptable conditions for the pedestrian thoroughfare use. These conditions would represent a **negligible** (not significant) effect.

13.93. Wind conditions on-Site between Plot C and Plot G (measurement location 149) and at the north-western corner of Plot G (measurement location 150) would be one category windier than suitable for pedestrian thoroughfare use. These conditions would represent a **minor adverse** (significant) effect. Remaining on-Site thoroughfares to the north of Plot G and between Plot G and Plot C would be suitable for standing and strolling use during the windiest season. These conditions would represent a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Entrances

13.94. During the windiest season (Figure 13.13) wind conditions at entrances to existing surrounding buildings on Tudor Road (measurement location 12), Station Hill (measurement location 50) and Greyfriars Road (measurement location 17) would be windier than in the baseline scenario. Strolling use conditions at these locations would be one category windier than suitable, representing a **minor adverse** (significant) effect. All remaining surrounding entrance locations would have conditions suitable for standing use or calmer, representing a **negligible** (not significant) effect.

13.95. Entrances to Plot G of the Proposed Development (measurement locations 83, 140 – 142, 146, 162, 171) would have conditions suitable for standing use or calmer during the windiest season (Figure 13.13). These conditions would represent a **negligible** (not significant) to **minor beneficial** (not significant) effect. In the Completed Development Scenario, entrances to Plots A, B and C are not specified as this will be a matter for detailed design. However, areas with conditions suitable for strolling use or windier should be avoided unless suitable mitigation is provided.

Ground Level Amenity Space

13.96. During the summer season (Figure 13.14), wind conditions at off-Site amenity spaces outside Reading Station (measurement location 70) would be suitable for sitting use, acceptable conditions for amenity use. These would represent a **negligible** (not significant) effect.

13.97. On-Site amenity and café seating space at Plaza level and in the western undercut of Plot G would be suitable for standing use (measurement locations 135, 138, 141, 142, 143) during the summer season (Figure 13.14), one category windier than suitable. Standing use conditions would represent a **minor adverse** (significant) effect.

13.98. Wind conditions at remaining locations within the western undercut of Plot G (measurement locations 146, 148) and to the north of Thames Tower (measurement location 167, 168) would be suitable for sitting use, acceptable conditions for outdoor seating during the summer season, representing a **negligible** (not significant) effect.

Terrace Level Amenity Space

13.99. Wind condition at Plot G terrace levels during the summer season (Figure 13.14, inset) would range from suitable for sitting to standing use. Standing use conditions would be one category windier than suitable for amenity use. Conditions at terrace levels would therefore present a **minor adverse** (significant) to **negligible** (not significant) effect.

Strong Winds

13.100. Instances of strong winds exceeding 20m/s for more than 0.025% of the time (approximately 2.2 hours per year) which would be a safety concern for all pedestrians would occur to the north-west of the Site (measurement locations 39, 41) on Station Hill (Figure 13.15).

13.101. Strong winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) which would have the potential to be a safety concern for cyclists and more vulnerable pedestrians would occur at a further 13 measurement locations (12, 14, 29, 33, 36, 38, 40, 43, 46, 50, 51) to the north-west and west of the Site, five measurement locations on Garrard Street (20, 98, 107, 109, 114) and three on-Site measurement locations around Plot G (144, 149, 150) (Figure 13.15).

13.102. Winds would exceed the strong wind threshold at Plot G roof level (measurement locations 174), however, this would be inaccessible other than for maintenance access and therefore no mitigation would be required.

Mitigation Measures and Likely Residual Effects

Demolition and Construction

Interim Development Scenario

13.103. As wind conditions at the Site would adjust from those of the existing Site to those of the Interim Development Scenario wind conditions on-Site would represent a **negligible** (not significant) effect for a construction site.

13.104. Instances of strong winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year), which would develop on Garrard Street as construction of the Interim Development Scenario progresses, would be a potential safety concern for cyclists and more vulnerable pedestrians using the thoroughfare. Wind mitigation measures identified for the Completed Development on Garrard Street, specifically 7m tall trees planted along the northern and southern

sides of Garrard Street, would be required to be installed upon commencement of the Plot G superstructure to ensure a safe wind environment. Instances of strong winds to the north and west of Plot G would be acceptable for a construction site where access is restricted and an appropriate health and safety procedure is in place.

Completed Development Scenario

13.105. As construction of the remainder of the Proposed Development progresses, wind conditions would be expected to gradually adjust from those of the Interim Development Scenario to those of the Completed Development Scenario. Wind conditions would represent a **moderate adverse** (significant) effect at the junction of Station Hill and Greyfriars Road and **minor adverse** (significant) effect between Plot C and Plot G, as well as instances of strong winds with the potential to be a safety concern for cyclists and more vulnerable pedestrians in both these areas.

13.106. Trees proposed for Greyfriars Road and on Station Hill would be required prior to commencement of above ground works relating to Plot A, as well as building mounted measures detailed below (porous canopies and balustrades at the north-western corner of Plot A) in conjunction with the construction of Plot A to ensure a safe wind environment. Adjustments to the landscaping to the east of Plot C from that of the Interim Development Scenario and installation of a second canopy on the western elevation of Plot G would be required as development of Plot C progresses in order to reduce the occurrence of strong winds with the potential to be a safety concern to pedestrians in the vicinity of Phase 2. With the implementation of these measures wind conditions would represent a temporary **negligible** (not significant) effect.

Interim Development Scenario

South Site

13.107. The 2019 S73 Applications detail wind mitigation measures required to ensure that wind conditions at the South Site are suitable for the intended pedestrian uses. The following measures were developed through wind tunnel testing to improve wind conditions at the Plot E roof terrace level:

- Porous screens, approximately 1.2m tall and 50% porous on the Plot E roof terraces; and
- Shrubs, approximately 1.2m tall on the Plot E roof terraces.

North Site

13.108. Conditions that are windier than suitable for the intended pedestrian use in the Interim Development Scenario and the occurrence of winds that would exceed 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) would require the use of landscaping and wind mitigation measures to ensure a safe and suitable wind environment. As such, wind mitigation measures were developed through an iterative process involving a 'massing workshop' to optimise the massing of Phase 2 and two wind mitigation workshops, in September and October 2019. Wind conditions during the second of these workshops were initially assessed with the draft landscaping plan ('*SHRN-LDA-S2-ZZ-PL-L-100-101.pdf"* provided by LDA Design on 24/10/2019) as detailed in Configuration 2 and, where necessary, additional wind mitigation measures were developed through an iterative process to refine the landscaping and mitigation measures.

13.109. Measures were developed to enhance the Phase 2 elements of the draft landscaping scheme. These have been incorporated into the Interim Development Scenario with photographs and a plan of the measures included in **Technical Appendix 13.2**. These measures are as follows:

- Sculpture, 7m tall by 2m nominal width, approximately 50% overall porosity, located south of western Plaza access stairs;
- Planter north of north-western corner of Plot G moved west by 3m;
- Single 7m tall deciduous tree added west of planter north of north-western corner of Plot G;
- Dense planting 1.5m in height added beneath trees in planter north of north-western corner of Plot G;
- Two elevated porous (approximately 50% open) screens, 4m tall by 2m wide, with 3m clearance to ground added north of north-western corner of Plot G, continuing line of above planter;
- Two 7m tall deciduous trees added to the north and the south of the intended route to the Plot C entrance (either side of measurement location 149);
- Dense planting 1.5m in height beneath trees north and south of the intended route to the Plot C entrance;
- Three 7m tall deciduous trees added along southern edge of Plaza at south-western corner of Plot G;
- Porous canopy on western side of Plot G reduced to 2.5m in depth from ground level frontage;
- Three 7m tall deciduous trees added north of proposed loading bay on northern side of Garrard Street;
- Two 5m tall deciduous trees in planters between proposed Phase 1 trees on southern side of Garrard Street west of Merchant's Place; and
- Dense planting on upper terrace, 1.5m in height.

Mitigation: Interim Development Scenario with Wind Mitigation Measures and the Existing Surrounding Buildings

South Site

13.110. As for Configuration 2, wind conditions at the South Site with wind mitigation measures are based on plots submitted in support of the 2019 Section 73 Applications which present the South Site in the context of the 2016 Consented Scheme maximum parameter massing for the North Site. Wind conditions within the bounds of the South Site would be expected to remain similar to those presented in the context of the Interim Development Scenario of the North Site.

Pedestrian Comfort.

13.111. During the windiest season (Figure 13.16), wind conditions at the Proposed Development south of Garrard Street would range from suitable for sitting to strolling use.

13.112. Wind conditions during the summer season, when amenity spaces would be expected to be most frequently used, would range from suitable for sitting and standing use at both ground (Figure 13.17) and terrace levels (Figure 13.18).

Thoroughfares

13.113. Wind conditions on thoroughfares through the Proposed Development would be suitable for standing and sitting use during the windiest season (Figure 13.16). These conditions would represent a **minor beneficial** (not significant) to **moderate beneficial** (not significant) effects.

13.114. Wind conditions on off-Site thoroughfares south of Garrard Street would have conditions suitable for strolling use or calmer. These conditions would represent a **negligible** (not significant) effect.

Entrances

13.115. Wind conditions at entrances to the Proposed Development would be suitable for sitting and standing use during the windiest season (Figure 13.16), representing a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Plaza Level Amenity Space

13.116. During the summer season (Figure 13.17) wind conditions at Plaza level amenity space would be suitable for sitting use, acceptable conditions for the intended use. These conditions would represent a **negligible** (not significant) effect.

Roof Terrace Amenity Space

13.117. During the summer season, wind conditions at the Plot E roof terrace level (Figure 13.18, measurement locations 173 and 173) would remain locally windier than suitable, representing a **minor adverse** (significant) effect. It would be expected that the implementation of additional landscaping not included during wind tunnel testing to provide localised shelter to these spaces would improve wind conditions such that they would be suitable for the intended use. Plaza and other roof terrace spaces on Plot E and Plot F presented in Figure 17.17 would have conditions representing a **negligible** (not significant) effect.

Strong Winds

13.118. There would be no instances of wind exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) at the South Site.

North Site

13.119. Discussion of the wind conditions during the Interim Development Scenario with wind mitigation measures and the existing surrounding buildings is based on the results presented in Figure 13.19 for the ground and terrace levels during the windiest season and Figure 13.20 for the ground and terrace levels during the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians are presented in Figure 13.21.

Pedestrian Comfort

13.120. During the windiest season (Figure 13.19), wind conditions in the Interim Development Scenario with wind mitigation measures would range from suitable for sitting to strolling use.

13.121. Wind conditions during the summer season (Figure 13.20) would be suitable for sitting and standing use.

Thoroughfares

13.122. Wind conditions on existing thoroughfares surrounding the Proposed Development would be suitable for strolling use or calmer during the windiest season (Figure 13.18), acceptable conditions for the intended pedestrian use. These conditions would therefore represent a **negligible** (not significant) effect.

13.123. Phase 2 thoroughfares surrounding Plot G would have conditions suitable for sitting to strolling use during the windiest season (Figure 13.19). Strolling use conditions or calmer would be suitable for

the intended pedestrian use and therefore conditions would represent a **negligible** (not significant) to **moderate beneficial** (not significant) effect.

Entrances

13.124. Entrances to existing surrounding buildings would have conditions suitable for standing use or calmer during the windiest season (Figure 13.19), which is acceptable for entrance locations, where standing use or calmer would be required. These conditions would therefore represent a **negligible** (not significant) effect.

13.125. Wind conditions at the entrance on the eastern elevation of Plot G (represented by measurement location 171) would have strolling use conditions during the windiest season (Figure 13.19). As this would be an emergency exit only, strolling use conditions would be suitable for the intended use. The conditions would represent a **negligible** (not significant) effect.

13.126. Other entrances to Plot G would be suitable for standing and sitting use during the windiest season with wind mitigation measures (Figure 13.19). These conditions would be suitable for, or one category calmer than, required for entrance use and would therefore represent a **negligible** (not significant) to **minor beneficial** (not significant) effect respectively.

Ground Level Amenity Space

13.127. Wind conditions at off-Site amenity spaces (measurement location 70) would be suitable for sitting use during the summer season (Figure 13.20). The conditions are similar to those in the Baseline Scenario and are suitable for amenity use. These conditions would represent a **negligible** (not significant) effect.

13.128. Wind conditions at the Plaza level amenity space west of Plot G (measurement locations 135, 137 and 138) and north of Thames Tower (measurement location 167) would have standing use conditions. Amenity space at the north-western corner of Thames Tower (measurement location 168), on the bank north of Plot G (measurement location 160) and within the western undercut of Plot G (measurement locations 140 – 143 and 146 – 148) would be suitable for sitting use during the summer season (Figure 13.20). A mix of sitting and standing use conditions over a large amenity space, such as the area surrounding Plot G, would be acceptable conditions and would represent a **negligible** (not significant) effect provided seating provision is located in areas suitable for sitting use.

Terrace Level Amenity Space

13.129. Wind conditions at the Plot G terrace levels during the summer season (Figure 13.20, inset) would be suitable for standing use. Standing use conditions would be one category windier than suitable for seating use at terrace levels. Standing conditions at terrace levels would therefore represent a **minor adverse** (significant) effect. Further wind mitigation testing will be undertaken to enhance the existing scheme and improve wind conditions such that they would be suitable for the intended use.

Strong Winds

13.130. Winds would exceed 15m/s at the south-eastern corner of Thames Tower (measurement location 79) for 5.2 hours per year, more than the 0.025% of the time threshold (approximately 2.2 hours per year) beyond which these winds would be a potential safety concern for cyclists and more vulnerable pedestrians (Figure 13.21). This exceedance would, however, be less than in the Baseline Scenario where winds at this location exceed 15m/s for 6.7 hours per year. It would not be contingent on the applicant to resolve pre-existing instances of strong winds.

13.131. There would be no other instances of winds exceeding 15m/s for more than 0.025% of the time during the Interim Development Scenario with the implementation of the detailed wind mitigation measures.

Completed Development Scenario

13.132. As described in the likely significant effects section above, in the Maximum Parameter Completed Development Scenario, without mitigation, wind conditions would range from **negligible** (not significant) to **moderate adverse** (significant) with instances of strong winds to the north west and west of the Site. The three Development Options were therefore tested to determine wind conditions for these locations. This analysis showed that without wind mitigation, wind conditions on Tudor Road, Greyfriars Road and Station Hill, at Plaza level between Plots A and C and Plots C and D, and on Plot A balconies would have instances of strong winds with the potential to be a safety concern for cyclists and more vulnerable pedestrians. Further, the development of Phase 3 would result in changes to the wind conditions around Phase 2, requiring the addition of mitigation to, and around, Plot G beyond that discussed for the Interim Development Scenario discussed above.

13.133. Wind mitigation measures were developed through an iterative process involving a massing workshop to optimise the building form of Phase 3 followed by a wind mitigation workshop on the 16th September 2019 to refine landscaping and wind mitigation measures. Wind mitigation measures were developed and refined in the context of Development Option 2 as this Development Option would result in the worst case wind conditions and therefore mitigation measures that would be successful for this Development Option would also likely have a beneficial change on wind conditions for the other Development Options or variations of these that may come forward as part of a future reserved matters application. Measures developed for Development Option 2 were subsequently transposed to Development Options 1 and 3 without further refinement.

13.134. Wind mitigation measures developed for Development Option 2 are in addition to the draft landscaping plan '*2019 07 16 Station Hill North landscaping.dwg*' (provided by CRTKL on 19/07/2019) amended with additional trees on Greyfriars Road and Station Hill outlined in the illustrative landscaping plan '*6516_Illustrative Plan Whole Site _190827.jpg*' (provided 05/09/2019). Wind conditions presented for the Development Options would require the following wind mitigation measures applied over Phase 2 and Phase 3 of the Proposed Development:

- Three 7m tall deciduous trees to the north of the north-western corner of Plot G, extending the proposed copse of trees north of Plot G by approximately 10m to the west;
- Dense shrubs or hedging at least 1m in height added below the above 7m tall trees;
- Eight 7m tall deciduous trees on the northern side of Garrard Street;
- Six 7m tall deciduous trees on the southern side of Garrard Street, three each to the east and west of the junction with Merchant's Place;
- One 7m tall deciduous tree on the western side of Merchants Place immediately south of the junction with Garrard Street;
- Porous (up to 50% open) canopy on Plot G western elevation, 4.5m deep, extending 22.5m south from north-western corner of Plot G at third floor level;
- Canopy around north-western corner of Plot A, changed from solid to porous (up to 50% open);
- Porous (up to 50% open) balustrade 1.5m tall segregating possible first floor level terrace at north-western corner of Plot A from porous canopy;

- North-western corner of Plot A chamfered at ground floor level (2m removed from Greyfriars Road and Station Hill facades);
- Columns at eastern edge of Plot C eastern undercut with full height porous (up to 50% open) screening at southern end;
- Hedging/dense shrubs at northern edge of Plaza between Plot A and Plot C, 1.5m tall;
- Hedging/dense shrubs backing amenity spaces between Plot A and Plot C at Plaza level, 1.5m tall;
- Hedging/dense shrubs between Plot C and Plot D, 1.5m tall;
- Hedging/dense shrubs bordering amenity/landscaping areas to west of Plot C, 1.5m tall; and
- Porous (up to 50% open) balustrades, 1.5m tall, on Plot A balconies.
- Hedging/dense shrubs, 1.5m tall, populating Plot G upper terrace.

13.135. Further to the assessment of Development Option 2 and Development Option 3 with wind mitigation measures, amendments were made to the upper roof terrace level of Plot G, as presented for the Interim Development Scenario. As such Plot G in the Development Option 1 with mitigation scenario is in a different configuration to that assessed in Development Options 2 and 3 and in Configurations 2, 6 and 7. This amendment would not be expected to substantially change wind conditions at the upper terrace level and will be addressed when assessing reserved matters.

South Site

Pedestrian Comfort

13.136. Wind conditions at the South Site with wind mitigation measures in the Completed Development Scenario reference plots submitted in support of the 2019 Section 73 Applications which present the South Site in the context of the 2016 Consented Scheme maximum parameter massing for the North Site. Wind conditions within the bounds of the South Site with wind mitigation measures would be expected to remain similar to those presented in Figures 13.16 to 13.18. As such, wind conditions would be expected to represent a **negligible** (not significant) to **moderate beneficial** (not significant) effect during the windiest season.

13.137. During the summer season, wind conditions would be expected to represent a **minor adverse** (significant) effect at the Plot E roof terrace level. It would be expected that the implementation of landscaping to provide localised shelter to these spaces would improve wind conditions such that they would be suitable for the intended use. Plaza and other roof terrace spaces on Plot E and Plot F presented in Figure 13.18 would have conditions representing a **negligible** (not significant) effect.

Strong Winds

13.138. There would be no instances of strong wind expected to occur at the South Site in the Completed Development Scenario.

North Site

Development Option 1 with Wind Mitigation Measures and the Cumulative Surrounding Buildings

13.139. Discussion of the wind conditions during Development Option 1 with wind mitigation measures and the cumulative surrounding buildings is based on the results presented in Figure 13.22, 13.23 and 13.24. These show: the ground level and Plot G terrace levels during the windiest season; the ground level and Plot G terrace levels during the summer season; and the Phase 3 balcony and

Phase 3 terrace levels during the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians are presented in Figure 13.25 for ground and Plot G terrace levels and Figure 13.26 for Phase 3 balcony and Phase 3 terrace levels.

Pedestrian Comfort

13.140. During the windiest season (Figure 13.22), wind conditions in Development Option 1 with wind mitigation measures would range from suitable for sitting to strolling use.

13.141. Wind conditions during the summer season would range from suitable for sitting to strolling use at ground level (Figure 13.23) and suitable for sitting to standing use at balcony and terrace levels (Figure 13.24).

Thoroughfares

13.142. Wind conditions on thoroughfares surrounding Phase 2 and Phase 3 of the Proposed Development would be suitable for strolling use or calmer during the windiest season (Figure 13.22). Strolling use conditions would be suitable for pedestrian thoroughfares and would represent a **negligible** (not significant) effect.

13.143. Conditions at the Plaza level thoroughfares in Development Option 1 (Figure 13.22 would be suitable for pedestrian thoroughfare use during the windiest season. Conditions would represent a **negligible** (not significant) to **moderate beneficial** (not significant) effect.

Entrances

13.144. The entrance to an existing building on the northern side of Station Hill (measurement location 50) would be one category windier than suitable during the windiest season (Figure 13.22) and windier than the baseline scenario. These conditions would represent a **minor adverse** (significant) effect. Wind conditions at other off-Site entrance locations would be suitable for standing use or calmer, representing a **negligible** (not significant) effect.

13.145. At the Plaza level entrance to Plot A (measurement location 119) strolling use conditions would be one category windier than desired during the windiest season (Figure 13.22) and would represent a **minor adverse** (significant) effect. Other entrances to Phase 3 (measurement locations 123, 126, 262) and Plot G (measurement locations 83, 141, 142, 146, 171) would be suitable for standing and sitting use, representing a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Ground Level Amenity Space

13.146. Wind conditions at existing outdoor seating (measurement location 70) would be suitable for sitting use during the summer season (Figure 13.23) and represent a **negligible** (not significant) effect.

13.147. Amenity space at the Phase 3 Plaza level between Plot A and Plot C (measurement locations 118 and 122), and in Phase 2 to the west of Plot G (measurement locations 135 and 138) would be suitable for standing use during the summer season (Figure 13.23). Standing use conditions would be suitable for a large amenity space with a mix of sitting and standing use conditions, provided seating provision is located in areas suitable for sitting use. Remaining amenity space at Plaza level (measurement locations 125, 127, 131, 139, 140, 143, 160) and north of Thames Tower (measurement locations 167, 168) would be suitable for sitting use. These conditions would represent a **negligible** (not significant) effect.

Terrace Level Amenity Space

13.148. Wind conditions at the Plot G terrace levels during the summer season (Figure 13.23, inset) would predominantly be suitable for sitting use, with standing use conditions on the western side of the amended upper terrace (measurement location 176). Standing use conditions would be one category windier than suitable for seating use at terrace levels, however, a mix of sitting and standing use conditions would be suitable, provided no seating provision is located in areas with sitting use conditions. These conditions at terrace levels would therefore represent a **negligible** (not significant) effect.

13.149. At Plot B roof level (measurement locations 220, 221, 248) (Figure 13.24) wind conditions would be suitable for sitting use, acceptable conditions for amenity use and therefore representing a **negligible** (not significant) effect.

Balconies

13.150. Wind conditions on the balconies on Plots A, B, C and D with mitigation measures (Figure 13.24) would have conditions suitable for sitting or standing use, acceptable conditions for private amenity spaces. These conditions would represent a **negligible** (not significant) effect.

Strong Winds

13.151. Winds would exceed 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) at measurement location 174 (Figure 13.25). As this space is inaccessible other than for maintenance work, no mitigation would be required at this location.

Development Option 2 with Wind Mitigation Measures and the Cumulative Surrounding Buildings

13.152. Discussion of the wind conditions within Development Option 2 with wind mitigation measures and the cumulative surrounding buildings is based on the results presented in Figure 13.27 for the ground and Plot G terrace levels during the windiest season, Figure 13.28 for the ground and Plot G terrace levels during the summer season and Figure 13.29 for the Phase 3 balcony and terrace levels during the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians are presented in Figure 13.30 for ground and Plot G terrace levels and Figure 13.31 for Phase 3 balcony and terrace levels.

Pedestrian Comfort

13.153. During the windiest season (Figure 13.27), wind conditions in Development Option 2 with wind mitigation measures would range from suitable for sitting to strolling use.

13.154. Wind conditions during the summer season would range from suitable for sitting to strolling use at ground level (Figure 13.28) and the Phase 3 balcony and terrace levels (Figure 13.29). Wind conditions on the Plot G terrace would be suitable for sitting and standing use (Figure 13.28).

Thoroughfares

13.155. Wind conditions on thoroughfares surrounding Phase 2 and Phase 3 of the Proposed Development would be suitable for strolling use or calmer during the windiest season (Figure 13.27) with landscaping and wind mitigation measures in place. Strolling use conditions would be suitable for pedestrian thoroughfares and would represent a **negligible** (not significant) effect.

13.156. At Plaza level, conditions on thoroughfares in Development Option 2 with wind mitigation measures in place would range from suitable for sitting to strolling use during the windiest season (Figure 13.27). Strolling use conditions would be suitable for pedestrian thoroughfare use, therefore

conditions would represent a **negligible** (not significant) to **moderate beneficial** (not significant) effect.

Entrances

13.157. Entrances to the existing surrounding building to the north of Station Hill (measurement location 50) would be suitable for strolling use during the windiest season (Figure 13.27). These conditions would be one category windier than the baseline scenario and one category windier than suitable for an entrance location, therefore would represent a **minor adverse** (significant) effect. Wind conditions at remaining off-Site entrances would be suitable for standing use or calmer, representing a **negligible** (not significant) effect.

13.158. At the Plot A Plaza level entrance (measurement location 119) wind conditions would be suitable for strolling use, one category windier than suitable for an entrance location. These conditions would represent a **minor adverse** (significant) effect. All other entrances to Phase 3 (measurement locations 123, 126, 262) and Plot G (measurement locations 83, 141, 142, 146, 171) would have conditions suitable for standing or sitting use, suitable for and one category calmer than required for entrance locations respectively during the windiest season (Figure 13.27). These conditions would represent a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Ground Level Amenity Space

13.159. Wind conditions at existing outdoor seating (measurement location 70) would be suitable for sitting use during the summer season (Figure 13.28), suitable for amenity use and would represent a **negligible** (not significant) effect.

13.160. Amenity space at the Phase 3 Plaza level between Plot C and Plot D (measurement location 127), to the west of Plot G (measurement location 135, 137) would be suitable for standing use during the summer season (Figure 13.28). Standing use conditions would be suitable for a large amenity space with a mix of sitting and standing use conditions provided seating provision is located in areas suitable for sitting use. Remaining amenity space at Plaza level (measurement locations 118, 125, 122, 131, 137 – 140, 143, 160) and north of Thames Tower (measurement locations 167, 168) would be suitable for sitting use, acceptable conditions for amenity use. These conditions would represent a **negligible** (not significant) effect.

Terrace Level Amenity Space

13.161. Wind conditions at Plot G terrace levels during the summer season (Figure 13.28, inset) would predominantly be suitable for sitting use with localised standing use conditions on the upper terrace (measurement location 176). Standing use conditions would be one category windier than suitable for seating use at terrace levels, however, a mix of sitting and standing use conditions would be suitable, provided no seating provision is located in areas with sitting use conditions. These conditions at terrace levels would therefore represent a **negligible** (not significant) effect.

13.162. At Plot B roof level (measurement locations 220, 221, 248) (Figure 13.29) wind conditions would be predominantly suitable for standing use, one category windier than suitable for amenity use. These conditions would represent a **minor adverse** (significant) effect.

Balconies

13.163. Wind conditions on the western elevation of Plot A represented by measurement location 193 (Figure 13.29) would have conditions suitable for strolling use during the summer season, one category windier than suitable for private amenity use. Strolling use conditions on balconies would represent a **minor adverse** (significant) effect. Wind conditions on remaining balconies on Plots

A, B, C and D would have conditions suitable for sitting or standing use, acceptable conditions for private amenity space. These conditions would represent a **negligible** (not significant) effect.

Strong Winds

13.164. Winds would exceed 15m/s for 2.7 hours per year on the Station Hill carriageway (measurement location 51), over the 0.025% of the time (approximately 2.2 hours per year) threshold for winds being a potential safety concern for cyclists and pedestrians (Figure 13.22). Winds at measurement locations 44 and 150 would exceed 15m/s for 2.1 hours per year respectively, marginally under the threshold. Strong winds would also occur on Plot A balconies represented by measurement locations 193 and 198, with the potential to be a safety concern for balcony occupants (Figure 13.23). As the roof space on Plot G would be accessible for maintenance purposes only, strong winds at location 174 would be acceptable. There would be no other instances of strong winds at the completed Development Option 2 with the wind mitigation measures. Additional wind mitigation measures would be required to be investigated during the detail design of Phase 3.

Development Option 3 with Wind Mitigation Measures and the Cumulative Surrounding Buildings

13.165. Discussion of the wind conditions during Development Option 3 with wind mitigation measures and the cumulative surrounding buildings is based on the results presented in Figure 13.32 for the ground and Plot G terrace levels during the windiest season, Figure 13.33 for the ground and Plot G terrace levels during the summer season and Figure 13.34 for the Phase 3 balcony and terrace levels during the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians are presented in Figure 13.35 for ground and Plot G terrace levels and Figure 13.36 for the Phase 3 balcony and terrace levels.

Pedestrian Comfort

13.166. During the windiest season (Figure 13.32), wind conditions within Development Option 3 with wind mitigation measures would range from suitable for sitting to strolling use.

13.167. Wind conditions during the summer season would range from suitable for sitting to strolling use at ground level (Figure 13.33), suitable for sitting to standing use at Plot G terrace (Figure 13.33, inset) and suitable for sitting uses at the Phase 3 balcony and terrace levels (Figure 13.34).

Thoroughfares

13.168. Wind conditions on thoroughfares surrounding Phase 2 and Phase 3 of the Development would be suitable for strolling use or calmer during the windiest season (Figure 13.32). Strolling use conditions would be suitable for pedestrian thoroughfares and would represent a **negligible** (not significant) effect.

13.169. At Plaza level, conditions on thoroughfares in Development Option 3 (Figure 13.32) would be suitable for pedestrian thoroughfare use during the windiest season. Conditions would represent a **negligible** (not significant) to **moderate beneficial** (not significant) effect.

Entrances

13.170. Entrances to the existing surrounding building to the north of Station Hill (measurement location 50) would be one category windier than suitable during the windiest season (Figure 13.32) and windier than the baseline scenario. These conditions would represent a **minor adverse** (significant) effect. Wind conditions at other off-Site entrance locations would be suitable for standing use or calmer, representing a **negligible** (not significant) effect.

13.171. Conditions at the Plot A Plaza level entrance (measurement location 119) would be one category windier than acceptable during the windiest season (Figure 13.32) and would represent a **minor adverse** (significant) effect. Other entrances to Phase 3 (measurement locations 123, 126, 262) and Plot G (measurement locations 83, 141, 142, 146, 171) would be suitable for entrance use, representing a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Ground Level Amenity Space

13.172. Wind conditions at existing outdoor seating (measurement location 70) would be suitable for sitting use during the summer season (Figure 13.33) and represent a **negligible** (not significant) effect.

13.173. Amenity space at the Phase 3 Plaza level between Plot A and Plot C (measurement location 118), Plot C and Plot D (measurement location 125, 127) and in Phase 2 to the west of Plot G (measurement location 135, 138, 147) would be suitable for standing use during the summer season (Figure 13.33). Standing use conditions would be suitable for a large amenity space with a mix of sitting and standing use conditions, provided seating provision is located in areas suitable for sitting use. Remaining amenity space at Plaza level (measurement locations 122, 131, 139 – 140, 143) and north of Thames Tower (measurement locations 167, 168) would be suitable for sitting use. These conditions would represent a **negligible** (not significant) effect.

Terrace Level Amenity Space

13.174. Wind conditions at Plot G terrace levels during the summer season (Figure 13.33, inset) would predominantly be suitable for sitting use, with standing use conditions on the western side of the upper terrace (measurement location 175, 176). Standing use conditions would be one category windier than suitable for amenity use on the upper terrace. These conditions at terrace levels would therefore represent a **minor adverse** (significant) to **negligible** (not significant) effect.

13.175. At Plot B roof level (measurement locations 220, 221, 248) (Figure 13.34) wind conditions would be suitable for sitting use, acceptable conditions for amenity use and therefore representing a **negligible** (not significant) effect.

Balconies

13.176. Wind conditions on Plots A, B, C and D balconies with mitigation measures would have conditions suitable for sitting or standing use (Figure 13.34), acceptable conditions for private amenity spaces. These conditions would represent a **negligible** (not significant) effect.

Strong Winds

13.177. Winds would exceed 15m/s for 2.2 hours per year on the Station Hill carriageway (measurement location 43), more than the 0.025% of the time (approximately 2.2 hours per year) threshold for winds being a potential safety concern for cyclists and pedestrians (Figures 13.35 and 13.36). As the roof space on Plot G would be accessible for maintenance purposes only, strong winds at location 174 would be acceptable. There would be no other instances of strong winds in Development Option 3 with the wind mitigation measures in place.

Summary

13.178. A summary of the likely effects, mitigation and residual effects is set out in Table 13.4 below. The mitigation measures summarised in relation to the Completed Development Scenario are those identified as being suitable for the three Development Options with the residual effects being those of the Development Options with mitigation. Whilst the Development Options only represent certain

ways in which the Proposed Development could come forward and may be subject to change, the mitigation measures identified are likely to be suitable for a future development configuration coming forward within the maximum parameters. Nevertheless, further wind tunnel testing would be required as the design progresses towards a reserved matters application to ensure that the actual development configuration (with mitigation) achieves a suitable wind environment within and surrounding the Site. It is anticipated that a condition requiring future reserved matters applications to be accompanied by a wind tunnel test report would be applied to any future planning consent.

Table 13.4: Summary of Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Construction Interim Development Scenario			
Off-Site Thoroughfares	**Negligible**	None	**Negligible**
Off-Site Entrances	**Negligible**	None	**Negligible**
Off-Site Amenity Spaces	**Negligible**	None	**Negligible**
On-Site	**Negligible**	None	**Negligible**
Strong Winds	Strong winds on Garrard Street	Early installation of the landscaping scheme specifically 7m tall trees planted at the southern edge of the Plaza and along the northern side of Garrard Street, 5m tall trees in planters on the southern side of Garrard Street. Implementation of appropriate health and safety procedures for construction workers.	On site strong winds are considered acceptable on the basis that only construction workers would access these areas and appropriate health and safety procedures are in place. Strong Winds on Garrard Street will be addressed through additional trees on Garrard Street and at the southern edge of the Plaza level.
Construction Completed Development Scenario			
Off-Site Thoroughfares	**Temporary, local and of moderate adverse to negligible significance**	Early installation of the landscaping scheme and wind mitigation measures, specifically trees along Garrard Street, Greyfriars Road, and Station Hill.	**Temporary, local and of negligible significance**
On-Site Thoroughfares	**Negligible**	None	**Negligible**
Off-Site Entrances	**Temporary, local and of moderate adverse to negligible significance**	Early installation of the landscaping scheme and wind mitigation measures, specifically landscaping and canopy measures at junction of Greyfriars Road, and Station Hill.	**Temporary, local and of minor adverse (at Location 50 only) to negligible significance**
On-Site Entrances	**Negligible**	None	**Negligible**
Off-Site Amenity Spaces	**Negligible**	None	**Negligible**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Strong Winds	Strong winds on north-western corner of the Site on Station Hill, Garrard Street and Greyfriars Road. As the roof space on Plot G would be accessible for maintenance purposes only, strong winds at location 174 would be acceptable.	Early installation of trees proposed for Greyfriars Road and Station Hill, as well as building mounted mitigation measures (porous canopies and balustrades at the north-western corner of Plot A) to ensure a safe wind environment. Adjustments to the landscaping to the east of Plot C from that of the Interim Development Scenario and installation of a second canopy on the western elevation of Plot G required as development of Plot C progresses in order to reduce the occurrence of strong winds with the potential to be a safety concern to pedestrians in the vicinity of Phase 2. Implementation of appropriate health and safety procedures for construction workers.	Strong winds within the construction zone are considered acceptable on the basis that only construction workers would access these areas and appropriate health and safety procedures are in place. Strong winds on Station Hill to be addressed through further wind tunnel testing following detail design of Phase 3.
Interim Development Scenario			
Off-Site Thoroughfares	**Negligible**	None	**Negligible to permanent, local and of minor adverse significance**
On-Site Thoroughfares	**Permanent, local and of minor adverse to moderate beneficial significance**	Landscaping scheme, 7m tall deciduous trees to the north and west of Plot G, 7m tall sculpture south of the north-western Plaza access stairs, elevated porous screens north of north-western corner of Plot G.	**Permanent, local and of negligible to moderate beneficial significance**
Off-Site Entrances	**Negligible**	None	**Negligible**
On-Site Entrances	**Permanent local and of negligible to minor beneficial significance**	None	**Permanent local and of minor adverse to minor beneficial significance.**
Off-Site Amenity Spaces	**Negligible**	None	**Negligible**
On-Site Ground Level Amenity Spaces	**Negligible**	None	**Negligible**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
On-Site Terrace Level Amenity Spaces	**Permanent, local and of minor adverse significance**	Planting at least 1.5m tall on the Plot G upper terrace would be expected to improve wind conditions. Landscaping and planting at South Site Plot E roof terrace level.	**Permanent, local and of minor adverse significance.**
Strong Winds	Strong winds at south-eastern corner of Thames Tower (measurement location 79), north and west of the north-western corner of Plot G (measurement locations 149, 155, 157 and 259) and on Garrard Street (measurement locations 89 and 90)	Landscaping scheme, 7m tall trees planted at the southern edge of the Plaza and along the northern side of Garrard Street, 5m tall trees in planters on the southern side of Garrard Street. Planting at least 1.5m tall on the Plot G upper terrace.	Strong winds at measurement location 79 would be present in the baseline and as such it would not be contingent on the applicant to reduce the occurrence of strong winds at this location.
Completed Development Scenario			
Off-Site Thoroughfares	**Permanent, local and of moderate adverse to negligible significance**	Wind mitigation measures specifically trees along Garrard Street, Greyfriars Road, and Station Hill. Further wind tunnel testing to be undertaken at reserved matters stage to determine mitigation based on proposed building geometry.	**Permanent, local and of negligible significance (based on testing of Development Options with mitigation. Final effect to be determined at Reserved Matters Stage).**
On-Site Thoroughfares	**Permanent, local and of minor adverse to moderate beneficial significance**	Wind mitigation measures at Plaza level and canopy applied to Plot G Further wind tunnel testing to be undertaken at reserved matters stage to determine mitigation based on proposed building geometry.	**Permanent, local and of negligible to moderate beneficial significance (based on testing of Development Options with mitigation. Final effect to be determined at Reserved Matters Stage).**
Off-Site Entrances	**Permanent, local and of moderate adverse to negligible significance**	Wind mitigation measures specifically trees along Garrard Street, Greyfriars Road, and Station Hill. Further wind tunnel testing required at Phase 3 detail design.	**Permanent, local and of minor adverse to negligible significance (based on testing of Development Options with mitigation. Final effect to be determined at Reserved Matters Stage).**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
On-Site Entrances	**Permanent, local and of minor adverse to minor beneficial significance**	Further wind tunnel testing required at Phase 3 detail design.	**Permanent, local and of minor adverse to minor beneficial significance**
Off-Site Amenity Spaces	**Negligible**	None	**Negligible**
On-Site Ground Level Amenity Spaces	**Permanent, local and of minor adverse to negligible significance**	Wind mitigation measures, at Plaza level and canopy applied to Plot G	**Permanent, local and of negligible significance (based on testing of Development Options with mitigation. Final effect to be determined at Reserved Matters Stage)**
On-Site Terrace Level Amenity Spaces	**Permanent, local and of minor adverse to negligible significance**	Landscaping and planting at South Site Plot E roof terrace level.	**Permanent, local and of minor adverse (on Plot E) to negligible (on Plots F and G) significance**
On-Site Balcony Level Amenity Spaces	**Permanent, local and of moderate adverse significance**	Further wind tunnel testing required at Phase 3 detail design.	**Permanent, local and of minor adverse significance. Wind conditions to be addressed at Phase 3 detail design.**
Strong Winds	**Strong winds at north-western corner of North Site and at balcony levels.** **As the roof space on Plot G would be accessible for maintenance purposes only, strong winds at location 174 would be acceptable.**	Wind mitigation measures, specifically trees along Garrard Street, Greyfriars Road, and Station Hill. Further wind tunnel testing to be undertaken during the detail design of Phase 3.	**Strong winds at balcony and terrace levels to be resolved at reserved matters stage** **Strong winds adjacent to Phase 3 to be resolved at Reserved matters stage.**

Comparison of Effects between this ES and the 2015 ES as amended by the 2019 ES Addendum

13.179. In the 2015 ES, wind conditions at the existing Site would be similar to those presented in this ES. The Completed Development as assessed for this ES would differ substantially in height and distribution of massing from that assessed for the 2015 ES. As such, local wind conditions in the areas surrounding and through the Proposed Development would be substantially different in distribution and magnitude.

13.180. Prior to the development of wind mitigation measures, the significance of effects in this ES would cover a similar range to those in the 2015 ES as amended by the 2019 ES Addendum prior to the application of wind mitigation measures, ranging from moderate adverse to moderate beneficial. With the development of wind mitigation measures, the significant effects in this ES would be minor adverse, negligible or beneficial, at ground and Plaza levels, which would be similar to those in the 2015 ES. At terrace levels wind conditions would represent a minor adverse to negligible effect;

similar conditions relative to the 2015 ES as amended by the 2019 ES Addendum which had conditions representing a moderate adverse effect.

14. Daylight, Sunlight and Overshadowing

Introduction

14.1. This chapter, prepared by GIA, presents an assessment of the likely effects of the Proposed Development on the daylight and sunlight amenity to the occupiers of neighbouring sensitive properties and overshadowing to existing amenity areas in the vicinity of the Site.

14.2. A solar glare assessment has also been undertaken due to the Proposed Development's proximity to rail tracks to and from Reading station. In addition, a light pollution assessment has been carried out to identify any potential effects to existing and proposed surrounding sensitive receptors.

14.3. This chapter contains a description of the methods used to assess the effects and a description of the relevant baseline conditions of the Site and its surrounding area. This is followed by an assessment of the likely significant effects of the Proposed Development during the demolition and construction works and once the Proposed Development is complete and operational. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any adverse effects identified, and a description is provided of the nature and significance of likely residual effects.

14.4. The assessment of daylight, sunlight and overshadowing effects presented in this chapter is based upon the reserved matters applications for Phase 1 (Plots E and F), the detailed application for Phase 2 (Plot G) and the maximum parameters for Phase 3 (Plots A, B, C and D), and as such, this is considered a worst-case scenario.

14.5. This chapter is supplemented by the following documents:

- **Technical Appendix 14.1**: Drawings of the existing Site and the Development;
- **Technical Appendix 14.2:** Daylight and Sunlight Results to surrounding sensitive receptors;
- **Technical Appendix 14.3:** Overshadowing Results;
- **Technical Appendix 14.4:** Light Pollution Results; and
- **Technical Appendix 14.5:** Solar Glare Results.

14.6. A stand-alone report entitled 'Internal Daylight and Sunlight Design Guide' has been prepared by GIA to review the daylight and sunlight amenity within the Proposed Development.

14.7. Please note that for the purposes of this ES chapter, the demolition and construction works will be referred to as 'the Works'.

Assessment Methodology and Significance Criteria

Assessment Methodology

14.8. The non-mandatory Building Research Establishment (BRE) 'Site Layout Planning for Daylight and Sunlight – A guide to good practice'[1] (hereafter the BRE Guidelines) suggest that residential properties have the highest requirement for daylight and sunlight and state that "the guidelines are intended for use for rooms in adjoining dwellings where light is required, including living rooms, kitchens and bedrooms". Therefore, this chapter focuses on those residential buildings surrounding the Site which would have the potential to be affected by the Proposed Development. The uses of nearby buildings, in terms of commercial and residential, were established using external observations and Valuation Office Agency (VOA) checks. The BRE Guidelines are the industry recognised standard for assessing all matters related to daylight, sunlight and overshadowing, and are the primary reference within all national and local policy.

14.9. When determining whether changes in light condition are in line with policy and guidance, it is important to consider other contextual matters, such as instances where the existing light levels within neighbouring properties are already low, or where the proposed residual values are commensurate with those that would be expected in urban areas of similar density. Furthermore, daylight and sunlight impacts of a development should be balanced against the improvements and benefits which the scheme will bring to the area.

Baseline characterisation

14.10. Baseline characterisation was completed by firstly undertaking a review of the surrounding land uses using information and data sourced from the VOA website. This review was undertaken for all surrounding properties in close enough proximity to the Site to be affected by the Proposed Development, to identify any residential or other sensitive properties that should be considered as potential sensitive receptors.

14.11. It should be noted that buildings with transient use such as classrooms, hospitals and student accommodation have a lower requirement for daylight and sunlight and are therefore given a lower sensitivity than permanent residential properties.

14.12. The review of information and data sourced from the VOA website was followed by a site visit during the month of submission to confirm that the existing conditions around the Site remain accurate to those modelled. The conditions recorded are not considered to have changed from the day of the Site visit to the time of writing this ES chapter.

14.13. Based on the above, a three-dimensional (3D) AutoCAD model was developed for the existing surrounding properties and existing buildings on-Site using a full topographical survey, photogrammetric survey and Site photographs.

Scenarios assessed

14.14. The following scenarios have been considered and are reported within this chapter of the ES:

- Baseline Scenario;
- Demolition and Construction Scenario – qualitative assessment;
- Interim Development Scenario (Phases 1 and 2 of the Proposed Development) – qualitative assessment;
- Complete and Operational Development Scenario (Phases 1, 2 and 3);
- Comparison with the 2016 Consented Scheme; and
- Cumulative Scenario (presented in **Chapter 15** and therefore not discussed further in this Chapter).

Baseline Scenario

14.15. The Baseline Scenario has considered the current baseline condition (as at the time of writing) at identified sensitive receptors. It is depicted on drawings 5847/76/01/01, 5847/76/01/02 and 5847/76/01/03 (**Technical Appendix 14.1**). The future baseline scheme (Former Coopers BMW site, Napier Road / Kings Meadow Road Reading RG1 8BN) is too far away from the Site to affect the daylight, sunlight and overshadowing conditions on the Site or at surrounding sensitive receptors and has therefore not been considered within this assessment.

14.16. As noted above, the BRE Guidelines state that residential properties have the highest requirement for daylight and sunlight. Accordingly, existing residential receptors adjoining or in proximity to the Site have been considered within this assessment.

14.17. For overshadowing, all neighbouring amenity areas from the north, north-east and north-west of the Site in close enough proximity to experience overshadowing from the Proposed Development have been considered.

Demolition and Construction

14.18. The Demolition and Construction Scenario has been assessed qualitatively, based on professional judgement.

Interim Development Scenario

14.19. The Interim Development Scenario comprises the completed and operational Phase 1 and Phase 2 of the Proposed Development in the context of the surrounding existing environment other than Xafinity House which will have been demolished prior to completion of Phase 2. This scenario assesses the potential daylight, sunlight and overshadowing effects from this Interim Development Scenario. The Interim Development Scenario has been assessed qualitatively, based on professional judgement.

Completed Development Scenario

14.20. The Completed Development Scenario consists of the detailed Phase 1 and 2, and the outline maximum parameter scheme for Phase 3 in the context of the surrounding existing environment. This scenario assesses the potential daylight, sunlight, overshadowing, solar glare and light pollution effects of the Proposed Development on the surrounding receptors and amenity spaces as well as sensitive road junctions and train lines.

14.21. This scenario is illustrated on drawing numbers 5847/76/01/04, 5847/76/01/05 and 5847/76/01/06 (**Technical Appendix 14.1**).

Consented Scheme Scenario

14.22. This scenario assesses the potential daylight, sunlight and overshadowing effects of the Proposed Development in comparison with those of the 2016 Consented Scheme as amended by the Section 73 Applications for Phase 1 (Planning References: 190441 and 190442) in the context of the surrounding existing environment. This enables a comparison of the effects of the 2015 ES as amended by the 2019 ES Addendum with the effects of the Proposed Development.

14.23. This scenario is illustrated on drawing numbers 5847/76/02/01, 5847/76/02/02 and 5847/76/02/03 (**Technical Appendix 14.1**).

Sensitive Receptors

Daylight and Sunlight

14.24. As set out in the assessment methodology, existing residential receptors are considered to be sensitive receptors that may be affected by the Proposed Development.

14.25. As shown in **Figures 14.1** and **14.2**, and Table 14.1, the following residential properties have been considered due to their proximity to the Site.

Table 14.1 Daylight and Sunlight Receptor Locations

Daylight and Sunlight Receptor Location	
1-15 Tanfields, Vachel Road	30 Garrard Street
Reada Court, Vachel Road	125 Friar Street
1-29 Sackville Street (odds)	127 Friar Street
5-21 Tudor Road (Friary Court)	136-137 Friar Street
Alexia Court, 3 Tudor Road	144 Friar Street
9-11 Stanshawe Road	1-29 Projection East, Merchants Place
5-19, and 25 Vachel Road (odds)	1-41 Icon House, Merchants Place
Belmont Court, Vachel Road	1-45 Projection West, Merchants Place
20-24 Vachel Road	7-11 Station Road
Montrose House, Vachel Road	49-51 Greyfriars Road
8-18 Stanshawe Road (evens)	53 Greyfriars Road
13-19 Stanshawe Road (odds)	Bridewell & Samuel House, Greyfriars Road - Student Housing
32-34 Friar Street	The Gateway Public House, 31 Greyfriars Road
18-29 Regent Court	Malcolm Place, Caversham Road
21-23 Vachel Road	27-31 Vachel Road

14.26. In terms of daylight and sunlight, the neighbouring consented scheme 52-55 Friar Street and 12 Greyfriars Road (162210) has been considered a future sensitive receptor.

14.27. The approved reserved matters details for Plots E and F have also been assessed as future sensitive receptors in terms of daylight.

14.28. Plots A, B and D are considered part of the proposed outline submission. Their daylight potential has therefore been addressed in the form of a 'Daylight and Sunlight Design Guide', which sits outside of the EIA, but forms part of the application documents.

Overshadowing

14.29. Owing to the southerly location of the sun path, only the amenity areas located to the north of the Site have the potential to experience alterations in overshadowing with the Proposed Development implemented. Therefore, only amenity areas located northward of the Site from due east to due west have been considered. Due to the scale of the Proposed Development and the nature of the surrounding area, the amenity areas in proximity to the Site that are considered sensitive in terms of overshadowing are shown in **Figure 14.3** and Table 14.2.

Table 14.2 Overshadowing Receptor Locations

Overshadowing Receptor Location
Station Hill Square
Montrose House Communal Roof Terrace
Private gardens serving 5-21 Tudor Road (Friary Court)
Rear private gardens serving 9-17 Stanshawe Road (odds)
Rear private gardens serving 8-28 Stanshawe Road (evens)
Rear private gardens serving 7-31 Vachel Road (odds)

Light Pollution

14.30. Light Pollution is not a comparative assessment; the fact that there may be light pollution in the Baseline Scenario does not necessarily justify its occurrence as a result of a development. Therefore, this assessment considers the effect of the Proposed Development in absolute terms and not against the Baseline Scenario.

14.31. All residential buildings within 20 metres of a commercial building have the potential to experience light pollution effects, including proposed residential buildings within the Site as outlined below. The residential receptors considered sensitive in terms of light pollution are shown in **Figure 14.4** and Table 14.3.

14.32. Light pollution assessments can only be undertaken where the façades, internal layouts and floor/ceiling levels details are known. As such, the receptors assessed relate solely to light pollution from Plot G. Although Phase 3 is intended to include commercial uses, the details required to undertake a light pollution assessment from this Phase are currently unknown. As a result, the scope of receptors will need to be reconsidered at reserved matters stage to include any neighbouring buildings within 20m of the Phase 3 commercial elements.

Table 14.3 Light Pollution Receptor Locations

Overshadowing Receptor Location	Receptor Type
30 Garrard Street	Existing Surrounding Receptor
Plot E	Internal Future Receptor
Plot F	Internal Future Receptor
Plot D	Internal Future Receptor

14.33. Plots A and B of the Proposed Development are too far from Plot G to experience light pollution effects and are therefore not considered sensitive.

14.34. All other sensitive receptors are considered too far from the Site to be affected by the Proposed Development in terms of light pollution.

Solar Glare

14.35. Solar Glare is not a comparative assessment; the fact it may occur in the Baseline Scenario does not necessarily justify its occurrence as a result of a development. Therefore, this assessment considers the effect of the Proposed Development in absolute terms and not against the baseline.

14.36. The nearby railway lines, as detailed in Table 14.4 and shown in **Figure 14.5** have been considered in this assessment. The bi-direction train line closest to the Site has been assessed in both directions as a worst-case scenario. All other lines approaching and departing Reading Station are expected to experience similar or lesser effects than those of the assessed trainline.

Table 14.4 Solar Glare Receptor Locations

Solar Glare Receptor	Receptor Reference	Direction of Travel	Number of Viewpoints Assessed
Track 7 West	W1 – W11	Westbound	11
Track 7 East	E1 – E8	Eastbound	8

Approach to Assessment of Demolition and Construction

14.37. Owing to the evolving and changing nature of the works, the assessment of potential effects during demolition and construction of the Proposed Development on daylight, sunlight and overshadowing to surrounding receptors has not been modelled. Instead, a qualitative assessment has been undertaken using professional judgement and experience.

14.38. The potential daylight, sunlight and overshadowing effects relating to demolition and construction works would vary throughout the construction programme and gradually increase to the potential effects identified for the Completed Development. It is considered that the Completed Development Scenario represents the worst-case assessment in terms of likely effects on levels of daylight, sunlight and overshadowing received by sensitive receptors.

Approach to Assessment of the Complete and Operational Effects

14.39. The technical analyses carried out to inform the assessments have been undertaken by creating a digital 3D model of the existing Site, and the complete and operational Proposed Development, based on measured survey data.

Daylight

14.40. The BRE Guidelines specify two primary methods for assessing daylight within an existing sensitive receptor:

- Vertical Sky Component (VSC); and
- No Sky Line (NSL) Method.

14.41. In the assessment of future receptors, namely 52-55 Friar Street and 12 Greyfriars Road, as well Plots E and F within the Proposed Development, the Average Daylight Factor (ADF) method will be used as specified in the BRE Guidelines for assessment of new receptors.

14.42. These are presented in further detail below.

Vertical Sky Component (VSC) Method

14.43. The VSC method of assessment is defined in the BRE Guidelines as the:

"ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky".

14.44. The 3D model uses a Waldram Diagram to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by existing and proposed buildings, and thus calculate the sun hours on ground in each scenario and how the Proposed Development would affect the amount of daylight being received at surrounding sensitive receptors.

14.45. Only those surrounding properties which have windows facing towards the Site were included in the assessment. If a nearby property has no windows facing the Site, this property would not be affected by the Proposed Development in terms of light.

14.46. The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings.

14.47. Regarding existing trees, these may be ignored unless they form dense continuous belts. As stated within the BRE "*where the effect of a new building on existing building is being analysed, it is usual to ignore the effect of existing trees. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf*." There are no "*dense continuous belts*" of trees within the Site, and as such, trees are excluded from the assessment as per the BRE Guidelines.

14.48. The maximum VSC value is 39.9% for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines state that:

"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if either:

- *the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value;*
- *the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value."*

14.49. It is acknowledged that the values in the BRE Guidelines are derived on the basis of a 2-3 storey suburban model, therefore the application of its guidelines in inner urban environments should be treated flexibly. This form of assessment does not take account of context or detailed matters such as window size, room use, room size, window number or dual aspect rooms. This assessment also assumes that all obstructions to the sky are 100% non-reflective. It should be noted that the BRE Guidelines acknowledges this and state, in paragraph 2.2.3;

2.2.3 'The numerical values given here are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints.'

14.50. Clearly in more urban environments, if development is to meet the scale and proportion of neighbouring buildings, large factor reductions are very difficult to avoid. GIA's experience in daylight and sunlight matters in dense urban environments suggest that weight should also be given to the retained values rather than just the percentage change. Our experience in the field would suggest that a more realistic VSC level in a dense urban environment would be considered to be around 15%.

14.51. GIA's view on retained VSC levels is supported by the Greater London Authority's hearing report for the Monmouth House and Featherstone Street development (application reference: P2015/3136/FUL) where it was considered in Para 120, Page 31:

'For general guidance, whilst the BRE guidelines recommend a target value of 27% VSC when measured on an absolute scale, that value is derived from a low density suburban housing model. In an inner city urban environment, VSC values in excess of 20% should be considered as reasonably good, and VSC in the mid-teens should be acceptable.'

No Sky Line (NSL) Method

14.52. The NSL method is a measure of the distribution of daylight at the 'working plane' within a room. For residential properties, the 'working plane' is a horizontal plane 0.85m above finished floor level. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room may be poor and supplementary electric lighting may be required.

14.53. Where actual room layouts were available, these have been considered in the modelling of the NSL. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms using the NSL method. Where layout information was not available, assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases, a standard 4.2m (14 ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable.

14.54. The potential effects of daylighting distribution in an existing building can be found by plotting the NSL in each of the main rooms. For houses, this would include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are less important. The BRE Guidelines identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its former value, then this would be noticeable to its occupants.

14.55. British Standard (BS) 8206 Part 2 Lighting for Buildings, Code of Practice for Daylighting also states that the:

"uniformity of daylight is considered to be unsatisfactory if a significant part of the working plane (normally more than 20%) lies behind the no-sky line".

14.56. Therefore, an NSL of at least 80% would be considered satisfactory.

14.57. In relation to deep rooms lit by windows on one side, the BRE Guidelines state in paragraph 2.2.20:

"If an existing building contains rooms lit from one side only and greater than 5m deep, then a greater movement of the no sky line may be unavoidable."

Average Daylight Factor (ADF)

14.58. 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."

14.59. 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.

14.60. This is, therefore, a significantly more detailed method of assessment than the VSC method.

14.61. 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.

14.62. 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.

Alternative Targets - Daylight

14.63. Where moderate and major effects are experienced, an assessment against the retained levels of the 2016 Consented Scheme as amended by the 2019 Section 73 Applications (hereafter the 2016 Consented Scheme as amended) has been undertaken as a means of establishing alternative targets. This methodology is suggested within the BRE Guidelines for sites where the advisory

numerical target values may not be appropriate due to the special requirements of its location, such as city centres, or where an extant planning permission exists and the developer seeks to change the design. The BRE Guidelines also state that '*since the permitted scheme only exists on paper, it would be inappropriate for it to be treated in the same way as an existing building, and for the developer to set 0.8 times the value for the permitted scheme as the benchmark'*, therefore the following criteria have been used to assess whether the Proposed Development leads to material changes in light when compared to the 2016 Consented Scheme as amended:

- 3% absolute loss in VSC when comparing the retained levels of the Proposed Development to the retained levels of the Extant Planning Permission scheme; and
- 10% absolute loss in NSL when comparing the retained levels of the Proposed Development to the retained levels of the Extant Planning Permission scheme.

Sunlight

Annual Probable Sunlight Hours (PSH)

14.64. The annual PSH is a measure of sunlight that a given window may expect over the period of a year where there is no obstruction and equates to a maximum of 1,486 hours. Sunlight is measured using a sun indicator which contains 100 spots, each representing 1% of annual PSH (i.e. 14.86 hours of the annual PSH).

14.65. The number of spots is calculated for all scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of PSH for each of the time periods for each window assessed.

14.66. The BRE Guidelines note on page 14 that:

- *"In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon."*
- *"all main living rooms of dwellings…should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun".*
- *"If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked."*
- *"…a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day"*.

14.67. In regard to existing surrounding receptors, the BRE Guidelines provide that a window may be adversely affected if a point at the centre of the window receives for the whole year, less than 25% of the annual PSH, of which at least 5% should be received during the winter months (21 September to 21 March) (winter PSH). In addition, if a window experiences less than 0.8 times its former sunlight hours during either period, and if there is a reduction in annual PSH which is greater than 4% it may be adversely affected.

14.68. British Standard – Lighting for buildings – Part 2: Code of practice for daylight[2] (hereafter BS 8206 Part 2) states that:

- *"Provided that the entry of sunlight is properly controlled, it is generally welcome in most buildings in the UK. Dissatisfaction can arise as much from the permanent exclusion of sunlight*

as from its excess. The provision of sunlight is important in dwellings, particularly during winter months. Sunlight is especially valued in habitable rooms used for long periods during the day."

- *"Interiors in which the occupants have a reasonable expectation of direct sunlight should receive at least 25% of probable sunlight hours (see 2.10.2). At least 5% of probable sunlight hours should be received during the winter months, between 21 September and 21 March. Sunlight is taken to enter an interior when it reaches one or more window reference points."*

14.69. It is often not possible to determine the room uses within each of the neighbouring properties, nor is it clear which windows should be considered as the 'main windows'. Therefore, regardless of use, all the rooms with windows facing the Site and within 90 degrees of due south have been considered in the assessment.

Alternative Targets – Sunlight

14.70. Where moderate and major effects are experienced, an assessment against the retained levels of the 2016 Consented Scheme as Amended has been undertaken as a means of establishing alternative targets. This methodology is suggested within the BRE Guidelines for Site's where the advisory numerical target values may not be appropriate due to the special requirements of its location, such as city centres, or where an extant planning permission exists and the developer seeks to change the design. The BRE Guidelines also state that '*since the permitted scheme only exists on paper, it would be inappropriate for it to be treated in the same way as an existing building, and for the developer to set 0.8 times the value for the permitted scheme as the benchmark'*, therefore the following criteria have been used to assess whether the Proposed Development leads to material changes in light when compared to the Extant Planning Permission:

- 2% absolute loss in annual PSH when comparing the retained levels of the Proposed Development to the retained levels of the Extant Planning Permission scheme; and
- 1% absolute loss in winter PSH when comparing the retained levels of the Proposed Development to the retained levels of the Extant Planning Permission scheme.

Summary of Criteria for Daylight and Sunlight

14.71. Table 14.5 provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.

Table 14.5: Summary of Daylight and Sunlight Assessment Criteria

Method	BRE Criteria
VSC	A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times is former value.
NSL	A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.
ADF	A retained ADF level of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms should be achieved.
PSH	A room may be adversely affected if it received for the whole year, less than 25% of the annual PSH including at least 5% of the annual PSH during the winter months (21 September to 21 March) (winter PSH). In addition, if a window experiences less than 0.8 times its former sunlight hours during either period. and for existing neighbouring buildings, if there is a reduction in annual PSH which is greater than 4%.

Overshadowing

Transient overshadowing

14.72. The BRE Guidelines suggests that where large buildings are proposed that may affect a number of gardens or open spaces, it is useful to plot a shadow plan to illustrate the location of shadows at different times of the day and year. For the purpose of this assessment the hourly shadows were mapped for the following three key dates in the year:

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

14.73. The 21 September (Autumn Equinox) is not assessed owing to the identical solar altitude and therefore equivalent outcomes of overshadowing to those presented for 21 March.

14.74. The transient overshadowing has been calculated at hourly intervals throughout the day from 06:00 to 20:00, and visual representations are provided in **Technical Appendix 14.3**. Where there are gaps in timings in **Technical Appendix 14.3**, this is because the sun would not be present during these times (for example, from approximately 16:00 GMT onwards on 21 December) and thus no shadow can be cast. On December 21, the sun is at its lowest point causing long shadows to be cast and this represents the worst-case scenario in terms of overshadowing.

14.75. The analysis described above varies according to different latitudes. The Site is located within Reading, which is at a latitude of 51.5° north.

Sun Hours on Ground

14.76. The BRE Guidelines suggest that Sun Hours on Ground assessments should be undertaken on the equinox (21 March or 21 September). Using specialist software, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.

14.77. It is recommended that at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20% reduction).

Light Pollution

14.78. Light pollution is defined as any light emitting from artificial sources into spaces where it is unwanted, such as spillage of light from office or commercial buildings onto residential accommodation, where this would cause nuisance to the occupants. Commercial buildings and office spaces are illuminated to 500 lux (in accordance with British Standard BS EN 12464-1:2002) and are highly glazed thus have the potential to cause effects from light spillage, whilst residential buildings are illuminated to lower levels and are less likely to be highly glazed, therefore do not require assessments in terms of light pollution effects. The Institution of Lighting Professionals (ILP) Guidance for the Reduction of Obtrusive Light GN01:2011[3] (hereafter the ILP Guidance) provide suggested lighting level values to ascertain the acceptability of lighting levels on light pollution.

14.79. It should be noted that artificial light is not always perceived as being negative, particularly in areas of high crime where good street lighting and light into street environments is seen as a positive attribute. Adverse effects caused as a result of electric lighting include the intrusion of light into sensitive locations such as adjacent residential accommodation, areas of special night-time interest, ecologically sensitive areas, or needless spillage into the night sky.

14.80. Potential light pollution effects of a new development are typically assessed in relation to four specific criteria:

- Sky Glow is the brightening of the night sky over our towns, cities and countryside. It can be quantified by measuring the Upward Light Ratio (ULR), which is the maximum permitted percentage (%) of luminaire flux for the total installation that goes directly into the sky;
- Light Intrusion is the spilling of light beyond the boundary of a proposed development. It is assessed as vertical illuminance in lux (Ev) measured flat at the centre of the sensitive receptor;
- Luminaire Intensity is the uncomfortable brightness of a light source when viewed against a dark background. It is applied to each source visible from a sensitive receptor and is measured as source intensity (I) (kcd); and
- Building Luminance which can cause an increase in the brightness of a general area and is measured in cd per metre squared (L) as an average over the building facade caused only by external lighting.

14.81. Whilst the ILP Guidance relates and refers to external luminaires only, commercial buildings with large areas of glazing and possible night-time usage can sometimes cause light intrusion from their internal luminaires. For this reason, quantitative light pollution assessments can be undertaken in relation to these internal luminaires.

14.82. The Proposed Development would include external lighting (street, public realm and façade) but as this is yet to be designed. Any proposed lighting would be designed and installed according to the ILP Guidance specifications and as such the effects are considered to be negligible. This is confirmed by the Proposed Development's Lighting Strategy prepared by DPA Lighting. As such, light pollution effects from external lighting sources is scoped out of this assessment.

14.83. Light pollution effects from internal (office) lighting can only be quantitively assessed where the façade and internal details of a proposed building are known. As such, the light pollution assessment only considers the potential effects of the detailed Plot G (Phase 2) within the Proposed Development. Whilst Phase 3 (Plots A, B, C and D) is proposed to include commercial uses, the planning application for this Phase is being submitted in outline, thus the façade and internal details are not yet known, and potential light pollution effects cannot be assessed.

14.84. In relation to the internal luminaires of the proposed office floors of Plot G, whilst a detailed lighting design has yet to be specified and will be designed as part of the tenancy fit-out, a light intrusion assessment as outlined below has been undertaken in order to quantify the potential effects. A technical assessment of Sky Glow, Luminaire Intensity and Building Luminance is inappropriate for internal lighting and has therefore not been considered as part of this assessment.

Light Intrusion Methodology

14.85. The assessment has been undertaken by preparing a computer-generated 3D model of the Proposed Development and using specialist lighting simulation software. The light fittings used for this lighting simulation represent typical recessed office luminaires regularly spaced on the proposed office ceilings within Plot G in order to achieve an average illuminance of 500 lux across the working plane. This assessment assumes that all luminaires are switched on at once and no blinds or shading devices are deployed and so it should be considered a worst-case assessment.

14.86. The ILP Guidance provides light pollution targets by Environmental Zone (ranging from E0 Protected dark areas to E4 Urban). The targets also consider a pre-curfew and post-curfew condition, i.e. before 11pm at night and after 11pm until morning. Based on the environmental zones detailed in the ILP Guidance, as set out in Table 14.6, the Site is classified as environmental

zone E4. This zone allows for a maximum pre-curfew light intrusion level of 25 lux and a maximum post-curfew light intrusion level of 5 lux.

Table 14.6: ILP Light Pollution Criteria for Environmental Zones

Environmental Zone	Sky Glow ULR (Max %) (1)	Light Intrusion (into windows) Ev (Lux) (2)		Luminaire Intensity (candelas) (3)		Building Luminance Pre-curfew (4)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L (cd/m^2)
E0 – Dark areas (e.g. UNESCO Starlight Reserves, IDA Dark Sky Parks)	0	0	0	0	0	0
E1- Intrinsically dark areas (e.g. National Parks, areas of outstanding natural beauty)	0	2	0 (1*)	2,500	0	0
E2- Low district brightness (e.g. rural or small village locations)	2.5	5	1	7,500	500	5
E3- Medium district brightness (e.g. small town centres or urban locations)	5.0	10	2	10,000	1,000	10
E4- High district brightness (e.g. town/city centres with high levels of night time activity)	15.0	25	5	25,000	2,500	25

Notes:

ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky

Ev = Vertical Illuminance in Lux and is measure flat on the glazing at the centre of the window

I = Light Intensity in Cd

L = Luminance in Cd/m2

Curfew = The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the planning authority. If not otherwise stated – 23.00 hrs is suggested.

* = From Public road lighting installations only.

Solar Glare

14.87. Solar glare is particularly important at pedestrian and road junctions, where glare can cause temporary blinding of drivers or pedestrians. Typically, elements considered to be reflective are either glazed apertures or metal cladding.

14.88. The BRE Guidelines includes the following statement in regard to the potential for reflected solar glare from a new development:

"Glare or solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings. The problem can occur either when there are large areas of reflective glass or cladding on the façade, or when there are areas of glass

or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long term problem only for some heavily glazed (or mirror clad) buildings…"

14.89. Solar Glare effects can only be quantitively assessed where the façade details of a proposed building are known. Typically, only highly glazed buildings are considered which are visible from sensitive receptors like road junctions or, as in this case, railway lines. As such, the solar glare assessment only considers the potential effects of the detailed Plot G (Phase 2) within the Proposed Development. Phase 3 is being submitted in outline, thus the façade details are not yet known and potential solar glare effects cannot be assessed yet.

Viewpoints for Railway lines

14.90. Instances of solar reflection have the potential to affect train drivers and their view of signals. Due to the proximity of the Site to the railway line running to and from Reading Station, an assessment has been undertaken from these viewpoints.

14.91. In the case of a train driver, the view direction is defined by the rail tracks. The Railway Group Standard GE/RT8037 Signal Positioning and Visibility[4] sets the eye level of the driver at 2.75 m above the rails. The view point is centred between the tracks for ease of reference. Although train drivers sit slightly to the left within the cabin, this bears no material effect on the analysis of the images as the signals are visible at a distance of hundreds of metres at which point the slight shift in the cabin equates to a very small angular change.

14.92. The assessment also considers a train drivers field of vision which takes the angular extent seen at any given time, which for humans facing forwards is approximately 180 degrees.

Solar Glare Technical Assessment

14.93. The potential for reflected solar glare or dazzle from glazed or reflective façades from the Proposed Development has been assessed using specialist lighting software. The assessment shows the path of the sun for the entire year around the Proposed Development. From this, two computer generated angular images have been produced for each selected viewpoint, indicating the area which sees the reflection of the sun path at any point during the year. A modified diagram portraying a standardised extent of human vision is then overlaid onto the image.

14.94. The assessment has been undertaken on the basis that the fovea centralis (also generally known as the fovea) is a part of the eye, located in the centre of the macula region of the retina. The fovea is responsible for sharp central vision (also called foveal vision), which is necessary in humans for reading, watching television, driving, and any activity where visual detail is of primary importance. The macula corresponds to the central 13° of the visual field; the fovea to the central 3°.

14.95. **Figure 14.6** highlights the degrees of vision corresponding to the foveal view, with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare. Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.

14.96. The degrees of vision provide a reference from which significant effects can be identified. At 3°, the potential for the reflected glare to cause a hazard is high and mitigation would be required. Between 3° and 30°, there is the potential that there could be an issue and mitigation may be necessary.

14.97. As stated in the International Commission on Illumination (CIE) CIE Collection on Glare (CIE 146:2002)[5], occurrences at angles beyond 30° would be of little significance in most situations but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car, for

example, the limits of the windscreen would generally obstruct the driver's view at angles beyond 30° from the line of sight. Therefore, the risk of reflective solar glare causing a hazard is reduced and, as such, mitigation would make only a minor difference.

14.98. The methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year and the location of this occurrence in respect of an individual's line of sight. It is also to be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

14.99. It must be noted that the solar glare assessments undertaken assume a worst-case scenario whereby the sun will shine every day during daylight hours which is not the case within the UK.

Significance Criteria

Effect Significance Terminology Overview

14.100. In terms of sensitivity, surrounding properties are considered highly sensitive to daylight and sunlight levels, and specifically habitable rooms within the properties such as living rooms, kitchens and bedrooms, in accordance with the BRE Guidelines. All existing residential receptors assessed within this chapter are considered highly sensitive due to the expectation of natural light. Buildings with transient occupants such as student accommodation are considered to be of lower sensitivity as they are not permanent residences and are transient in nature.

14.101. For transient overshadowing, all public areas of open space such as parks and squares and neighbouring communal amenity areas and private gardens are considered highly sensitive.

14.102. In relation to light pollution, all of the receptors that have been assessed are considered to be of high sensitivity.

14.103. For solar glare, all viewpoints are considered to be of high sensitivity.

14.104. The key terminology used to describe the magnitude of effects within this chapter is as follows and is further described in the below sections of this chapter:

- major;
- moderate;
- minor; and
- negligible.

14.105. The nature of the effects may be either adverse (negative) or beneficial (positive).

14.106. Following the classification of an effect using this methodology, a clear statement is then made as to whether the effect is significant or not significant. As a general rule, in relation to sunlight, daylight, overshadowing, light pollution and solar glare the following criteria is applied:

- 'moderate' or 'major' effects are deemed to be 'significant';
- 'minor' effects are considered to be 'not significant', although they may be a matter of local concern; and
- 'negligible' effects are considered to be 'not significant' and not a matter of local concern.

Evaluating Effects and Significance – Daylight, Sunlight and Overshadowing

Daylight and Sunlight

14.107. For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying Appendix I, in terms of assigning criteria to assess the effects:

- Section 3 of Appendix I states*: "Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space… The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied."*
- Paragraph 5 of Appendix I states*: "Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space."*
- Paragraph 6 of Appendix I states: *"Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or long-term, local, adverse of major significance. Factors tending towards a minor adverse impact include:*
  - *Only a small number of windows or limited area of open space are affected;*
  - *The loss of light is only marginally outside the guidelines;*
  - *An affected room has other sources of skylight or sunlight; and*
  - *The affected building or open space only has a low level of requirement for skylight or sunlight."*

14.108. The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines:

"*Factors tending towards a major adverse impact include:*

- *a large number of windows or large area of open space are affected;*
- *the loss of light is substantially outside the guidelines;*
- *all the windows in a particular property are affected; and*
- *the affected indoor or outdoor spaces have a particular strong requirement for skylight or sunlight, e.g. a living room in a dwelling or a children's playground"*.

14.109. Where the BRE Guidelines are met, the effects would be considered negligible.

14.110. With regard to the BRE Guidelines, professional judgement has been used to determine whether the potential effects would result in adverse or beneficial effects. The initial numerical criteria for determining the category of effect is based on percentage alterations, as follows:

- 0 – 19.9% alteration = negligible;
- 20 – 29.9% alteration = minor;
- 30 – 39.9% alteration = moderate; and
- Greater than 40% alteration = major.

14.111. For instances where existing VSC, NSL and annual PSH levels within a property are low, any alteration may result in a disproportionate percentage change, whereby the actual change in daylight or sunlight within the property experienced by the occupant may not be as noticeable as

the percentage change would suggest. This is one example of when professional judgement is taken into account.

14.112. Therefore, when assigning an overall significance per property, consideration has been given to the proportion of rooms / windows affected, as well as the percentage alterations, absolute changes, and any other relevant factors, such as the presence of balconies, overhangs or design features which may also affect the determination of the significance of effect.

14.113. Where room uses are unknown, all rooms assessed within the property or building are considered habitable to give the worst-case scenario for potential daylight and sunlight effects caused by the development.

14.114. Where the scale of VSC levels and NSL levels within a property differ, professional judgement has also been used to determine an overall significance. In addition, if the scale of annual PSH and winter PSH differ greatly, professional judgement has also been used to determine the significance of the effect. This has been based on the factors previously stated.

Overshadowing

Transient Overshadowing

14.115. The BRE Guidelines do not include criteria for assessing the significance of transitory overshadowing other than to identify the different times of the day and year when shadow would be cast over a surrounding area.

14.116. The assessment of potential effects as a result of transient overshadowing is therefore based on professional judgement, taking into consideration the conditions of the existing Site and surrounding area, and comparing these conditions against the effect of the transient overshadowing arising from the Proposed Development.

Sun Hours on Ground

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

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

14.119. Table 14.7 sets out the numerical BRE criteria adopted in relation to the sun on ground assessment.

Table 14.7: Numerical BRE criteria for Sun Hours on Ground assessment

Significance	Numerical criteria on 21st March
Negligible	Over 50% of the amenity area will receive 2 hours of sunlight or less than 20% alteration in area which receives 2 hours of direct sunlight.
Minor adverse	20-29.9% reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).

Significance	Numerical criteria on 21st March
Moderate adverse	30-39.9% reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).
Major adverse	40%+ reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).

Light Pollution

14.120. The ILP Guidance Notes do not provide details on assigning significance of effects for light pollution, therefore the assessment is based on professional judgement considering the extent of the residential façade adversely affected as well as the extent to which the thresholds set out in the guidance are exceeded. Table 14.8 highlights the criteria used to assign a specific significance.

Table 14.8: Criteria Used for Determining the Effect of Light Pollution

Significance	Description
Negligible	No breaches of ILP criteria for pre-curfew or post-curfew.
Minor adverse	Small breaches of ILP post-curfew criteria, marginally noticeable to the sensitive receptor. This may include marginal breaches of the ILP criteria which should be viewed in the context of the urban character of the area. No breaches in ILP pre-curfew criteria.
Moderate adverse	Breaches in ILP post-curfew criteria which may cause a moderate noticeable change to the sensitive receptor. This may consist of a large proportion of marginal infringements of the numerical values suggested in the ILP guidance and/or a small percentage of significant infringements. No breaches in ILP pre-curfew criteria.
Major adverse	Breaches in ILP post-curfew criteria which may cause a major noticeable change to the sensitive receptor. This may consist of a large proportion of significant breaches of both the pre-curfew and post-curfew criteria suggested within the ILP Guidance Notes.

Solar Glare

14.121. There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare. Generally, however, solar reflections at high altitudes are less likely to cause nuisance or distraction as one has to look upwards to see it.

14.122. Professional judgement has therefore been applied to assign the significance of solar glare arising from the Proposed Development and to determine the criteria for assessing the significance of solar glare set out in Table 14.9.

14.123. Multiple viewpoints may be chosen for each of the train line or signals affected. In terms of significance criteria however, professional judgement has been used to determine the effect at the location rather than the individual perspectives within a section of track. Factors that could influence the significance of effect may include:

- sunlight availability probability;
- area of façade off which reflections are visible;
- period of time reflections are visible;
- angle at which reflections are visible from line of sight;
- views of the development being obscured for example by trees; and
- the time of day at which the solar reflection will occur for example during peak traffic times.

14.124. Initially, the following guide will be used to ascertain the possible significance for each view and the factors listed above will then be taken into consideration to determine the overall significance for the designated viewpoint.

Table 14.9: Criteria Used for Determining the Effect of Solar Glare

Significance	Possible factors
Negligible	No reflections are visible or if visible all occur at angles greater than 30° from the driver's line of sight and so, as stated by the CIE, will be of "little significance".
Minor adverse	Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time.
Moderate adverse	Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time.
Major adverse	Solar reflections are visible within 5° of a driver's line of sight.
Note – mitigating factors such as alternative and unaffected signals/traffic lights and car visor angle may result in the assignment of significance which differs from the above.	

Assumptions and Limitations

14.125. Where actual room layouts were available, these have been considered when modelling the internal layouts of surrounding properties. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2m (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL.

14.126. Floor levels have been assumed for surrounding properties where access has not been obtained. With the working plane located 850mm above the finished floor level, this has the potential to affect the assessment of NSL.

14.127. For solar glare, although great care has been taken in identifying typical viewpoints, this does not guarantee that there are no additional sensitive locations where reflected solar glare could present a particular risk. For practical reasons, the area of the assessment has been limited to the area surrounding the Proposed Development. This area extends to a distance of approximately 600 m around the Site in all directions. At greater distances, the likelihood of solar reflections causing significant glare is reduced as the time that buildings will reflect is reduced and the area of façade visible constitutes a reduced angle and so reduces the possibility of the whole sun disk being reflected. This is the standard approach adopted to solar glare assessment within EIA.

14.128. In addition, the methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year, and the location of this occurrence in respect of an individual's line of sight. It must also be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account. This is the standard approach adopted to solar glare assessment within EIA.

Baseline Conditions

Existing Baseline

14.129. The study area comprises an urban area with buildings of multiple tenures and scales ranging from three storey buildings to the west through to larger buildings, such as Thames Tower, to the east and south, and with the low-rise Reading Station buildings to the north.

14.130. The existing baseline is shown in drawings 5847/76/01/01, 5847/76/01/02 and 5847/76/01/03 in **Technical Appendix 14.1**.

Baseline Daylight and Sunlight to Surrounding Sensitive Receptors

14.131. A total of 1,212 windows serving 869 rooms within 63 residential buildings have been assessed for daylight. For sunlight, 368 rooms within 26 residential buildings have been assessed. The full baseline daylight and sunlight assessment is presented within **Technical Appendix 14.2** and is summarised in Table 14.10.

Table 14.10: Summary of Baseline Daylight and Sunlight Levels

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that meet NSL Criteria (>80%)		Total No. of Rooms that meet annual PSH criteria	
	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed
1-15 Tanfields	7	18	8	10	2	6
Reada Court	12	14	10	10	10	10
1 Sackville Street	3	4	1	4	-	-
3 Sackville Street	6	7	4	5	0	1
5 Sackville Street	4	5	5	5	-	-
7 Sackville Street	6	6	4	4	-	-
9 Sackville Street	4	4	4	4	-	-
11 Sackville Street	4	4	3	4	-	-
13 Sackville Street	2	3	2	3	-	-
15 Sackville Street	3	5	4	5	0	1
17 Sackville Street	3	5	3	4	0	1
19 Sackville Street	5	7	3	4	0	1
21 Sackville Street	2	3	1	3	-	-
23 Sackville Street	4	4	3	4	-	-
25 Sackville Street	3	6	3	5	0	1
27 Sackville Street	4	6	3	4	0	1
29 Sackville Street	2	4	2	4	0	1
5-21 Tudor Road (Friary Court)	41	52	37	39	39	39

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that meet NSL Criteria (>80%)		Total No. of Rooms that meet annual PSH criteria	
	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed
Montrose House	20	20	20	20	-	-
125 Friar Street	7	28	3	3	-	-
127 Friar Street	3	6	4	5	-	-
1-29 Projection East	20	94	24	66	0	15
13 Stanshawe Road	3	3	2	2	-	-
136-137 Friar Street	1	9	3	4	1	1
1-41 Icon House	10	54	13	38	0	16
144 Friar Street	0	2	0	2	-	-
1-45 Projection West	51	138	68	110	52	83
7-11 Station Road	0	57	0	24	0	20
8 Stanshawe Road	0	5	3	5	-	-
10 Stanshawe Road	1	5	0	4	-	-
12 Stanshawe Road	1	2	2	2	-	-
14 Stanshawe Road	1	4	2	3	-	-
15 Stanshawe Road	3	3	2	2	-	-
16 Stanshawe Road	1	3	2	3	-	-
17 Stanshawe Road	3	3	2	2	-	-
18 Stanshawe Road	2	6	2	3	0	1
19 Stanshawe Road	3	3	3	3	-	-
30 Garrard Street	29	250	85	160	31	58
32 Friar Street	1	7	0	5	-	-
33 Friar Street	0	4	0	4	0	1
34 Friar Street	0	4	0	3	-	-
49-51 Greyfriars Road	22	33	14	24	17	22
5 Vachel Road	0	5	0	5	-	-
7 Vachel Road	0	6	0	4	-	-
9 Vachel Road	0	4	0	4	-	-
11 Vachel Road	0	5	0	5	-	-
13 Vachel Road	0	6	2	6	-	-
15 Vachel Road	0	5	2	5	-	-
17 Vachel Road	0	10	0	4	-	-
19 Vachel Road	0	10	0	4	-	-
20-24 Vachel Road	9	16	12	12	-	-

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that meet NSL Criteria (>80%)		Total No. of Rooms that meet annual PSH criteria	
	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed
21-23 Vachel Road	2	8	0	8	-	-
25 Vachel Road	1	4	0	4	-	-
27-31 Vachel Road	3	12	0	12	-	-
53 Greyfriars Road	6	13	6	9	6	6
9-11 Stanshawe Road	2	9	8	8	2	3
Alexia Court-3 Tudor Road	10	31	7	12	10	12
Bridewell & Samuel House - Student Housing	24	67	34	57	-	-
Building to Rear of 136-137 Friar Street	0	6	1	1	0	1
The Gateway Public House - 31 Greyfriars Road	1	11	3	7	2	4
Belmont Court	17	21	21	21	-	-
Malcom Place	26	39	31	39	35	39
18-29 Regent Court	19	24	24	24	21	24
Total	417	1212	505	869	228	368

14.132. Regarding daylight conditions in the Baseline Scenario, 417 (34%) of the 1,212 windows assessed meet the BRE criteria for VSC by achieving a VSC level of 27% or above. For NSL, 505 (58%) out of the 869 rooms assessed meet the BRE criteria, achieving 80% or above daylight distribution.

14.133. The sunlight conditions in the Baseline Scenario show that 228 (62%) out of the 368 rooms assessed within the surrounding buildings meet the BRE criteria for both annual and winter PSH.

14.134. Overall, these levels of daylight and sunlight compliance are considered consistent with those expected within an urban location.

Baseline Overshadowing to Sensitive Surrounding Amenity Areas

14.135. One public amenity area, one communal roof terrace and 30 private gardens serving 29 buildings to the west of the Site have been assessed for overshadowing.

14.136. The full baseline transient overshadowing assessment is presented within **Technical Appendix 14.3.** Owing to the medium rise nature of the existing buildings within the Site minimal shadow is cast on the surrounding area during the summer months and the equinox. It follows that much of the shadow currently seen surrounding the Site is a function of the surrounding buildings themselves. Shadows are longer on the winter solstice and this is consistent with expectations for an urban area. Station Hill Square is partially in shadow as a result of the existing buildings within the Site and Thames Tower throughout the year however the Sun Hours on Ground assessment for this area demonstrates that 88% of the amenity area experiences two or more hours of direct sunlight on 21st March and therefore achieves the levels of sunlight recommended by the BRE.

14.137. Overall, the levels of overshadowing are considered good given their urban location.

Likely Significant Effects

Demolition and Construction

14.138. The likely effects in relation to the daylight and sunlight amenity, overshadowing, light pollution and solar glare for the surrounding properties, amenity areas and trainline receptors would vary throughout the demolition and construction works, depending on the level of obstruction caused.

14.139. The daylight, sunlight and overshadowing effects during demolition would be beneficial until the point of construction. As construction works progress, the new buildings would steadily increase in magnitude as the superstructure is built and then clad. Those effects that are perceptible, as the superstructure and cladding progress, would be similar to those once the Proposed Development is complete and operational, as presented below. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely daylight, sunlight and overshadowing effects.

14.140. During the demolition and construction phase, a number of tall cranes are likely to be present on-Site, however their size and temporary presence would lead to generally imperceptible effects of a temporary nature.

14.141. As such, the overall effect in terms of daylight, sunlight and overshadowing would range from being **temporary, beneficial effects** during demolition, then gradually changing from beneficial to **permanent, local effects** of **negligible** to **major adverse significance**, once the Proposed Development is complete, as set out in the assessment of the Completed Development scenario below.

14.142. Whilst temporary construction and demolition lighting would be used on the Site, the design is not known at this point in time and therefore cannot be assessed. However, the effects have the potential to be **adverse** on neighbouring residential receptors. In addition, as construction works progress, and lighting within the Proposed Development is installed, the potential light pollution effects would be similar to those once the Proposed Development is complete and operational, as presented below that is **negligible** to **moderate adverse** without mitigation.

14.143. In terms of solar glare, the effects during the demolition works is considered **negligible**. As construction works progress, and the facades of the Proposed Development are installed, the potential solar glare effects would be similar to those once the Proposed Development is complete and operational, as presented below. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely solar glare effects.

14.144. As such, the overall effect in terms of solar glare would range from being **negligible effects** during demolition, then gradually changing from **negligible** to **permanent, local effects** of **minor adverse significance**, once the Proposed Development is complete, as set out in the assessment of the Completed Development scenario below.

Interim Development Scenario

14.145. This scenario considers the Proposed Development comprising the approved Reserved Matters details for Plots E and F (Phase 1) and the detailed Plot G scheme (Phase 2). Xafinity House is assumed to have been demolished within this scenario.

14.146. The likely effects in relation to daylight and sunlight amenity and overshadowing of surrounding amenity areas would vary depending on their proximity to the Phase 1 and Phase 2 buildings, as well as Xafinity House.

14.147. In terms of solar glare and light pollution, as Phase 1 and 2 are the only elements designed in detail, the effects report for the Completed Development would be no different from those of the Interim Development.

Daylight & Sunlight

14.148. In terms of daylight and sunlight, the Completed Development Scenario represents the worst case scenario. Whilst there is the potential for isolated properties to experience slightly less effects than those of the Completed Development below, these would be short-term in nature and have therefore not been separately assessed. On this basis, the overall effects of the Interim Development Scenario on daylight and sunlight would range from **permanent, local effects** of **negligible** to, at worst, **major adverse significance**.

14.149. For the future sensitive receptors (52-55 Friar Street & 12 Greyfriars Road and Plots E & F of the Proposed Development), the overall effects of the Interim Development, based on the Completed Development Scenario portraying the worst case, would be **permanent**, **local effect** of **moderate adverse significance** in regard to daylight. For sunlight, the future sensitive receptors do not have any relevant windows within 90° of due south and therefore have not been assessed in relation to sunlight.

Overshadowing

14.150. In terms of overshadowing, the Completed Development Scenario represents the worst case scenario. Whilst there is the potential for Station Hill Square to be in shadow slightly less of the time than under the Completed Development Scenario, these minor differences would be short-term in nature and have therefore not be separately assessed. All other receptors would experience a negligible effect in terms of overshadowing. On this basis, the overall effects of the Interim Development Scenario on overshadowing would range from **permanent, local effects** of **negligible** to, at worst, **moderate adverse significance**.

Light Pollution

14.151. The effects of the Completed Development Scenario reported below in terms of light pollution would be the same as those of the Interim Development Scenario. One of the future receptors, Plot D, would not be relevant within this Scenario as it forms part of Phase 3. In addition, the buildings within Phase 3 would partially obscure the northern façade of Plot E of the Proposed Development in the Completed Development Scenario. Whilst Phase 3 would not be in place in the Interim Development Scenario, owing to the distance of the Plot E façade from Plot G, the exclusion of the Phase 3 massing would not alter the light pollution effects. Thus, the likely effects in terms of light pollution would range from **permanent, local effects** of **negligible** to **moderate adverse significance.**

Solar Glare

14.152. The effects of Solar Glare from the Interim Development Scenario would be the same as those of the Completed Development Scenario reported below. Thus, the effects in terms of solar glare would be **permanent, local** and of **minor adverse significance**.

Completed Development Scenario

14.153. This scenario considers the Proposed Development comprising the approved Reserved Matters details for Plots E and F (Phase 1); detailed application for Plot G (Phase 2); and outline Maximum Parameters for Plots A, B, C and D (Phase 3).

14.154. In terms of daylight, sunlight and overshadowing, measures were implemented during the design process to minimise the impacts on surrounding sensitive receptors while still ensuring the provision of a viable scheme. These design interventions are included within the assessment and constitute part of the iterative design process. The design measures have included:

- Taller elements being focused on the northern area of the Site owing to it being further from sensitive receptors and additional effects being limited to a small number of properties (namely those on Greyfriars Road directly overlooking the Site);
- The tallest building being located within the central northern area of the Site, meaning neighbouring buildings are less affected;
- Provision of a lower south-west corner to minimise the effects to buildings along Greyfriars Road;
- Increased separation between the eastern edge of Phase 3 and Plot G to allow more light to reach the northern façade of Plot F and improve the public realm;
- Stepping back the Plot G massing from south to north to minimise potential effects upon the buildings to the south; and
- Setting back of the building line of Plot G to the north to allow more sunlight to enter Station Square.

14.155. The assessments have been undertaken for the Maximum Parameter envelope of Plots A, B, C and D. As such, the effects represent the worst-case scenario. As the design progresses to the reserved matters stage, the Plots will be designed to further minimise effects, where possible meaning that the overall effects will be in line with or less than those reported within this chapter. Three Development Options have been prepared for viability purposes, which include articulation and setbacks to minimise the daylight, sunlight and overshadowing effects to sensitive receptors. However, these Development Options have not been assessed within this chapter as the Maximum Parameter envelope represents the worst case scenario.

Daylight

14.156. The potential daylight impacts on surrounding residential properties arising from the Proposed Development have been assessed against the Baseline Scenario in regard to VSC and NSL in accordance with the BRE's criteria. The full daylight assessment for the Proposed Development can be found within **Technical Appendix 14.2** and is summarised in Table 14.11 below.

14.157. A total of 1,212 windows serving 869 rooms have been assessed within 63 surrounding residential buildings in terms of daylight. Overall, of the 1,212 windows assessed for VSC, 688 (57%) would meet the BRE's criteria. Of the 869 rooms assessed for NSL, 578 (67%) would meet the BRE's criteria.

14.158. The 26 properties highlighted in grey in Table 14.11 would experience no or little alteration (below 20%), and the effect on daylight to these properties would therefore be **negligible**.

14.159. The remaining 37 buildings are discussed in detail in the following paragraphs.

Table 14.11: Effects to VSC and NSL to Surrounding Sensitive Receptors

Address	VSC						NSL					
			Below BRE Criteria						Below BRE Criteria			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
1-15 Tanfields	18	18	0	0	0	0	10	6	2	0	2	4
Reada Court	14	14	0	0	0	0	10	10	0	0	0	0
1 Sackville Street	4	4	0	0	0	0	4	1	1	2	0	3
3 Sackville Street	7	7	0	0	0	0	5	3	1	1	0	2
5 Sackville Street	5	5	0	0	0	0	5	1	4	0	0	4
7 Sackville Street	6	6	0	0	0	0	4	3	0	0	1	1
9 Sackville Street	4	4	0	0	0	0	4	2	1	1	0	2
11 Sackville Street	4	4	0	0	0	0	4	2	1	1	0	2
13 Sackville Street	3	3	0	0	0	0	3	2	1	0	0	1
15 Sackville Street	5	5	0	0	0	0	5	2	1	2	0	3
17 Sackville Street	5	5	0	0	0	0	4	1	3	0	0	3
19 Sackville Street	7	6	1	0	0	1	4	1	3	0	0	3
21 Sackville Street	3	3	0	0	0	0	3	1	1	1	0	2
23 Sackville Street	4	4	0	0	0	0	4	3	1	0	0	1
25 Sackville Street	6	6	0	0	0	0	5	4	1	0	0	1
27 Sackville Street	6	6	0	0	0	0	4	4	0	0	0	0
29 Sackville Street	4	4	0	0	0	0	4	3	1	0	0	1

Address	VSC						NSL					
			Below BRE Criteria						Below BRE Criteria			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
5-21 Tudor Road (Friary Court)	52	52	0	0	0	0	39	38	1	0	0	1
Montrose House	20	15	5	0	0	5	20	20	0	0	0	0
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	3	2	0	0	2
1-29 Projection East	94	19	14	36	25	75	66	35	21	6	4	31
13 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
136-137 Friar Street	9	9	0	0	0	0	4	4	0	0	0	0
1-41 Icon House	54	35	9	6	4	19	38	26	5	4	3	12
144 Friar Street	2	2	0	0	0	0	2	2	0	0	0	0
1-45 Projection West	138	66	11	17	44	72	110	64	10	12	24	46
7-11 Station Road	57	57	0	0	0	0	24	24	0	0	0	0
8 Stanshawe Road	5	5	0	0	0	0	5	5	0	0	0	0
10 Stanshawe Road	5	5	0	0	0	0	4	4	0	0	0	0
12 Stanshawe Road	2	2	0	0	0	0	2	2	0	0	0	0
14 Stanshawe Road	4	4	0	0	0	0	3	3	0	0	0	0
15 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
16 Stanshawe Road	3	3	0	0	0	0	3	3	0	0	0	0
17 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0

Address	VSC						NSL					
			Below BRE Criteria						Below BRE Criteria			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
18 Stanshawe Road	6	6	0	0	0	0	3	3	0	0	0	0
19 Stanshawe Road	3	3	0	0	0	0	3	3	0	0	0	0
30 Garrard Street	250	37	14	18	181	213	160	78	19	5	58	82
32 Friar Street	7	5	2	0	0	2	5	3	0	2	0	2
33 Friar Street	4	0	3	1	0	4	4	1	0	0	3	3
34 Friar Street	4	2	2	0	0	2	3	0	0	1	2	3
49-51 Greyfriars Road	33	0	0	0	33	33	24	0	0	0	24	24
5 Vachel Road	5	1	4	0	0	4	5	2	1	2	0	3
7 Vachel Road	6	4	2	0	0	2	4	4	0	0	0	0
9 Vachel Road	4	3	1	0	0	1	4	4	0	0	0	0
11 Vachel Road	5	5	0	0	0	0	5	5	0	0	0	0
13 Vachel Road	6	6	0	0	0	0	6	6	0	0	0	0
15 Vachel Road	5	5	0	0	0	0	5	5	0	0	0	0
17 Vachel Road	10	10	0	0	0	0	4	4	0	0	0	0
19 Vachel Road	10	10	0	0	0	0	4	4	0	0	0	0
20-24 Vachel Road	16	8	8	0	0	8	12	12	0	0	0	0
21-23 Vachel Road	8	8	0	0	0	0	8	8	0	0	0	0
25 Vachel Road	4	4	0	0	0	0	4	4	0	0	0	0
27-31 Vachel Road	12	12	0	0	0	0	12	12	0	0	0	0

Address	VSC						NSL					
			Below BRE Criteria						Below BRE Criteria			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
53 Greyfriars Road	13	6	0	1	6	7	9	4	0	0	5	5
9-11 Stanshawe Road	9	5	0	0	4	4	8	5	1	1	1	3
Alexia Court-3 Tudor Road	31	18	2	0	11	13	12	10	0	0	2	2
Bridewell & Samuel House - Student Housing	67	28	11	21	7	39	57	38	3	4	12	19
Building to Rear of 136-137 Friar Street	6	6	0	0	0	0	1	1	0	0	0	0
The Gateway Public House - 31 Greyfriars Road	11	1	2	0	8	10	7	2	0	0	5	5
Belmont Court	21	20	1	0	0	1	21	21	0	0	0	0
Malcom Place	39	30	9	0	0	9	39	24	9	4	2	15
18-29 Regent Court	24	24	0	0	0	0	24	24	0	0	0	0
Total	1212	688	101	100	323	524	869	578	94	49	148	291

1-15 Tanfields

14.160. A total of 18 windows serving 10 rooms were assessed for daylight within this building.

14.161. For VSC, all windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

14.162. For NSL, six of the 10 (60%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.163. Of the four affected rooms, two would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect whilst two would experience an alteration of greater than 40% which is considered a major adverse effect.

14.164. Three of the four affected rooms are located within a narrow lightwell, facing directly towards the easterly wing of 1-15 Tanfields itself. As such, the majority of sky visibility within these rooms in the Baseline Scenario is received from the north whereby any significant development on the Site would lead to a disproportionate change. The remaining room is served by a small roof-light where daylight distribution in the corners is restricted. As such, the alterations in NSL to this building are a function of architecture of the building itself.

14.165. The majority of effects in terms of daylight to this building are a result Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.166. In consideration of all rooms meeting the BRE's criteria for VSC and the affected rooms experiencing lower NSL as a result of their architecture, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **minor adverse significance**.

1 – 25 and 29 Sackville Street (odds)

14.167. A total of 67 windows serving 58 rooms were assessed for daylight within this terrace of residential properties. With all 14 properties affected in the same manner and to the same degree they have been reported as a group (note 27 Sackville Street would experience negligible effects and has therefore not been considered within this section).

14.168. For VSC, 66 of the 67 (99%) windows assessed windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

14.169. The affected window experiences an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

14.170. For NSL, 29 of the 58 (50%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.171. Of the 29 affected rooms, 20 would experience an alteration in NSL between 20 and29.9% which is considered a minor adverse effect, eight would experience an alteration between 30 and39.9% which is considered a moderate adverse effect and one would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

14.172. 22 of the 29 affected rooms retain a daylight distribution in excess of 50% which is considered commensurate with the Site's urban location. One of the remaining rooms is served by a dormer window which limits the daylight distribution, and two room are served by small windows that likely

serve a staircase or bathroom and four are located in an inset location where sky visibility is limited by the rear extension of the building itself and neighbouring buildings.

14.173. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. RMA detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance. In consideration of the fact that the majority of rooms meeting the BRE's criteria for VSC and that the affected rooms experiencing a lower NSL is as a result of their fenestration and architecture, and based on professional judgement, the overall effect of the Proposed Development upon these buildings is considered **permanent, local** and of **minor adverse significance**.

5-21 Tudor Road (Friary Court)

14.174. A total of 52 windows serving 39 rooms were assessed for daylight within this residential building.

14.175. For VSC, all windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect

14.176. For NSL, 38 of the 39 (97%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.177. The affected room would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect.

14.178. The affected room would retain an NSL of 66.7% which is considered commensurate with the Site's urban location.

14.179. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.180. In consideration of the fact that all rooms meet the BRE's criteria for VSC, the retained NSL level of the one affected room, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **negligible**.

Montrose House, 20-24 Vachel Road and Belmont Court

14.181. A total of 57 windows serving 53 rooms were assessed for daylight within these residential buildings. With all three buildings affected in the same manner and to the same degree they have been reported as a group.

14.182. For VSC, 43 of the 57 (75%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.183. Of the 14 affected windows, all would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

14.184. The 14 affected windows all retain a VSC level in excess of 15% which is considered commensurate with the Site's urban location.

14.185. For NSL, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

14.186. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design

of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.187. In consideration of all rooms meeting the BRE's criteria for NSL, the retained VSC levels of the affected windows, and based on professional judgement, the overall effect of the Proposed Development upon these buildings is considered **permanent, local** and of **minor adverse significance**.

127 Friar Street

14.188. A total of six windows serving five rooms were assessed for daylight within this building.

14.189. For VSC, all windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

14.190. For NSL, three of the five (60%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.191. Of the two affected rooms, both would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect.

14.192. The two affected rooms retain a daylight distribution of 57.3% and 66.6% respectively, which is considered commensurate with the Site's urban location.

14.193. In consideration of all windows meeting the BRE's criteria for VSC, the retained NSL levels of affected rooms, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **minor adverse significance**.

1-29 Projection East

14.194. A total of 94 windows serving 66 rooms were assessed for daylight within this building.

14.195. For VSC, 19 of the 94 (20%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.196. Of the 75 affected windows, 14 would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 36 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 25 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

14.197. 27 of the 75 affected windows (five minor adverse, 21 moderate adverse and one major adverse) retain a VSC level in excess of 15%, which is considered commensurate with the Site's urban location. 12 (five minor adverse, two moderate adverse and five major adverse) have very low existing levels of less than 10%, where even a small alteration would lead to a disproportionate percentage change. The remaining 36 windows (four minor adverse, 13 moderate adverse and 19 major adverse) are in obstructed locations, either within an internal corner, the narrow light-well between 1-29 Projection East and 30 Garrard Street, or beneath a projecting balcony which limits visibility of the sky dome. Larger alterations in areas such as these are common within city centres and are partially due to the architecture of the building itself.

14.198. For NSL, 35 of the 66 (53%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.199. Of the 31 affected rooms, 21 would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and six would experience an alteration between 30 and 39.9%

which is considered a moderate adverse effect. The remaining four rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.200. 12 of the 31 affected rooms (eight minor adverse, three moderate adverse and one major adverse) retain a daylight distribution in excess of 50%, which is considered commensurate with the Site's urban location. Seven rooms (two minor adverse, two moderate adverse and three major adverse) are obstructed by a projecting balcony overhead which limits visibility of the sky dome. The remaining 12 rooms see alterations due to their location in internal corners or in close proximity to 30 Garrard Street, where sky visibility is restricted due to the architecture of the building itself and the dense urban context.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.201. For VSC, 93 of the 94 (99%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.202. The affected window retains a VSC level of 22%, which is considered commensurate with the Site's urban location.

14.203. For NSL, no rooms would experience a material change when compared to the Extant Planning Permission.

14.204. Therefore, the retained levels of daylight within this building are not materially different overall to those of the 2016 Consented Scheme as Amended.

14.205. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.206. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered to be **permanent, local** and of **moderate adverse significance.** The effect is not materially different overall from that of the 2016 Consented Scheme as Amended**.**

1-41 Icon House

14.207. A total of 54 windows serving 38 rooms were assessed for daylight within this building.

14.208. For VSC, 35 of the 54 (65%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.209. Of the 19 affected windows, nine would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and six would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining four windows would experience an alteration in excess of 40% which is considered a major adverse effect.

14.210. 13 of the 19 affected windows (eight minor adverse and five moderate adverse) retain a VSC level in excess of 15%, which is considered commensurate with the Site's urban location. Five of the remaining six windows (one moderate adverse and four major adverse) are located beneath a projecting balcony which limits visibility of the sky dome, meaning even modest increases in massing can result in a disproportionate percentage change.

14.211. For NSL, 26 of the 38 (68%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.212. Of the 12 affected rooms, five would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and four would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining three rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.213. Six of the 12 affected rooms (three minor adverse and three major adverse) retain a daylight distribution in excess of 50%, which is considered commensurate with the Site's urban location. Four rooms (one minor adverse and three major adverse) are obstructed by a projecting balcony overhead which limits visibility of the sky dome. The remaining two rooms see alterations due to their location in within a light-well overlooking 30 Garrard Street, where sky visibility is restricted due to the dense urban location.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.214. For VSC, 52 of the 54 (96%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.215. The two affected windows are located beneath a balcony and experience a small absolute alteration of 3% VSC which is unlikely to be perceptible by the occupants.

14.216. For NSL, 35 of the 38 (92%) rooms would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.217. The three affected rooms experience small absolute alterations of in NSL 10.3%, 10.6% and 11.9% and are obstructed by a projecting balcony overhead which limits visibility of the sky dome.

14.218. Therefore, the retained levels of daylight within this building are not materially different overall to those of the 2016 Consented Scheme as Amended.

14.219. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.220. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance.** The effect is not materially different from the 2016 Consented Scheme as Amended.

1-45 Projection West

14.221. A total of 138 windows serving 110 rooms were assessed for daylight within this building.

14.222. For VSC, 66 of the 138 (48%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.223. Of the 72 affected windows, 11 would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 17 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 44 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

14.224. 21 of the 72 affected windows (three minor adverse, 11 moderate adverse and seven major adverse) retain a VSC level in excess of 15%, which is considered commensurate with the Site's urban location. 19 windows (four minor adverse, three moderate adverse and 12 major adverse) have very low existing levels, less than 10%, where even a small alteration would lead to a disproportionate percentage change. 18 of the remaining 32 windows (two minor adverse, two moderate adverse and 14 major adverse) are located beneath a projecting balcony which limits

visibility of the sky dome, meaning even modest increases in massing can result in a disproportionate percentage change.

14.225. For NSL, 64 of the 110 (58%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.226. Of the 46 affected rooms, 10 would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and 12 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 24 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.227. 19 of the 46 affected rooms (seven minor adverse, eight moderate adverse and four major adverse) retain a daylight distribution in excess of 50%, which is considered commensurate with the Site's urban location. Nine rooms (one minor adverse, three moderate adverse and five major adverse) have very low existing daylight distribution, less than 30% NSL, where even a small alteration would lead to a disproportionate change. Eight rooms (one minor adverse, one moderate adverse and six major adverse) are obstructed by a projecting balcony overhead which limits visibility of the sky dome and leads to a disproportionate change. The remaining rooms are located on lower floors where obstruction is caused by the close relationship with the 30 Garrard Street or 30-31 Friar Street buildings, as is common within densely built city centres.

Alternative Target – Comparison with the Extant Planning Permission

14.228. For both VSC and NSL the is no material change to the retained levels when compared to the 2016 Consented Scheme as Amended.

14.229. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate to major adverse significance.** The effect is not materially different from the Extant Planning Permission.

30 Garrard Street

14.230. A total of 250 windows serving 160 rooms were assessed for daylight within this building.

14.231. For VSC, 37 of the 250 (15%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.232. Of the 213 affected windows, 14 would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 18 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 181 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

14.233. Four of the 213 affected windows (one minor adverse and three moderate adverse) retain a VSC level in excess of 15%, which is considered commensurate with the Site's urban location. 71 windows (nine minor adverse, eight moderate adverse and 54 major adverse) have very low existing levels, less than 10%, where even a small alteration would lead to a disproportionate percentage change. 82 of the remaining 138 windows (three minor adverse, five moderate adverse and 74 major adverse) are known to serve bedrooms which are considered less sensitive to daylight than living rooms within the BRE Guidelines.

14.234. For NSL, 78 of the 160 (49%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.235. Of the 82 affected rooms, 19 would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and five would experience an alteration between 30 and 39.9%

which is considered a moderate adverse effect. The remaining 58 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.236. 19 of the 82 affected rooms (14 minor adverse, four moderate adverse and one major adverse) retain a daylight distribution in excess of 50%, which is considered commensurate with the Site's urban location. 17 rooms (two minor adverse and 15 major adverse) have very low existing daylight distribution, less than 30% NSL, where even a small alteration would lead to a disproportionate change. 27 of the remaining 45 rooms (one minor adverse and 26 major adverse) are known to be bedrooms which are considered less sensitive to daylight than living rooms.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.237. For VSC, 247 of the 250 (99%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.238. The three affected windows experience small absolute alterations between 3.1% and 4.5% VSC which would only lead to a marginally noticeable change in daylight.

14.239. For NSL, 144 of the 160 (90%) rooms would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.240. 12 of the 16 affected rooms experience an absolute alteration in NSL between 10% and 19.5% whilst four experience an absolute alteration between 21.7% and 26.8%. Five of the affected rooms however retain NSL levels in excess of 60% which is considered commensurate with the Site's urban location. 12 of the remaining rooms experience are known to be bedrooms which are considered lower sensitivity in terms of daylight.

14.241. Therefore, the retained levels of daylight within most of this building are not materially different to those of the 2016 Consented Scheme as Amended.

14.242. It is also worth noting that this property was converted from office space to residential following the various Station Hill planning consents and therefore in the knowledge that a large-scale development would occur directly opposite that would lead to major alterations in daylight.

14.243. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate to major adverse significance.** The vast majority of windows/rooms retain levels of VSC and NSL that are not materially different from the 2016 Consented Scheme as Amended.

32 Friar Street

14.244. A total of seven windows serving five rooms were assessed for daylight within this building.

14.245. For VSC, five of the seven (71%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.246. Of the two affected windows, both would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

14.247. For NSL, three of the five (60%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.248. Of the two affected rooms, both would experience an alteration in NSL between 30 and 39.9% which is considered a moderate adverse effect.

14.249. The two windows affected in terms of VSC and rooms in terms of NSL are known to be bedrooms which are considered less sensitive to daylight than living rooms within the BRE Guidelines.

14.250. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **minor adverse significance**.

33 Friar Street

14.251. A total of four windows serving four rooms were assessed for daylight within this building.

14.252. For VSC, all four windows assessed see losses greater than recommended by the BRE.

14.253. Of the four affected windows, three would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect whilst one would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect.

14.254. One of the four affected windows (minor adverse) retains a VSC level of 15.8% which is considered commensurate with the Site's urban location. Two have very low existing levels of VSC (4% and 9.5%), where even a small alteration would lead to a disproportionate percentage change. The remaining window is located within an obstructed light-well, therefore even modest increases in massing can result in a disproportionate percentage change.

14.255. For NSL, one of the four (25%) rooms assessed would meet the BRE's criteria and is therefore considered to experience a negligible effect.

14.256. Of the three affected rooms, all would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

14.257. The three affected rooms are obstructed by the massing of 33 Friar Street itself, 34 Friar Street, 35-38 Friar Street and 30-31 Friar Street. Therefore, even modest increases in massing on the Site can result in a disproportionate percentage change.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.258. For both VSC and NSL the is no material change to the retained levels when compared to the 2016 Consented Scheme as Amended.

14.259. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance.** The effect is not materially different from the 2016 Consented Scheme as Amended.

34 Friar Street

14.260. A total of four windows serving three rooms were assessed for daylight within this building.

14.261. For VSC, two of the four (50%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.262. Of the two affected windows, both would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

14.263. For NSL, all three rooms assessed see losses greater than recommended by the BRE. Of the three affected rooms, one would experience an alteration in NSL between 30 and 39.9% which is considered a moderate adverse effect whilst two would experience an alteration in excess of 40% which is considered a major adverse effect.

14.264. The two affected windows and three affected rooms are obstructed by the massing of 34 Friar Street itself, 33 Friar Street 35-38 Friar Street and 30-31 Friar Street. Therefore, even modest increases in massing on the Site can result in a disproportionate percentage change.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.265. For both VSC and NSL, there is no material change to the retained levels when compared to the 2016 Consented Scheme as Amended.

14.266. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance.** The effect is not materially different from the Extant Planning Permission.

49-51 Greyfriars Road

14.267. A total of 33 windows serving 24 rooms were assessed for daylight within this building.

14.268. For VSC, all 33 windows assessed see losses greater than recommended by BRE.

14.269. Of the 33 affected windows, all would experience an alteration in VSC greater than 40% which is considered a major adverse effect.

14.270. For NSL, all 24 rooms assessed see losses greater than recommended by BRE.

14.271. Of the 24 affected rooms, all would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

14.272. This building captures all its light from across the Site, which in the Baseline Scenario is underdeveloped given its central location. As a result, any significant development of the Site would lead to reduced levels of VSC and NSL.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.273. For VSC, 22 of the 33 (67%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.274. The six of the affected windows experience absolute alterations between 3.1% and 3.6% VSC which would only lead to a marginally noticeable change in daylight.

14.275. For NSL, 21 of the 24 (88%) rooms would not experience a material change when compared to the 2016 Consented Scheme as Amended and so are considered to experience a negligible effect.

14.276. The remaining five affected windows in terms of VSC and three affected rooms in terms of NSL are located on the top floor. The five windows experience absolute alterations between 3.1% and 7% VSC and the three rooms experience absolute alterations between 10.2% and 12.3% NSL. All affected windows and rooms face Plot A of the Proposed Development, which is taller than the 2016 Consented Scheme as Amended, therefore additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.

14.277. Whilst there are small material changes to a selection of windows and rooms when compared to the retained levels of the 2016 Consented Scheme as Amended, the majority of this building retains levels of daylight in line with that of the 2016 Consented Scheme as Amended.

14.278. This property was converted from office space to residential following the various Station Hill planning consents and therefore with the knowledge that a large-scale development would occur directly opposite that would lead to major alterations in daylight.

14.279. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.280. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **major adverse significance** and the majority of windows/rooms retain levels of VSC and NSL that are not materially different from the 2016 Consented Scheme as Amended.

5 - 9 Vachel Road (odds)

14.281. A total of 15 windows serving 13 rooms were assessed for daylight within this row of buildings. With all three properties affected in the same manner and to the same degree they have been reported as a group.

14.282. For VSC, eight of the 15 (53%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.283. Of the seven affected windows, all would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

14.284. All seven affected windows retain a VSC in excess of 15% which is commensurate with the Site's urban location.

14.285. For NSL, ten of the 13 (77%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.286. Of the three affected rooms, one would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect whilst two would experience an alteration between 30 and 39.9% which is considered a moderate adverse Effect.

14.287. The majority of effects in terms of daylight to these buildings are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to these buildings, however this may not lead to an overall change in significance.

14.288. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon these buildings is considered **permanent, local** and of **minor adverse significance**.

53 Greyfriars Road

14.289. A total of 13 windows serving nine rooms were assessed for daylight within this building.

14.290. For VSC, six of the 13 (46%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.291. Of the seven affected windows, one would experience an alteration in VSC between 30 and 39.9% which is considered a moderate adverse effect whilst six would experience an alteration in excess of 40% which is considered a major adverse effect.

14.292. For NSL, four of the nine (44%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.293. Of the five affected rooms, all would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

14.294. This building captures the majority of its light from across the Site, which in the Baseline Scenario is underdeveloped given its central location. As a result, any significant development of the Site would lead to reduced levels of VSC and NSL.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.295. For VSC, seven of the 13 (54%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.296. The six affected windows experience absolute alterations between 3.7% and 4.4% VSC which would only lead to a marginally noticeable change in daylight.

14.297. For NSL, eight of the nine (89%) rooms would not experience a material change when compared to the 2016 Consented Scheme as Amended. The affected room experiences a small absolute alteration of 10.6%.

14.298. All six affected windows and the affected room are located on the eastern façade, the six windows experience absolute alterations between 3.7% and 4.4% VSC and the affected room experiences an absolute alteration of 10.6% NSL. All affected windows and rooms face Plot A of the Proposed Development, which is taller than the 2016 Consented Scheme as Amended, therefore additional alterations are to be expected to this small number of windows when compared to the 2016 Consented Scheme as Amended.

14.299. Whilst there are small material changes to a selection of windows and rooms, the majority of this building retains levels of daylight in line with that of the 2016 Consented Scheme as Amended.

14.300. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.301. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate to major adverse significance.** However, the majority of windows/rooms retain levels of VSC and NSL that are not materially different from the 2016 Consented Scheme as Amended.

9-11 Stanshawe Road

14.302. A total of nine windows serving eight rooms were assessed for daylight within this building.

14.303. For VSC, five of the nine (56%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.304. The four affected windows would experience an alteration in excess of 40% which is considered a major adverse effect.

14.305. Two of the affected windows have very low existing levels, less than 10%, where even a small alteration would lead to a disproportionate percentage change.

14.306. For NSL, five of the eight (63%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.307. Of the three affected rooms, one would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect whilst one would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining room would experience an alteration greater than 40% which is considered a major adverse effect.

14.308. Two of the three affected rooms (one minor adverse and one moderate adverse) retain a daylight distribution in excess of 50%, which is considered commensurate with the Site's urban location. The remaining room is obstructed by an overhanging porch, where the majority of sky visibility within this room in the Baseline Scenario is received from the north and therefore any significant development on the Site would lead to a disproportionate change.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.309. For VSC, seven of the nine (78%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.310. The two affected windows are obstructed by 9 Greyfriars Road to the south-east and 35-43 Greyfriars Road to the north-east, thus relying on light received across the Site.

14.311. For NSL, five of the eight (63%) rooms would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.312. The three affected rooms experience an absolute alteration in NSL between 13.5% and 22.1%. Two of the three rooms retain an NSL in excess of 57% which is commensurate with the Site's urban location. The remaining room is obstructed by a porch overhead which limits visibility of the sky dome and is likely to be a non-habitable room.

14.313. Therefore, the retained levels of daylight within most of this building are not materially different to those of the 2016 Consented Scheme as Amended.

14.314. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.315. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **minor to moderate adverse significance**. The majority of windows/rooms retain levels of VSC and NSL that are not materially different from the 2016 Consented Scheme as Amended.

Alexia Court-3 Tudor Road

14.316. A total of 31 windows serving 12 rooms were assessed for daylight within this building.

14.317. For VSC, 19 of the 31 (61%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.318. Of the 12 affected windows, two would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect whilst the remaining 10 would experience an alteration in VSC greater than 40% which is considered a major adverse effect.

14.319. Two windows (both major adverse) have very low existing levels, less than 10%, where even a small alteration would lead to a disproportionate percentage change. Six of remaining 10 windows serve a living/kitchen/dining room (LKD) with two mitigating windows that exceed the BRE's criteria of 27% VSC. The final four windows are known to serve bedrooms which are considered less sensitive to daylight than living rooms within the BRE Guidelines.

14.320. For NSL, 10 of the 12 (83%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.321. Of the two affected rooms, both would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

14.322. The two affected rooms are bedrooms which are considered less sensitive in terms of daylight. They are also located within a narrow light-well, where the lower levels of daylight distribution are a function of the obstruction cause by the massing of the Alexia Court building itself as well as 53 Greyfriars Road and 49-51 Greyfriars Road.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.323. For VSC, 21 of the 31 (68%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.324. Seven of the 10 affected windows serve LKDs that have one or more mitigating window that retain a VSC level in excess of 27%. The three remaining windows are obstructed by 53 Greyfriars Road to the east and their inset location. These windows face the taller element (Plot A) of the Proposed Development, therefore additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.

14.325. For NSL, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.326. Therefore, the retained levels of daylight within most of this building are not materially different to those of the 2016 Consented Scheme as Amended.

14.327. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.328. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance.** The majority of windows/rooms retain levels of VSC and NSL that are not materially different from the 2016 Consented Scheme as Amended.

Bridewell & Samuel House - Student Housing

14.329. A total of 67 windows serving 57 rooms were assessed for daylight within this building.

14.330. For VSC, 28 of the 67 (42%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.331. Of the 39 affected windows, 11 would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 21 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining seven windows would experience an alteration in excess of 40% which is considered a major adverse effect.

14.332. 15 of the 39 affected windows (eight minor adverse and seven moderate adverse) retain a VSC level in excess of 15%, which is considered commensurate with the Site's urban location. Six windows (three moderate adverse and three major adverse) have very low existing levels of less than 10%, where even a small alteration would lead to a disproportionate percentage change. The remaining windows are located within a light-well where they are obstructed by the massing of Bridewell & Samuel House itself, therefore the alterations in VSL to these windows are a function of architecture of the building itself.

14.333. For NSL, 38 of the 57 (68%) rooms assessed would meet BRE's criteria and are therefore considered to experience a negligible effect.

14.334. Of the 19 affected rooms, three would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and four would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 12 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.335. Nine of the 19 affected rooms (three minor adverse, four moderate adverse and two major adverse) retain a daylight distribution in excess of 50%, which is considered commensurate with the Site's

urban location. The remaining rooms are located within the light-well, where the daylight distribution is restricted by the massing of Bridewell & Samuel House itself.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.336. For VSC, 64 of the 67 (96%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.337. The three affected windows experience small absolute alterations of 3% VSC, which would only lead to a marginally noticeable change in daylight.

14.338. For NSL, 47 of the 57 (82%) rooms would not experience a material change when compared to the Extant Planning Permission.

14.339. Six of the affected rooms retain an NSL in excess of 50% which is considered commensurate with the Site's urban location. The remaining nine rooms experience material changes in NSL owing to their obstructed location within a light-well.

14.340. Therefore, the retained levels of daylight within most of this building are not materially different to those of the 2016 Consented Scheme as Amended.

14.341. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.342. This property is student accommodation which has a transient population and thus may be considered less sensitive from a daylight perspective.

14.343. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance**. The majority of windows/rooms retain levels of VSC and NSL that are not materially different from the 2016 Consented Scheme as Amended.

The Gateway Public House - 31 Greyfriars Road

14.344. A total of 11 windows serving seven rooms were assessed for daylight within this building.

14.345. For VSC, one of the 11 (9%) windows assessed would meet the BRE's criteria and is therefore considered to experience a negligible effect.

14.346. Of the 10 affected windows, two would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect whilst eight would experience an alteration in excess of 40% which is considered a major adverse effect.

14.347. For NSL, two of the seven (29%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.348. All five affected rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.349. This building captures the majority of its light from across the Site, which in the Baseline Scenario is underdeveloped given its central location. As a result, any significant development of the Site would lead to reduced levels of VSC and NSL levels.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.350. For VSC, 10 of the 11 (91%) windows assessed would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.351. The affected window experiences a small absolute alteration of 3% VSC, which would only lead to a marginally noticeable change in daylight.

14.352. For NSL, four of the seven (57%) rooms would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.353. Therefore, the retained levels of VSC are not materially different to those of the 2016 Consented Scheme as Amended. Whilst the NSL within half of the rooms would experience a material change from the 2016 Consented Scheme as Amended, alterations in NSL are not uncommon in constrained urban locations where a tall building strategy is being applied.

14.354. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.355. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate to major adverse significance**. The majority of windows retain levels of VSC that are not materially different from the 2016 Consented Scheme as Amended, whilst material changes in NSL are experienced due to the tall building strategy.

Malcolm Place

14.356. A total of 39 windows serving 39 rooms were assessed for daylight within this building.

14.357. For VSC, 30 of the 39 (77%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.358. All nine affected windows would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

14.359. For NSL, 24 of the 39 (62%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.360. Of the 15 affected rooms, nine would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and four would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining two rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.361. 11 of the 15 affected rooms (seven minor adverse and four moderate adverse) retain a daylight distribution in excess of 50%, which is considered commensurate with the Site's urban location.

14.362. The majority of effects in terms of daylight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to this building, however this may not lead to an overall change in significance.

14.363. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **minor to moderate adverse significance**.

52-55 Friar Street & 12 Greyfriars Road (Future Receptor)

14.364. Detailed room layouts were obtained for this future receptor; therefore, this scheme has been assessed in terms of ADF and NSL. A total of 68 rooms have been assessed comprising 19 LKDs and 49 bedrooms.

14.365. 19 (28%) of the 68 rooms within this future property would comply with the BRE criteria in terms of ADF. There is no change in compliance compared to the Baseline Scenario.

14.366. Four of the 19 LKDs meet the BRE criteria of 2% ADF for rooms with a kitchen. Of the 15 that do not achieve 2% ADF, 10 see no material alteration (less than 0.2% ADF) compared with the Baseline, two experience an alteration between 0.2% and 0.29% ADF and the final three LKDs experience an alteration between 0.3% and 0.36% ADF.

14.367. 15 of the 49 bedrooms retain an ADF of 1% or greater and therefore comply with the BRE criteria. 14 of the bedrooms fall marginally short of BRE criteria with 0.8% of 0.9% in both the Baseline and the Proposed Development scenario. The levels of light within these rooms is commensurate with the urban location. The remaining bedrooms see an alteration of less than 0.1% ADF in the Proposed Development scenario which is not perceptible.

14.368. Eight of the 68 rooms (9%) meet the BRE Guidelines for NSL within this future receptor.

14.369. 22 of the 60 rooms retain an NSL in excess of 50% which is considered acceptable given the urban location. 24 would experience alterations of less than 20% which is not considered noticeable. 10 of the remaining 12 are LKDs that look into the courtyard with a balcony overhead and the final two are bedrooms within an obstructed location.

14.370. Owing to the courtyard nature and urban location of this development, it is not uncommon to experience lower levels of NSL, particularly in LKDs.

14.371. Whilst the Proposed Development leads to alterations in ADF and NSL to this future residential receptor, the majority of alterations will be consistent with those of the 2016 Consented Scheme as Amended; therefore, the levels of light would have been understood when permission was granted for this scheme.

14.372. Given the low magnitude of the majority of the alterations in ADF and NSL, the urban location of this future receptor 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 on daylight to this future receptor is considered **permanent, local** and of **moderate adverse significance**.

Station Hill Plot E and F (Future Receptor)

14.373. Plots E and F (Phase 1) of the Proposed Development have been assessed in terms of retained daylight levels, as opposed to reduction in light as shown in table 14.11 above. Detailed daylight assessments have been undertaken for all habitable rooms within Plots E and F.

14.374. 886 rooms were assessed within Plot E in terms of ADF and NSL. 663 (75%) of the 886 habitable rooms within Plot E meet the BRE criteria in terms of ADF, whilst 451 (51%) meet the BRE criteria for NSL. Compared with the approved reserved matters application for Plot E, 59 additional rooms do not meet the BRE criteria for ADF. These comprise four LKDs, 12 living rooms and 43 bedrooms.

14.375. 384 rooms were assessed within Plot F in terms of ADF and NSL. 229 (60%) of the 384 habitable rooms within Plot F meet the BRE criteria in terms of ADF, whilst 191 (50%) meet the BRE criteria for NSL. Compared with the approved reserved matters application for Plot F, 52 additional rooms do not meet the BRE criteria for ADF. These comprise three LKDs, 16 living rooms and 33 bedrooms.

14.376. Reduced levels of light are experienced along the Garrard Street façade of Plots E and F. It is worth noting that the majority of effects in terms of daylight to this building are a result of Phase 3

of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the daylight effects to these building through setback and articulation of the massing.

14.377. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon Plots E and F is considered **permanent, local** and of **moderate adverse significance**.

Sunlight

14.378. The full sunlight assessment can be found in **Technical Appendix 14.2** of this ES and the summary results are presented in Table 14.12.

14.379. Of the 368 rooms assessed for sunlight, 278 (76%) would meet the BRE's criteria for both annual and winter PSH and are therefore considered to experience a negligible effect.

14.380. The 16 buildings highlighted in grey in Table 14.12 experience little or no change in sunlight levels with the completed Proposed Development in place and are therefore considered to experience a negligible effect. The remaining 10 affected buildings are discussed in detail following Table 14.12.

Table 14.12: Effects to PSH to Surrounding Sensitive Receptors

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Annual PSH			Winter PSH		
			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
1-15 Tanfields	6	6	0	0	0	0	0	0
Reada Court	10	10	0	0	0	0	0	0
3 Sackville Street	1	1	0	0	0	0	0	0
15 Sackville Street	1	1	0	0	0	0	0	0
17 Sackville Street	1	1	0	0	0	0	0	0
19 Sackville Street	1	1	0	0	0	0	0	0
25 Sackville Street	1	1	0	0	0	0	0	0
27 Sackville Street	1	1	0	0	0	0	0	0
29 Sackville Street	1	1	0	0	0	0	0	0
5-21 Tudor Road (Friary Court)	39	39	0	0	0	0	0	0
1-29 Projection East	15	7	0	0	8	0	0	0
136-137 Friar Street	1	1	0	0	0	0	0	0
1-41 Icon House	16	7	1	4	2	0	0	9
1-45 Projection West	83	76	1	4	2	0	0	0
7-11 Station Road	20	20	0	0	0	0	0	0
18 Stanshawe Road	1	1	0	0	0	0	0	0

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Annual PSH			Winter PSH		
			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
30 Garrard Street	58	32	1	5	20	0	0	8
33 Friar Street	1	1	0	0	0	0	0	0
49-51 Greyfriars Road	22	0	0	0	22	0	0	22
53 Greyfriars Road	6	0	0	0	6	0	0	6
9-11 Stanshawe Road	3	2	0	0	1	0	0	0
Alexia Court-3 Tudor Road	12	9	0	1	2	0	0	2
Building to Rear of 136-137 Friar Street	1	1	0	0	0	0	0	0
The Gateway Public House - 31 Greyfriars Road	4	0	0	0	4	0	0	4
Malcom Place	39	35	0	3	1	0	0	4
18-29 Regent Court	24	24	0	0	0	0	0	0
Total	**368**	**278**	**3**	**17**	**68**	**0**	**0**	**55**

1-29 Projection East

14.381. For annual PSH, seven of the 15 (47%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining eight rooms see losses greater than 40% which is considered a major adverse effect.

14.382. All eight rooms have very low levels of existing annual PSH, less than 10%, owing to their almost due west orientation and the building's urban context, therefore even modest increases in massing on the Site would result in a disproportionate percentage change.

14.383. For winter PSH, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.384. For annual PSH and winter PSH, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.385. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance**. The effects are not materially different from the 2016 Consented Scheme as Amended.

1-41 Icon House

14.386. For annual PSH, nine of the 16 (56%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.387. Of the seven rooms affected annually, one would experience an alteration in annual PSH between 20 and 29.9% which is considered a minor adverse effect and four would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining two rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.388. Four of the seven rooms that don't meet the BRE's criteria for annual PSH are obstructed by a balcony overhead that intercepts the high-angle summer sunlight. The alterations to these rooms are therefore a function of the architecture of 1-41 Icon House itself. The remaining three rooms face almost due west, meaning that given the building's urban context, even modest increases in massing on the Site would result in a disproportionate percentage change.

14.389. For winter PSH, seven of the 16 (44%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.390. All nine rooms affected in the winter, would experience an alteration in excess of 40% which is considered a major adverse effect.

14.391. The nine rooms have very low levels of existing winter PSH, 2% or less, owing to their almost due west orientation and the building's urban context. Therefore, even modest increases in massing on the Site can result in a disproportionate percentage change.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.392. For annual PSH and winter PSH, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.393. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance**. The effects are not materially different from the 2016 Consented Scheme as Amended.

1-45 Projection West

14.394. For annual PSH, 76 of the 83 (92%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.395. Of the seven rooms that don't meet the BRE's criteria for annual PSH, one would experience an alteration in annual PSH between 20 and 29.9% which is considered a minor adverse effect and four would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining two rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.396. Three of the seven rooms that don't meet the BRE's criteria for annual PSH are obstructed by a balcony overhead that intercepts the high-angle summer sunlight. The alterations to these rooms are therefore a function of the architecture of 1-45 Projection West itself. The remaining four rooms face almost due west in orientation and given the building's urban context, even modest increases in massing on the Site would result in a disproportionate percentage change.

14.397. For winter PSH, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.398. For annual PSH and winter PSH, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.399. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance**. The effects are not materially different from the 2016 Consented Scheme as Amended.

30 Garrard Street

14.400. For annual PSH, 32 of the 58 (55%) rooms assessed within this building would meet BRE's criteria and are therefore considered to experience a negligible effect.

14.401. Of the 26 rooms that don't meet the BRE's criteria for annual PSH, one would experience an alteration in annual PSH between 20 and 29.9% which is considered a minor adverse effect and five would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 20 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

14.402. For winter PSH, 50 of the 58 (86%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining eight experience losses greater than 40% which is considered a major adverse effect.

14.403. The affected rooms face almost due west in orientation, and given the building's urban context, even modest increases in massing on the Site would result in a disproportionate percentage change. It is also worth noting that this building was converted from office space to residential following the various Station Hill planning consents. As such, this building has been implemented with the knowledge that a large-scale development would occur directly opposite that would lead to major alterations in sunlight.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.404. For annual PSH and winter PSH, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.405. Therefore, the retained levels of sunlight within this building are not materially different to those of the 2016 Consented Scheme as Amended.

14.406. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **major adverse significance**. However, the effects are not materially different from the 2016 Consented Scheme as Amended.

49-51 Greyfriars Road

For both annual PSH and winter PSH, all 22 rooms assessed within this building see losses greater than 40% which is considered a major adverse effect.

14.407. This building captures all its light from across the Site, which in the Baseline Scenario is underdeveloped given its central location. As a result, any significant development of the Site would lead to reduced levels of annual and winter PSH levels. In addition, all windows face almost due east where they only have the potential to capture half the available sunlight. 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 major alterations in sunlight.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.408. For annual PSH, 14 of the 22 (64%) rooms would not experience a material change when compared to the 2016 Consented Scheme as Amended.

14.409. The eight affected rooms experience absolute alterations between 2% and 3% annual PSH which would be a marginally noticeable change.

14.410. For winter PSH, 15 of the 22 (68%) rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.411. The seven affected rooms experience absolute alteration of 1% winter PSH which would be marginally noticeable.

14.412. The affected rooms are east facing onto the Site and owing to the additional height of the Proposed Development, additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.

14.413. Overall, the retained levels of sunlight within this building are not significantly different to those of the 2016 Consented Scheme as Amended.

14.414. The majority of effects in terms of sunlight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the sunlight effects to this building, however this may not lead to an overall change in significance.

14.415. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **major adverse significance**. However, the majority of rooms retain levels of annual and winter PSH that are not materially different from the 2016 Consented Scheme as Amended.

53 Greyfriars Road

14.416. For both annual PSH and winter PSH, all six rooms assessed within this building see losses greater than 40% which is considered a Major Adverse effect.

14.417. This building captures all its light from across the Site, which in the Baseline Scenario is underdeveloped given its central location. As a result, any significant development of the Site would lead to reduced levels of annual and winter PSH levels. In addition, all windows face almost due east where they only have the potential to capture half the available sunlight. 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 major alterations in sunlight.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.418. For annual PSH, all rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.419. The six affected rooms experience absolute alterations between 3% and 4% annual PSH which is considered a small absolute change in sunlight.

14.420. The affected rooms are east facing onto the Site, therefore owing to the additional height of the Proposed Development, additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.

14.421. For winter PSH, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.422. Overall, the retained levels of sunlight within this building are not significantly different to those of the 2016 Consented Scheme as Amended.

14.423. The majority of effects in terms of sunlight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the sunlight effects to this building, however this may not lead to an overall change in significance.

14.424. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **major adverse significance.** However, the retained levels of annual and winter PSH are not significantly different from the 2016 Consented Scheme as Amended.

9-11 Stanshawe Road

14.425. For annual PSH, two of the three (67%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining room sees losses greater than 40% which is considered a major adverse effect.

14.426. The one affected room faces almost due east and the high-angle sunlight is intercepted by a porch, therefore the alteration in annual PSH is a result of the architecture of 9-11 Stanshawe Road itself.

14.427. For winter PSH, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.428. For annual PSH and winter PSH, no rooms would experience a material change when compared to the Extant Planning Permission.

14.429. The majority of effects in terms of sunlight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the sunlight effects to this building, however this may not lead to an overall change in significance.

14.430. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **moderate adverse significance**. The effects are not materially different from the 2016 Consented Scheme as Amended.

Alexia Court-3 Tudor Road

14.431. For annual PSH, nine of the 12 (75%) rooms assessed within this building would meet BRE's criteria and are therefore considered to experience a negligible effect.

14.432. Of the three rooms affected annually, one would experience an alteration in annual PSH between 30 and 39.9% which is considered a moderate adverse effect whilst two would experience an alteration in excess of 40% which is considered a major adverse effect.

14.433. For winter PSH, 10 of the 12 (83%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining two see losses greater than 40% which is considered a major adverse effect.

14.434. The affected rooms are known to be bedrooms which are less sensitive in terms of sunlight within the BRE Guidelines.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.435. For annual PSH, 8 of the 12 (67%) rooms would not experience a material change when compared to the Extant Planning Permission.

14.436. The four affected rooms experience absolute alterations of 4% annual PSH, which would be a small noticeable change.

14.437. For winter PSH, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.438. Overall, with the exception of four rooms that experience a small material change in annual PSH, the retained levels of sunlight within this building are not significantly different to those of the 2016 Consented Scheme as Amended.

14.439. The majority of effects in terms of sunlight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the sunlight effects to this building, however this may not lead to an overall change in significance.

14.440. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **minor adverse significance**. The retained levels of annual and winter PSH are not significantly different from the 2016 Consented Scheme as Amended.

The Gateway Public House - 31 Greyfriars Road

14.441. For both annual PSH and winter PSH, all four rooms assessed within this building see losses greater than 40% which is considered a major adverse effect.

14.442. The affected rooms are known to be bedrooms which are less sensitive in terms of sunlight within the BRE Guidelines. This building captures all its light from across the Site, which in the Baseline Scenario is underdeveloped given its central location. As a result, any significant development of the Site would lead to reduced levels of annual and winter PSH levels. In addition, all windows face almost due east where they only have the potential to capture half the available sunlight.

Alternative Target – Comparison with the 2016 Consented Scheme as Amended

14.443. For annual PSH, all rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.444. The four affected rooms experience absolute alterations between 3% and 5% annual PSH which is considered a small material change in sunlight.

14.445. The affected rooms are east facing onto the Site. Therefore, owing to the additional height of the Proposed Development, additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.

14.446. For winter PSH, no rooms would experience a material change when compared to the 2016 Consented Scheme as Amended.

14.447. Overall, there is a small material change in the retained levels of sunlight annually within this building compared to those of the 2016 Consented Scheme as Amended whilst there is no material change in winter sunlight.

14.448. The majority of effects in terms of sunlight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design

of Phase 3 would aim to reduce the sunlight effects to this building, however this may not lead to an overall change in significance.

14.449. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **major adverse significance**. However, the retained levels of annual and winter PSH are not significantly different from the 2016 Consented Scheme as Amended.

Malcolm Place

14.450. For both annual PSH and winter PSH, 35 of the 39 (90%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect.

14.451. Of the four rooms that don't meet the BRE's criteria for annual PSH, three would experience an alteration in annual PSH between 30 and 39.9% which is considered a moderate adverse effect and one would experience an alteration in excess of 40% which is considered a major adverse effect.

14.452. The four rooms that don't meet the BRE's criteria for winter PSH would experience an alteration in excess of 40% which is considered a major adverse effect

14.453. Three of the four affected rooms are known to be bedrooms which are less sensitive in terms of sunlight within the BRE Guidelines.

14.454. The majority of effects in terms of sunlight to this building are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the sunlight effects to this building, however this may not lead to an overall change in significance.

14.455. In consideration of the above, and based on professional judgement, the overall effect of the Proposed Development upon this building is considered **permanent, local** and of **minor adverse significance**.

Overshadowing

14.456. The potential overshadowing impacts of the Proposed Development on surrounding amenity areas have been assessed against the Baseline Scenario. The full overshadowing assessment for the Proposed Development can be found within **Technical Appendix 14.3** and is summarised below.

14.457. One public amenity area (Station Hill Square), one communal roof terrace and 30 private gardens serving 29 buildings have been assessed in terms of overshadowing. The communal roof terrace and all 30 private gardens serving the 29 buildings outlined below would experience no or little alteration (below 20%), and the effect on overshadowing to these properties would therefore be **negligible**:

- Montrose House Communal Roof Terrace;
- 5 – 21 Tudor Road (Friary Court) private gardens;
- 9 – 17 Stanshawe Road rear private gardens (odds);
- 8 – 28 Stanshawe Road rear private Gardens (evens); and
- 7 – 31 Vachel Road rear private gardens (odds).

14.458. The remaining amenity area is discussed in detail below.

Station Hill Square

14.459. Station Hill Square is partially within the proposed red line boundary. 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.

21 March (equinox)

14.460. The area is unaffected by the Proposed Development from sunrise (06:08 Greenwich Mean Time (GMT)) until approximately 11:00 GMT on 21st March. From 11:00 GMT, shadow from the Proposed 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 Proposed Development until sunset at approximately 18:00 GMT.

21 June (summer solstice)

14.461. On June 21st, the area would be unaffected by the Proposed Development until approximately 12:00 British Summer Time (BST). From 12:00 BST until 15:00 BST the western portion of the amenity area would be cast under shadow by the Proposed Development. However, the north-eastern portion of the square would receive eight hours of direct sunlight (between sunrise and 15:00 BST). Between 15:00 BST and 18:00 BST the Proposed Development would cast shadow on the majority of the amenity area and then from 18:00 BST the shadow travels southwards, having completely passed by approximately 19:30 BST.

21 December (winter solstice)

14.462. On December 21st, due to the extent of existing overshadowing, the area is unaffected by the Proposed Development.

Sun Hours on Ground

14.463. The sun hours on ground assessment of the amenity area confirms compliance with the BRE's criteria. In total, 74% of the area sees at least two hours of direct sunlight on the 21st March.

14.464. The majority of effects in terms of overshadowing to this amenity area are a result of Phase 3 of the Proposed Development, which at maximum parameters, portrays a worst-case scenario. The detailed design of Phase 3 would aim to reduce the overshadowing effects to this amenity area, however this may not lead to an overall change in significance.

14.465. Overall, taking into consideration that the amenity space is fully compliant with the BRE's criteria and the extent of additional shadow cast by the Proposed Development, the effect of overshadowing is considered **permanent, local** and of **moderate adverse significance**.

Light Pollution

14.466. The potential light pollution impacts on surrounding existing and proposed residential buildings arising from the Proposed Development have been assessed. The full light pollution assessment for the Proposed Development can be found within **Technical Appendix 14.4** and is summarised below.

14.467. One existing surrounding building and three proposed buildings (future receptors) have been assessed in terms of light pollution from Phase 2. Two of the three buildings forming part of the Proposed Development (Plots E and D), would not exceed the ILP criteria and therefore the light pollution effects on these buildings is considered **negligible.**

14.468. The remaining buildings are discussed in detail below.

30 Garrard Street (Existing Receptor)

14.469. A total of 212 windows serving 134 habitable rooms were assessed within this existing building.

14.470. 182 of the 212 windows (86%) within this building meet the ILP criteria for light trespass and are therefore considered negligible in terms of light pollution.

14.471. The illuminance levels reaching the remaining 30 windows is 7 lux or less. This is well below the ILP pre-curfew criteria of 25 lux and therefore the windows experience a negligible effect in terms of pre-curfew light trespass.

14.472. The 30 windows that breach the post-curfew ILP criteria of 5 lux serve 19 habitable rooms on the western corner from Ground Floor through to Sixth Floor. These 19 rooms comprise 11 living/kitchen/dining rooms and eight bedrooms. Six of the 11 LKDs experience illuminance levels between 5.0 and 5.49 lux which is considered a minor adverse effect. The remaining five LKDs experience illuminance levels between 6.0 and 6.7 which is considered a moderate adverse effect however living/kitchen/dining rooms are less sensitive in term of post-curfew light pollution as they are less likely to be occupied after 11pm. Three of the eight bedrooms experience a post-curfew illuminance level of less than 6.0 lux which is a marginal breach of the ILP criteria and is therefore considered minor adverse. Four of the remaining bedrooms experience illuminance levels between 6.1 and 6.9 lux which is considered a moderate adverse effect and the final bedrooms experiences an illuminance level of 7.0 lux which is considered a major adverse effect. Mitigation measures would therefore be required to reduce the effect caused on this building post-curfew to negligible. This is discussed in the Mitigation Measures section of this chapter below.

14.473. It is also worth noting that 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, including commercial uses, would occur on the adjacent site. It is also worth noting that the similar relationship with Thames Tower is likely to generate similar effects in terms of light pollution to this property.

14.474. Based on professional judgement, the small number of windows effected by the Proposed Development, the magnitude of those breaches and full compliance with the ILP pre-curfew criteria, the overall effect of light pollution from the Proposed Development on this building is considered **permanent, local** and of **moderate adverse significance**.

Plot F (Future Receptor)

14.475. A total of 163 windows serving 150 habitable rooms were assessed within this proposed building.

14.476. 137 of the 163 windows (84%) within this building meet the ILP criteria for light trespass and are therefore considered negligible in terms of light pollution.

14.477. The illuminance levels reaching the remaining 26 windows is less than 8 lux. This is well below the pre-curfew threshold of 25 lux and therefore the windows experience a negligible effect terms of pre-curfew light pollution.

14.478. The 26 windows that breach the post-curfew ILP criteria of 5 lux serve 25 habitable rooms on the eastern side of this building. These 25 rooms comprise six living rooms and 19 bedrooms across 11 floors. One of the living rooms experiences an illuminance level of 5.2-5.7 lux which is considered a minor adverse effect. Four of the remaining living rooms experience illuminance levels between 6.1 and 6.7 lux which is considered a moderate adverse effect, and the final living room experiences an illuminance level of 7.3 lux which is considered a major adverse effect. However,

living/kitchen/dining rooms are less sensitive in term of post-curfew light pollution as they are less likely to be occupied after 11pm. Nine of the 19 bedrooms experience a post-curfew illuminance level between 5.0 and 5.9 lux which is a minor adverse effect, seven bedrooms experience a post-curfew illuminance level between 6.0 and 6.9 lux which is considered a moderate adverse effect and the remaining three bedrooms experience a post-curfew illuminance level between 7.0 and 7.9 lux which is considered a major adverse effect. Mitigation measures would therefore be required to reduce the effect caused on these windows post-curfew to negligible. The options for mitigation measures can be seen in the Mitigation Measures section of this chapter below.

14.479. Based on professional judgement, the small number of windows effected by the Proposed Development, the magnitude of those breaches and full compliance with the ILP pre-curfew criteria, the overall effect of light pollution from the Proposed Development on this building is considered **permanent, local** and of **moderate adverse significance**.

Solar Glare

14.480. The full solar glare assessment is provided in **Technical Appendix 14.5**.

14.481. The assessment has been undertaken from the bi-directional Track 7 to the north of the Site which is considered sensitive in terms of solar glare. Views have been captured along the track at 50 metre intervals from a distance of 475 metres to the west and 610 metres to the east from the Site. No signal locations were found for this section of track.

14.482. The receptor locations are shown in **Figures 14.5** and the two sensitive receptors assessed are discussed in further detail below.

Track 7 (Westbound)

14.483. 11 different viewpoints have been considered along this section of track travelling westbound approaching Reading Station, labelled W1 – W11.

- W1 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 8° and 10° in the early mornings (sunrise until 06:30 GMT) during the mid-seasons (mid-March until mid-April and mid-August until mid-September). Owing to the distance from the Proposed Development, the area of façade visible within the section of track is small;
- W2 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 9° and 14° in the early mornings (sunrise until 07:00 GMT) during the mid-seasons (mid-March until mid-April and mid-August until mid-September). Owing to the distance from the Proposed Development, the area of façade visible within the section of track is small;
- W3 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 9° and 16° in the early mornings (06.45 until 07:00 GMT) during the mid-seasons (mid-March until mid-April and mid-August until mid-September). The majority of the reflections would occur above the driver's visor cut-off line;
- W4 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 10° and 17° in the early mornings (06:00 until 07:00 GMT) during the mid-seasons (mid-March until mid-April and mid-August until mid-September). The majority of the reflections would occur above the driver's visor cut-off line;
- W5 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 10° and 18° in the early mornings (06:00 until 07:00 GMT) during the

mid-seasons (mid-March until mid-April and mid-August until mid-September). The majority of the reflections would occur above the driver's visor cut-off line;

- W6 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 9° and 18° in the early mornings (06:00 until 07:00 GMT) during the mid-seasons (mid-March until mid-April and mid-August until mid-September). The majority of the reflections would occur above the driver's visor cut-off line;
- W7 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 8° and 19° in the early mornings (06:00 until 07:00 GMT) during the mid-seasons (mid-March until mid-April and mid-August until mid-September). The majority of the reflections would occur above the driver's visor cut-off line;
- W8 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 12° and 25° in the early mornings (06:00 until 08:00 GMT) during the mid-seasons (mid-March until mid-April and mid-August until mid-September). The majority of the reflections would occur above the driver's visor cut-off line;
- W9 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 18° and 33° in the early mornings (06:00 until 08:00 GMT) during the mid-seasons (early-March until mid-April and mid-August until late-September) and the majority of the reflections occur above the driver's visor cut-off. In addition, solar reflections may be visible on the northern façade between 17° and 26° in the evenings (17:00 GMT until 19:00 GMT) during the mid-seasons (mid-March until mid-May and mid-July until mid-September). Owing to the angle of the northern façade in relation to the tracks, it is unlikely that solar reflections would result in potential instances of glare and the majority of the reflections occur above the driver's visor cut-off;
- W10 – instances of solar reflection may be visible on the eastern façade of the Proposed Development between 25° and 40° in the early mornings (06:45 until 08:00 GMT) during the mid-seasons (early-March until mid-April and mid-August until late-September) and all reflections occur above the driver's visor cut-off. In addition, solar reflections may be visible on the northern façade between 23° and 31° in the evenings (17:00 GMT until 19:00 GMT) during the summer months (mid-April until mid-August). Owing to the angle of the northern façade in relation to the tracks, it is unlikely that solar reflections would result in potential instances of glare and all reflections occur above the driver's visor cut-off;
- W11 – only small instances of solar reflection may be visible on the northern façade of the Proposed Development outside 30° of the driver's line of sight and above the driver's visor cut-off.

14.484. The eastern façade has been designed to include vertical fins to break-up any potential reflections. This would reduce the potential for the full sun disc to be reflected, thus the intensity of potential reflection would be lower. In addition, the majority of reflections off the Proposed Development occur in the early morning during the mid-seasons or in the evenings during the summer months, when the probability of the sun shining is approximately 30%.

14.485. Overall, taking into consideration the fins breaking up potential reflections from the eastern façade, the low probability of the sun shining at the times when solar reflections might occur and the majority of reflections occurring above the driver's visor cut-off line, the effect of solar glare on train drivers travelling westbound on Track 7 is considered **permanent, local and of minor adverse significance**.

Track 7 (Eastbound)

14.486. Eight different viewpoints have been considered along this section of track travelling eastbound approaching Reading Station, labelled E1 – E8:

- E1 – instances of solar reflection may be visible on the northern façade of the Proposed Development between 13° and 15° in the early mornings (sunrise until 05:00 GMT) during the summer months (mid-April until mid-August) and on the western façade between 15° and 19° in the late afternoons (15:30 GMT until sunset) during the end of the mid-seasons until the early winter months (mid-January until late-February and again in early-October until mid-November);
- E2 – instances of solar reflection may be visible on the northern façade of the Proposed Development between 14° and 16° in the early mornings (sunrise until 05:00 GMT) during the summer months (mid-May until mid-July) and are located above the driver's visor cut-off. In addition, solar reflections may be visible on the western façade between 16° and 23° in the late afternoons (15:00 GMT until sunset) during the early winter months (mid-January until mid-February and again in mid-October through mid-November);
- E3 – instances of solar reflection may be visible on the western façade of the Proposed Development between 18° and 25° in the late afternoons (between 15:00 and 16:00 GMT) during the end of the mid-seasons through the early winter months (mid-January until late-February and again in early-October until mid-November). All reflections would occur above the driver's visor cut-off;
- E4 – instances of solar reflection may be visible on the western façade of the Proposed Development between 20° and 25° in the late afternoons (between 15:00 and 16:00 GMT) during the end of the mid-seasons through the early winter months (mid-January through late-February and again in early-October until mid-November). All reflections would occur above the driver's visor cut-off;
- E5 – no solar reflections would be visible from the Proposed Development;
- E6 – instances of solar reflection may be visible on the western façade of the Proposed Development between 23° and 28° in the afternoons (between 14:00 and 16:00 GMT) during the mid-seasons until the early winter months (late-January until early-March and again in early-October until early-November). All reflections would occur well above the driver's visor cut-off;
- E7 – instances of solar reflection may be visible on the western façade of the Proposed Development between 28° and 35° in the afternoons (between 14:00 and 15:00 GMT) during the mid-seasons until the early winter months (mid-January until mid-March and again in mid-September until mid-November). All reflections would occur well above the driver's visor cut-off;
- E8 – no solar reflections would be visible from the Proposed Development.

14.487. Small slithers of reflection may be visible at the end of the day in summer on the nib-walls along the northern façade in a number of views. However, owing to their size they do not have the potential to cause instances of glare.

14.488. The western façade has been designed to include vertical fins to break-up any potential reflections. This would result in scattered reflections that would be visible for only a limited period of time. In addition, the majority of reflections off the Proposed Development occur in the early morning during the summer months or late afternoon during the end of the mid-seasons until the early winter months, when the probability of the sun shining is less than 30%.

14.489. Potential reflections from the western façade would only occur until Plot C has been constructed, at which point, this Plot would shade the western façade, thus mitigating potential reflections and the effect of solar glare from the western façade would be negligible.

14.490. Overall, taking into consideration the fins breaking up potential reflections from the western façade, the low probability of the sun shining at the times when solar reflections might occur, the majority of reflections occurring above the driver's visor cut-off line, all solar reflections occurring outside 10° from the driver's line of sight, and the temporary nature of potential reflections from the western façade (until Plot C is constructed), the effect of solar glare on train drivers travelling eastbound on Track 7 is considered **long term, local** and of **minor adverse significance**.

Mitigation Measures and Likely Residual Effects

Demolition and Construction

14.491. The potential daylight, sunlight, overshadowing and solar glare effects during demolition and construction would gradually increase in magnitude as the massing of the Proposed Development increases. Accordingly, the residual effect of the Proposed Development would increase from negligible up to those stated for the Completed Development.

14.492. Potential light pollution effects associated with the temporary demolition and construction lighting should be mitigated through conformity with the ILP Guidance, to be included as a requirement within the future CEMP. With implementation of this mitigation measure, the effects are considered **negligible**.

14.493. With regard to light pollution from the commercial buildings as they progress towards completion, as the mitigation measures proposed within the completed Proposed Development (ie. automated blinds and dimming system) may not be implemented and commissioned when the lighting system is being installed, potential light pollution effects should be mitigated by switching off the office lighting along the southern facades, adjacent to the residential receptors, post curfew (after 11pm). This should be stipulated within the future CEMP. With the incorporation of this mitigation measure in the future CEMP, the residual effects are considered **negligible**.

Interim Development Scenario

14.494. As the Completed Development Scenario represents the worst-case scenario in terms of daylight, sunlight, overshadowing, light pollution and solar glare effects, the Proposed Development would result in negligible to minor adverse effects to many buildings with instances of minor to moderate, moderate adverse, moderate to major and major adverse effects.

14.495. Mitigation is inherent in the design for Phase 1 and 2 in relation to daylight, sunlight and overshadowing effects, as outlined within the Completed Development Scenario. Therefore, the residual effects are the same as reported in the Likely Effects Section of this chapter; that is **negligible** to **major adverse** for daylight and sunlight and **negligible** to **moderate adverse** for overshadowing.

14.496. In terms of light pollution, the incorporation of mitigation measures detailed below for the Completed Development Scenario would mitigate the potential light pollution effects such that the residual effect would be **negligible**.

14.497. Mitigation is inherent in the design in terms of solar glare, as such, the residual effects are the same as reported in the Likely Effects Section of this Chapter, that is **minor adverse**.

Completed Development Scenario

Daylight and Sunlight

14.498. In relation to the effects on daylight and sunlight to the identified residential buildings, the Proposed Development would result in negligible to minor adverse effects to many buildings with instances of minor to moderate, moderate adverse, moderate to major and major adverse effects.

14.499. Owing to the scale of the Proposed Development in comparison to the Baseline Scenario, changes in daylight and sunlight conditions would be unavoidable.

14.500. In terms of daylight and sunlight, as part of the design process, numerous alternate massing options were explored to understand how the daylight and sunlight effects could be mitigated. Massing alterations were implemented to minimise the impacts on daylight and sunlight to surrounding sensitive receptors whilst ensuring the provision of a viable scheme. No additional mitigation is therefore available to the detailed Phases 1 and 2.

14.501. The assessments of Phase 3 have been undertaken on the basis of the maximum parameter envelope of Plots A, B, C and D (Phase 3). As such, the effects represent the worst-case scenario. Further design development will occur up to submission of the reserved matters applications for these plots and this will be undertaken in consideration of the daylight and sunlight effects. The overall effects will therefore be in line with, or less than those reported.

14.502. Given that mitigation is inherent in the design of Phases 1 and 2 and that the massing details of Phase 3 will only be determined as part of future reserved matters applications for the Plots within this Phase, the residual daylight effects remain as per the likely effects, that is:

- **Negligible** to 27 buildings;
- **Minor Adverse** to 23 buildings;
- **Minor to Moderate** Adverse to two buildings;
- **Moderate Adverse** to six buildings;
- **Moderate to Major** Adverse to three buildings; and
- **Major Adverse** to two buildings.

14.503. The residual daylight effects to the two future receptors, 52-55 Friars Street & 12 Greyfriars Road, and Plots E and F of the Proposed Development, are **moderate adverse**.

14.504. The residual sunlight effects would remain as:

- **Negligible** to 16 buildings;
- **Minor Adverse** to two buildings;
- **Moderate Adverse** to four buildings; and
- **Major Adverse** to four buildings.

Overshadowing

14.505. As with daylight and sunlight, measures including massing alterations were implemented during the design process to minimise the overshadowing impacts to identified amenity areas as much as possible while still ensuring the provision of a viable scheme.

14.506. As part of the design process, numerous alternate massing options were explored to understand how the overshadowing effects could be mitigated. Therefore, no additional mitigation is available to the detailed Phases 1 and 2. The assessments of Phase 3 have been undertaken on the basis

of the maximum parameter envelope of Plots A, B, C and D (Phase 3). As such, the effects represent the worst-case scenario. Further design development will occur up to submission of the reserved matters applications for these plots and this will be undertaken in consideration of the overshadowing effects. The overall effects will therefore be in line with, or less than those reported.

14.507. Consequently, the residual overshadowing effects would remain as:

- **Negligible** for one communal amenity area and 30 private gardens; and
- **Moderate Adverse** for one public open space (Station Hill Square).

Light Pollution

14.508. As discussed within the Assumptions and Limitations section, the light pollution assessment is based upon the indicative façade materials and office lighting layouts and is therefore a worst-case assessment. As the façade details and office light layouts progress during the detailed design and fit-out, the assessment will be refined. Where light pollution effects remain, additional mitigation would be incorporated. The likely effects on 30 Garrard Street and Plot F of the Proposed Development are negligible pre-curfew and so no mitigation is required during these times.

14.509. Effective post curfew mitigation could comprise:

- Providing a detailed lighting design designed to minimise the illuminance levels to the south and west of the floor plan;
- The dimming of lights at the perimeter of the floor plan post-curfew; and
- Automatic blinds post-curfew.

14.510. Based on professional judgement and experience on schemes of a similar nature with comparable light pollution effects, the incorporation of these mitigation measures on to the relevant facades and lighting layouts at detailed design stage would reduce the potential for significant breaches of ILP guidance to occur.

14.511. With the incorporation of one or more of the proposed mitigation measures, the residual light pollution effects would be **negligible** to the one existing receptors and all three future receptors.

Solar Glare

14.512. As with daylight and sunlight, measures including vertical fins were implemented during the design process to minimise the solar glare effects as much as possible. Therefore, no additional mitigation is required.

14.513. Consequently, the residual solar glare effects would remain as:

- **Minor Adverse** for eastbound and westbound train drivers.

Summary

14.514. Table 14.13 summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 14.13: Summary of Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Demolition and Construction Development Scenario			
Daylight, sunlight and overshadowing effects during demolition.	**Temporary, beneficial effects considered likely during demolition.**	None proposed.	**Temporary, beneficial effects considered likely during demolition.**
Light pollution effects during demolition.	**Adverse**	Installation of lighting in accordance with the ILP Guidance to be included as a requirement of a future CEMP.	**Negligible**
Solar glare effects during demolition	**Negligible effects considered likely during demolition.**	None proposed.	**Negligible effects considered likely during demolition.**
Daylight, sunlight and overshadowing effects during construction.	**Effects would gradually change from beneficial to those expected once the Proposed Development is complete and operational, that is negligible to major adverse.**	None proposed.	**Effects would gradually change from beneficial to those expected once the Proposed Development is complete and operational, that is negligible to major adverse.**
Light pollution effects during construction.	**Temporary Site Lighting: adverse**	Installation of lighting in accordance with the ILP Guidance to be included as a requirement of a future CEMP.	**Negligible .**
	Light pollution from completed commercial buildings (without mitigation): moderate adverse	Switch off all office light along the southern facades post curfew (after 11pm) to be included as a requirement of a future CEMP.	**Negligible**
Solar glare effects during construction	**Effects would gradually change from negligible to those expected once the Proposed Development is complete and operational that is minor adverse.**	None proposed.	**Effects would gradually change from negligible to those expected once the Proposed Development is complete and operational, that is minor adverse.**
Interim Development and Completed Development Scenarios			

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Daylight	27 buildings experience a **negligible** effect, 23 buildings experience **minor adverse** effect, two buildings experience a **minor to moderate adverse** impact, six buildings experience **moderate adverse** impacts, three buildings experience a **moderate to major adverse** impact and two buildings experience a **major adverse** impact. Two future receptors experience a **moderate adverse** impact.	Mitigation inherent in design of Phase 1 and 2. Mitigation through design for the Phase 3 reserved matters applications, including articulation and setbacks to minimise daylight effects.	**Permanent, local and of negligible to major adverse significance.**
Sunlight	16 buildings experience a **negligible** effect, two buildings experience **minor adverse** effect, four buildings experience **moderate** impact, and four buildings experience a **major** adverse impact.	Mitigation inherent in design of Phase 1 and 2. Mitigation through design for the Phase 3 reserved matters applications, including articulation and setbacks to minimise sunlight effects.	**Permanent, local and of negligible to major adverse significance.**
Overshadowing	One communal amenity area and 30 private gardens experience a **negligible** effect, and one public open space experiencing a **moderate adverse** effect.	Mitigation inherent in design of Phase 1 and 2. Mitigation through design for the Phase 3 reserved matters applications, including articulation and setbacks to minimise overshadowing effects.	**Permanent, local and of negligible to moderate adverse significance.**
Light pollution	Two future receptors experience a **negligible effect,** one existing building and one future receptor experience a **moderate adverse** effect.	Lighting designed to minimise the illuminance levels to the south and west of the floor plan; perimeter dimming; or Automated blinds.	**Permanent, local and of negligible significance.**
Solar glare	Eastbound and Westbound train drivers experience a **minor adverse** effect.	None proposed. Mitigation inherent in design.	**Permanent, local and of minor adverse significance.**

Comparison of Effects between this ES and the 2015 ES (as amended by the 2019 ES Addendum)

14.515. The purpose of this section is to compare the effects reported in the 2015 ES, and subsequent 2019 ES Addendum, with the effects reported in this ES.

14.516. The retained levels of daylight and sunlight at each property have been compared against those of the 2016 Consented Scheme as Amended to understand where material alterations in daylight or sunlight has occurred. The following criteria have been used to identify a material change in light:

- An absolute alteration in VSC of 3% or greater;

- An absolute alteration in NSL of 10% or greater;
- An absolute alteration in annual PSH of 2% or greater; and
- An absolute alteration in winter PSH of 1% or greater.

Daylight

Table 14.14: Daylight comparison to the 2015 ES

Receptor	Daylight effect reported in the 2015 ES (as amended by the 2019 ES Addendum)	Effect of Proposed Development compared with Baseline as reported in this ES	Effect of Proposed Development Compared with 2016 Consented Scheme as Amended
1-15 Tanfields	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to two of the 10 rooms (11.5% and 11.8% absolute loss in NSL) owing to their location within an obstructed light-well.
Reada Court	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
1 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.
3 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to one of the five rooms (11.2% absolute loss in NSL) however the room retains an NSL of 76.4% which is commensurate with the Site's urban location.
5 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to four of the five rooms (between 11.7% and 13.4% absolute loss in NSL) however the rooms retain NSL levels between 68.8% and 73.3% which is commensurate with the Site's urban location.
7 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.
9 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to two of the four rooms (11.6% and 13.4% absolute loss in NSL) however the rooms retain NSL levels between 71.8% and 76.4% which is commensurate with the Site's urban location.
11 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.
13 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.
15 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to three of the five rooms (between 11.5% and 17.1% absolute loss in NSL) however the rooms retain NSL levels between 59.5% and 78.7% which is commensurate with the Site's urban location.
17 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to one of the four rooms (18.1% absolute loss in NSL) however the room retains an NSL of 75.4% which is commensurate with the Site's urban location.

Receptor	Daylight effect reported in the 2015 ES (as amended by the 2019 ES Addendum)	Effect of Proposed Development compared with Baseline as reported in this ES	Effect of Proposed Development Compared with 2016 Consented Scheme as Amended
19 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to one of the four rooms (17% absolute loss in NSL) however the room retains an NSL of 77.7% which is commensurate with the Site's urban location.
21 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to two of the three rooms (between 117.7% and 13.4% absolute loss in NSL) however one of the rooms retains an NSL of 65.5% which is commensurate with the Site's urban location and the second is located within an obstructed recess.
23 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC. Small material change in NSL to one of the four rooms (11.9% absolute loss in NSL) however the room retains an NSL of 78.5% which is commensurate with the Site's urban location.
25 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.
27 Sackville Street	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
29 Sackville Street	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.
5-21 Tudor Road (Friary Court)	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
Montrose House	Not Assessed (negligible)	Minor Adverse	Small material change in VSC to six of the 20 windows (between 3.1% and 3.6% absolute loss in VSC) and all six windows retain a VSC in excess of 24% which is commensurate with the Site's urban location. No material change in NSL.
125 Friar Street	Negligible	Negligible	No material change in VSC or NSL.
127 Friar Street	Negligible	Minor Adverse	No material change in VSC or NSL.
1-29 Projection East	Moderate Adverse	Moderate Adverse	Small material change in VSC to one of the 94 windows (3.1% absolute loss in VSC), the window retains a VSC of 22.4% which is commensurate with the Site's urban location. No material change in NSL.
13 Stanshawe Road	Negligible	Negligible	No material change in VSC or NSL.
136-137 Friar Street	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.

Receptor	Daylight effect reported in the 2015 ES (as amended by the 2019 ES Addendum)	Effect of Proposed Development compared with Baseline as reported in this ES	Effect of Proposed Development Compared with 2016 Consented Scheme as Amended
1-41 Icon House	Moderate Adverse	Moderate Adverse	Small material change in VSC to two of the 54 windows (3% absolute loss in VSC). Small material change in NSL to three of the 38 rooms (between 10.3 and 11.9% absolute loss in NSL) however one of the rooms retain an NSL of 64.1% which is commensurate with the Site's urban location and all three rooms are obstructed by a balcony overhead which limits the visibility of the sky dome.
144 Friar Street	Negligible	Negligible	No material change in VSC or NSL.
1-45 Projection West	Moderate Adverse with a number of substantial reductions in daylight (Substantial is equivalent to Major in the 2019 ES).	Moderate to Major Adverse	No material change in VSC or NSL.
7-11 Station Road	Negligible	Negligible	No material change in VSC or NSL.
8 Stanshawe Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
10 Stanshawe Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
12 Stanshawe Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
14 Stanshawe Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
15 Stanshawe Road	Negligible	Negligible	No material change in VSC or NSL.
16 Stanshawe Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
17 Stanshawe Road	Negligible	Negligible	No material change in VSC or NSL.
18 Stanshawe Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
19 Stanshawe Road	Negligible	Negligible	No material change in VSC or NSL.
30 Garrard Street	Moderate Adverse with a number of substantial reductions in daylight. (Substantial is equivalent to Major in the 2019 ES)	Major Adverse	Small material change in VSC to three of the 250 windows (between 3.1% and 4.5% absolute loss in VSC). Material change in NSL to 16 of the 160 rooms (12 rooms between 10 and 19.5% and four between 21.7 and 26.8% absolute loss in NSL) however five of the rooms retain an NSL level in excess of 60% which is commensurate with the Site's urban location and 12 of the rooms are bedrooms which are considered lower sensitivity in terms of daylight.
32 Friar Street	Negligible	Minor Adverse	No material change in VSC or NSL.

Receptor	Daylight effect reported in the 2015 ES (as amended by the 2019 ES Addendum)	Effect of Proposed Development compared with Baseline as reported in this ES	Effect of Proposed Development Compared with 2016 Consented Scheme as Amended
33 Friar Street	Moderate Adverse	Moderate Adverse	No material change in VSC or NSL.
34 Friar Street	Moderate Adverse	Moderate Adverse	No material change in VSC or NSL.
49-51 Greyfriars Road	Substantial Adverse (equivalent to Major Adverse)	Major Adverse	Material change in VSC to 11 of the 33 windows (between 3.1% and 7.0% absolute loss in VSC). Small material change in NSL to three of the 24 rooms (between 10.2% and 12.3% absolute loss in NSL). The affected windows and rooms face the taller element of the Proposed Development, therefore additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.
5 Vachel Road	Minor Adverse	Minor Adverse	No material change in VSC or NSL.
7 Vachel Road	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.
9 Vachel Road	Not Assessed (negligible)	Minor Adverse	Small material change in VSC to one of the four windows (3.2% absolute loss in VSC). The window retains a VSC of 18.1% which is commensurate with the Site's urban location. No material change in NSL.
11 Vachel Road	Not Assessed (negligible)	Negligible	Small material change in VSC to one of the five windows (3.2% absolute loss in VSC). The window retains a VSC of 19.9% which is commensurate with the Site's urban location. No material change in NSL.
13 Vachel Road	Not Assessed (negligible)	Negligible	Small material change in VSC to two of the six windows (3.1% and 3.2% absolute loss in VSC) the windows retain a VSC of 20.5% and 21.0% which is commensurate with the Site's urban location. No material change in NSL.
15 Vachel Road	Not Assessed (negligible)	Negligible	Small material change in VSC to two of the five windows (3% and 3.1% absolute loss in VSC) the windows retain a VSC of 21.7% and 22.1% which is commensurate with the Site's urban location. No material change in NSL.
17 Vachel Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
19 Vachel Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
20-24 Vachel Road	Not Assessed (negligible)	Minor Adverse	Small material change in VSC to two of the 16 windows (3% and 3.2% absolute loss in VSC) the windows retain a VSC of 24.2% and 27.3% which is commensurate with the Site's urban location. No material change in NSL.
21-23 Vachel Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
25 Vachel Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.

Receptor	Daylight effect reported in the 2015 ES (as amended by the 2019 ES Addendum)	Effect of Proposed Development compared with Baseline as reported in this ES	Effect of Proposed Development Compared with 2016 Consented Scheme as Amended
27-31 Vachel Road	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
53 Greyfriars Road	Moderate Adverse	Moderate to Major Adverse	Small material change in VSC to six of the 13 windows (between 3.7% and 4.4% absolute loss in VSC). Small material change in NSL to one of the nine rooms (10.6% absolute loss in NSL). The affected windows and rooms face the taller element of the Proposed Development, therefore additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.
9-11 Stanshawe Road	Minor Adverse	Minor to Moderate Adverse	Small material change in VSC to two of the nine windows (4.1% and 4.4% absolute loss in VSC). Material change in NSL to three of the eight rooms (between 13.5% and 22.1% absolute loss in NSL), two of the three rooms retain an NSL in excess of 57% which is commensurate with the Site's urban location. The affected windows and rooms are obstructed by 9 Greyfriars Road to the south-east and 35-43 Greyfriars Road to the north-east, thus relying on light received across the Site.
Alexia Court-3 Tudor Road	Not Assessed (negligible)	Moderate Adverse	Material change in VSC to 10 of the 31 windows (between 3.5% and 6.1% absolute loss in VSC). Seven of the 10 affected windows serve LKDs that have one or more mitigating window that retains a VSC level in excess of 27%. The three remaining windows are obstructed by 53 Greyfriars Road to the east and their inset location; these windows face the taller element of the Proposed Development, therefore additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended. No material change in NSL.
Bridewell & Samuel House - Student Housing	Moderate Adverse	Moderate Adverse	Small material change in VSC to three of the 67 windows (3% absolute loss in VSC). Material change in NSL to 10 of the 57 rooms (between 15.6% and 33.1% absolute loss in NSL) however six of the rooms retain an NSL level in excess of 50% which is commensurate with the Site's urban location.
Building to Rear of 136-137 Friar Street	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.
The Gateway Public House - 31 Greyfriars Road	Moderate Adverse	Moderate to Major Adverse	Small material change in VSC to one of the 11 windows (3% absolute loss in VSC). Material change in NSL to three of the seven rooms (between 10.4% and 23.0% absolute loss in NSL). The affected windows and rooms are in close proximity to the Proposed Development, therefore additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.
Belmont Court	Not Assessed (negligible)	Minor Adverse	No material change in VSC or NSL.

Receptor	Daylight effect reported in the 2015 ES (as amended by the 2019 ES Addendum)	Effect of Proposed Development compared with Baseline as reported in this ES	Effect of Proposed Development Compared with 2016 Consented Scheme as Amended
Malcom Place	Not Assessed (negligible)	Minor to Moderate Adverse	Small material change in VSC to 14 of the 39 windows (3% and 3.1% absolute loss in VSC), all 14 windows retain a VSC in excess of 17% which is commensurate with the Site's urban location. Small material change in NSL to 19 of the 39 rooms (between 11.5% and 17.3% absolute loss in NSL). 15 of the affected rooms retain an NSL in excess of 50% which is commensurate with the Site's urban location.
18-29 Regent Court	Not Assessed (negligible)	Negligible	No material change in VSC or NSL.

Sunlight

Table 14.15: Sunlight comparison to the 2015 ES

Receptor	Sunlight effect reported in the 2015 ES as Amended by the 2019 ES Addendum	Effect of Proposed Development compared with Baseline reported in this ES	Effect of Proposed Development compared with 2016 Consented Scheme as Amended
1-15 Tanfields	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
Reada Court	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
3 Sackville Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
15 Sackville Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
17 Sackville Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
19 Sackville Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
25 Sackville Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
27 Sackville Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
29 Sackville Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
5-21 Tudor Road (Friary Court)	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
1-29 Projection East	Moderate Adverse	Moderate Adverse	No material change in annual or winter PSH.
136-137 Friar Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
1-41 Icon House	Moderate Adverse	Moderate Adverse	No material change in annual or winter PSH.
1-45 Projection West	Moderate Adverse	Moderate Adverse	No material change in annual or winter PSH.
7-11 Station Road	Negligible	Negligible	No material change in annual or winter PSH.
18 Stanshawe Road	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
30 Garrard Street	Substantial Adverse (Substantial adverse is equivalent to Major Adverse in this ES)	Major Adverse	No material change in annual or winter PSH.

Receptor	Sunlight effect reported in the 2015 ES as Amended by the 2019 ES Addendum	Effect of Proposed Development compared with Baseline reported in this ES	Effect of Proposed Development compared with 2016 Consented Scheme as Amended
33 Friar Street	Negligible	Negligible	No material change in annual or winter PSH.
49-51 Greyfriars Road	Substantial Adverse (Substantial adverse is equivalent to Major Adverse in this ES)	Major Adverse	Small material change in annual PSH to eight of the 22 rooms (between 2% and 3% absolute loss in annual PSH). Small material change in winter PSH to seven of the 22 rooms (1% absolute loss in winter PSH). The affected rooms face the Proposed Development, therefore owing to the added height, additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended.
53 Greyfriars Road	Substantial Adverse	Major Adverse	Small material change in annual PSH to all six rooms (between 3% and 4% absolute loss in annual PSH). The affected rooms face the Proposed Development, therefore owing to the added height, additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended . No material change in winter PSH.
9-11 Stanshawe Road	Moderate Adverse	Moderate Adverse	No material change in annual or winter PSH.
Alexia Court-3 Tudor Road	Not Assessed (negligible)	Minor Adverse	Small material change in annual PSH to four of the 12 rooms (4% absolute loss in annual PSH). The affected rooms are bedrooms which are lower sensitivity in terms of sunlight. No material change in winter PSH.
Building to Rear of 136-137 Friar Street	Not Assessed (negligible)	Negligible	No material change in annual or winter PSH.
The Gateway Public House - 31 Greyfriars Road	Moderate Adverse	Major Adverse	Small material change in annual PSH to all four rooms (between 3% and 5% absolute loss in annual PSH). The affected rooms face the Proposed Development, therefore owing to the added height, additional alterations are to be expected to these windows when compared to the 2016 Consented Scheme as Amended. No material change in winter PSH.
Malcom Place	Not Assessed (negligible)	Minor Adverse	No material change in annual or winter PSH.
18-29 Regent Court	Not Assessed (negligible)	Negligible	Small material change in annual PSH to five of the 39 rooms (between 4% and 6% absolute loss in annual PSH). Two of the affected rooms are bedrooms which are lower sensitivity in terms of sunlight. No material change in winter PSH.

Overshadowing

14.518. In the 2015 ES, the overshadowing effects to Station Square (now referred to as Station Hill Square) were assessed to be minor adverse effect. This public amenity area now experiences a moderate adverse effect owing to the additional massing of Phase 3.

Light Pollution and Solar Glare

14.519. These assessments were not carried out as part of the 2015 ES.

References

[1] Building Research Establishment (BRE) (2011): 'Site Layout Planning for Daylight and Sunlight 2011, A Guide to Good Practice, Second Edition (2011)', IHS BRE Press, Berkshire.

[2] British Standards (BSi) (2008): 'British Standard BS 8206-2:2008 – Lighting for buildings – Part 2: Code of practice for daylighting', BSi, London.

[3] Institution of Lighting Professionals (ILP) (2011): 'Guidance Notes for the Reduction of Obtrusive Light GN01:2011', ILP website: https://www.theilp.org.uk/documents/obtrusive-light/ last accessed 26/09/2019

[4] Railway Group Standard (2003): 'Signal Positioning and Visibility', Rail Safety and Standards Board, London.

[5] CIE International Commission on Illumination (2002): 'CIE Collection on Glare – CIE 146-147:2002', Commission Internationale De L'Eclariage, Vienna.

15. Cumulative Effects

Introduction

15.1. This Chapter assesses the likely significant cumulative effects of the Proposed Development. The Chapter has been prepared by Waterman Infrastructure and Environment Ltd (Waterman IE) with input from each of the technical specialists who have contributed to the Environmental Impact Assessment (EIA) and this Environmental Statement (ES).

Assessment Methodology

15.2. This Chapter considers 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.

15.3. The approach to the assessment of Type 1 and Type 2 cumulative effects is detailed below.

Type 1 Cumulative Effects

15.4. The type 1 cumulative effects identified in this Chapter are based on the likely residual effects reported in the preceding technical Chapters of this ES (**Chapters 7 - 14** inclusive) and therefore take account of mitigation measures that would be in place, such as the Construction Environmental Management Plan (CEMP).

15.5. In determining those receptors which have potential to be affected by more than one type of effect from the Proposed Development, consideration has been given to the type of receptor, proximity to the Site and likely extent of exposure to effect interactions. On this basis, the receptors likely to be affected by more than one type of effect are primarily surrounding residents, and to a lesser extent employees and pedestrians.

15.6. The socio-economic effects have not been included within this assessment of type 1 cumulative effects. This is because the Socio Economic effects (refer to **Chapter 7: Socio-Economics**) are highly unlikely to interact with any other identified environmental effects associated with the Proposed Development.

Type 2 Cumulative Effects

15.7. A review of schemes which have planning permission was undertaken to determine those which would be likely give rise to significant type 2 cumulative effects. In determining the schemes to be considered as part of the cumulative assessment due regard was given to the following:

- The likelihood of the scheme being implemented;
- The scheme's distance from the Site;
- The scheme's proposed use; and
- The scheme's proposed floor area, or uplift in floor area.

15.8. The schemes considered within the Type 2 Cumulative Assessment (collectively referred to as Cumulative Schemes) are set out in Table 15.1 below and are shown on **Figure 15.1**.

Table 15.1 Schemes Proposed for Consideration within the Type 2 Cumulative Assessment

No	Site	Application Reference	Proposals	Decision/Date	Distance and direction from the Site (at its closest point)
1.	80 Caversham Road	182252 / OUT	Outline application considering access, landscaping, layout and scale involving the demolition of all existing buildings and structures (Classes B1a & B2) and erection of new buildings ranging between basement and 2 – 25 storeys in height, providing 658 (79 x studio, 227x1, 335x2 & 17x3-bed) residential units, office accommodation (Class B1a), flexible ground floor Class A1-3 uses, a community centre(Class D1), health centre uses (Class D1) and various works including car parking, servicing, public and private open space, landscaping, highways, pedestrian and vehicular access and associated works.	Decision Pending	150m north
2.	29-35 Station Road, Reading, RG1 1LG	181930	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.	Decision Pending	45m south-east
3.	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.

No	Site	Application Reference	Proposals	Decision/Date	Distance and direction from the Site (at its closest point)
4.	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 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.	Approved 09/01/19	300m to the east.
5.	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 café (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.

No	Site	Application Reference	Proposals	Decision/Date	Distance and direction from the Site (at its closest point)
6.	Kenavon Drive	170509	Demolition of the two existing retail (Homebase and former Toys R Us) structures and the erection of new buildings ranging between 2 and 11 storeys in height, providing 765 (18 x studio, 302x1, 409x2 and 36x3- bed) residential units (Class C3), 5 commercial units (1x flexible Class A1-A4, B1 or D1-D2, 1x flexible D1 or D2, 1x flexible Class A1- A5, 1x flexible Class A3 or A4, 1x flexible A1-A5 or D1-D2 uses), various works to the public realm, including a new riverside square, landscaping, accesses, parking and associated works	Approved October 2018	700m east
7.	Former Scottish and Southern Electricity Site, North of Vastern Road	No application submitted to date – anticipated in June 2019. Public consultation only.	Residential development in five buildings of up to 11 storeys. No further details such as unit numbers are currently available.	N/A – application not yet submitted	300m north
8.	Broad Street, Reading	182137	Construction of three residential buildings (Use Class C3) ranging in height from 5 to 22 storeys (Site E to provide 52 units , Site B to provide 139 Units and Site A to provide 172 units) above Broad Street Mall and provision of a podium level amenity area; Construction of an 18 storey building on South Court comprising ground and first floor retail (Use Class A1/A2/A3) and residential over upper floors (Use Class C3, Site C to provide 99 units); Change of use and extension of Quadrant House to form a 3 storey residential building (Use Class C3, Site D to provide 31 units); Creation of three ground floor retail units (Use Class A1/A2/A3) fronting Dusseldorf Way and Queens Walk	N/A – currently pending a decision	160m south west

15.9. In the absence of detailed information regarding construction programmes, all assessments of effects of type 2 cumulative demolition and construction have assumed that there would be overlap in the implementation of the Proposed Development with the relevant cumulative schemes.

Type 1 Cumulative Effect Assessment

15.10. The following section identifies the Type 1 Cumulative Effects during Demolition and Construction and for the completed and operational Proposed Development.

15.11. Relevant surrounding land uses and sensitive receptors are identified in **Chapter 3: Land Use and Activities**. To avoid repetition, sensitive receptors have been grouped together according to land use. It is anticipated that the proximity of the majority of receptors to the Site is such that effect interactions would be similar for most sensitive receptors according to land use type. The criteria for identifying those receptors which are considered to be the most potentially sensitive has included the land use / activity, proximity to the Site and likely extent of exposure to effect interactions.

Demolition and Construction Type 1 Cumulative Effects

15.12. The likely significant type 1 cumulative effects for various sensitive receptors during the demolition and construction works are listed in Table 15.2. This table also distinguishes the anticipated interactions during the main phases of the demolition and construction works. A description of the construction works is provided in **Chapter 6: Development Programme Demolition and Construction**.

Table 15.2: Likely Type 1 Cumulative Effects during Demolition and Construction

Sensitive Receptor / Land Use	Works			
	Demolition	Substructure Construction	Superstructure Construction	Fit out and Landscaping
Existing and future surrounding residents present at the time of demolition and construction	N-, (V-), Vis-,	N-, (V-), Vis-,	N-, (V-) Vis-,	(N-), Vis+,
Future occupants (residents and employees) of the Site	N-, (V-), Vis-,	N-, (V-), (Vis-),	N-, (V-), Vis-	(N-), Vis+,
Surrounding commercial, retail, and leisure uses	N-, (V-) (Vis-),	N- ,(V-), (Vis-),	N-, Vis-	(N-), Vis +,
Pedestrians and cyclists	N-, (V-), (Vis-),	N ,(V), (Vis),	N, Vis -,	(N-), Vis +,
Other road users	(N-), (Vis-),	(N), (Vis),	(N-), Vis-,	(N-), Vis+
Local views and townscape*	Vis-, N-	Vis-, N-	Vis-, N-	Vis+, N-

Note: * The effect to local views and townscape is positive. Whilst there are some adverse effects for longer distance views, no effect interactions are considered to occur at this distance.

Key:

N = Noise
V = Vibration
Vis = Visual
× = no adverse effects likely
( ) = very minor effects anticipated
(+) = Beneficial effects anticipated
(-) = Adverse effects anticipated

15.13. Table 15.2 indicates that there is the potential for some type 1 cumulative effect interactions to take place during the demolition and construction works. These would generally be reduced during fit

out and landscaping. Effects would primarily relate to temporary noise and vibration and visual effects to adjacent occupants / future Site residents with fewer effects to pedestrians and road users in the surrounding area. Effects from noise and vibration are generally greater during demolition and substructure / superstructure construction reducing during fitout and landscaping. Visual receptors experiencing adverse impacts would substantially reduce when the super structures are complete when the structures are in place (See **Chapter 8: Townscape and Visual** for more details).

Proposed Development Type 1 Cumulative Effects

15.14. The likely significant type 1 cumulative effects for various sensitive receptors during the Interim Development Scenario and Completed Development Scenario are listed in Table 15.3.

Table 15.3: Likely Type 1 Cumulative Effects during the Interim Development Scenario and Completed Development

Sensitive Receptor / Land Use	Interim Development	Completed Development
Existing and future surrounding residents	Vis+, DSO-	Vis+, DSO-
Future occupants (residents and employees) of the Site	Vis+, DSO-, (W-)	Vis+, DSO-, W-
Surrounding commercial, retail, and leisure uses	Vis+, DSO-	Vis+, +/-, DSO-
Pedestrians and cyclists	(N-), Vis+	(N-), Vis+
Other road users	×	×
Local views and townscape	Vis+, W-	Vis+, W-

Note: * The effect to local views and townscape is positive. Whilst there are some adverse effects for longer distance views, no effect interactions are considered to occur at this distance.

Key:

N = Noise
Vis = Visual
W = Wind
DSO = Day Light, Sunlight and Overshadowing
× = no Type 1 effects likely
( ) = very minor effects anticipated
+ = Beneficial effects anticipated
- = Adverse effects anticipated
+/- = Both beneficial and adverse effects anticipated

15.15. Table 15.3 indicates that there is the potential for some type 1 cumulative effect interactions to take place during both the Interim Development Scenario and the Completed Development. Effects would primarily relate to the interactions between visual effects, daylight, sunlight, overshadowing and wind. All visual and townscape effects on local receptors would be beneficial during both the Interim Development Scenario and the Completed Development. Only a small number of off Site receptors very close to the Site would experience Type 1 Cumulative Effects, these would generally be interactions between beneficial visual effects and adverse wind and DSO effects.

Type 2 Cumulative Effects

Socio - Economics

Demolition and Construction

15.16. The implementation of the Proposed Development along with the eight cumulative schemes 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.

15.17. 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 Proposed Development along with the cumulative schemes would have **negligible** effect on construction-related employment at the regional level.

Completed Development

15.18. The eight cumulative schemes included in this assessment would bring forward a range of land uses including residential, commercial and leisure floorspace.

15.19. The likely type 2 cumulative effect on employment has been assessed using the same methodology and employment densities used to assess the Proposed Development (refer to **Chapter 7: Socio-Economics**). On this basis, it has been estimated that the cumulative schemes would generate up to approximately 1,903 FTE jobs. Considered alongside the Proposed Development, the likely type 2 cumulative effect on employment is assessed to be **long-term**, **district** and of **moderate beneficial** significance.

15.20. The cumulative schemes would deliver in the region of 2,620 residential units and, combined with the Proposed Development 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 **major beneficial** significance at the district level.

15.21. 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 Proposed Development (refer to **Chapter 7: Socio-Economics**). This estimates that the cumulative schemes would accommodate approximately 5,200 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.

15.22. 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**.

Townscape and Visual

Demolition and Construction

Townscape

15.23. The largest cumulative effects occur as a result of the combination of the Proposed Development and the schemes at 52 – 55 Friar Street and 29 – 35 Station Hill Road. If demolition and/or construction of these schemes were to occur simultaneously with the Completed Development, the effects to Townscape would be slightly greater. However, it would not alter the overall significance of the demolition and construction effects identified within **Chapter 8: Townscape and Visual**, and the effect with regard to all views, townscape character areas would be temporary, local and between **negligible** and **major adverse**.

Visual

15.24. The cumulative visual effects of the demolition and construction works of the Proposed Development and cumulative schemes would depend on the visibility of earthworks and of large plant and construction equipment. All viewpoints, with the exception of viewpoints, 6, 15, 16, 26, 28, 29,30 and 35 where the cumulative schemes are entirely hidden by land form, built form, vegetation and / or the Completed Development, may experience some further disturbance from construction activities if the construction programmes of the cumulative schemes overlap with that of the Proposed Development. However, owing to the temporary and transient nature of the demolition and construction activities, the likely cumulative effects are considered unlikely to change the significance of effects from those of the Completed Development in isolation. As such, the likely cumulative effects of the demolition and construction works of the Proposed Development together with the cumulative schemes would range from **negligible** to **temporary adverse**, and of **major significance**.

Completed Development

Townscape

15.25. The largest cumulative effects occur as a result of the combination of the Proposed Development and the schemes at 52 – 55 Friar Street and 29 – 35 Station Hill Road due to their proximity to the Site. The effects to Townscape would be slightly greater than those of the Proposed Development in isolation. However, they would not alter the overall significance of the effects identified within **Chapter 8: Townscape and Visual**, and the effect with regard to all townscape character areas would be permanent, local and between **negligible** and **major beneficial** significance**.**

Visual

15.26. Table 15.4 sets out the cumulative visual effects of the Completed Development in combination with the cumulative schemes. The greatest cumulative visual effects occur at long distance and mid distance viewpoints due to the interaction between the Completed Development and cumulative schemes that comprise taller built elements. In particular, the schemes at 80 Caversham Road, 29 – 35 Station Hill Road, the former Scottish and Southern Electricity Site, North of Vastern Road and Broad Street. The lower cumulative schemes, principally the developments on land between Weldale Street and Chatham Street and Bristol and West Arcade, Market Place affect views closer to the Completed Development notability Viewpoints 9, 10 and 24. However, generally the cumulative effects are similar to the effects of the Completed Development in isolation. At maximum parameters cumulative effects would range from **major adverse** to **major beneficial** whilst at

minimum parameters, the cumulative effects would range from **major adverse** to **moderate beneficial**.

Table 15.4: Likely Cumulative Effects on Views and Visual Amenity

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP3. Visitors to St Peter's Church and Church Yard High Sensitivity	The Completed Development and cumulative schemes would sit alongside Thames Tower at a higher level on the skyline creating a stepped profile with some screening provided by trees in the foreground and midground. The cumulative schemes add a stronger urban presence to the centre left of the frame. However, tree cover does provide some screening and only filtered views would be experienced. The overall effect would be prominent but would not dominate the view in its entirety and the leafy outlook would be retained. The effect would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**
	At minimum parameters the outline elements would be largely imperceptible and given that only filtered views of the cumulative schemes would be experienced, the effect would be similar to that of the Interim Development Scenario.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**
VP4 Balmore Walk Visitors / users of Balmore Park High Sensitivity	The Completed Development and cumulative schemes would represent the highest buildings on the skyline. The cluster of buildings would step up with Plot C forming the highest building. The Completed Development and cumulative schemes would add positively to the urban skyline of Reading by adding to the tall buildings that make up focal point of the redeveloped area of central Reading. However, the scale of effect remains the same as that of the Completed Development Scenario.	Moderate	**Permanent**, **local**, **beneficial effect** of **major significance**
	At minimum parameters buildings Plots A and C would appear low on the skyline and be largely screened by the development at 80 Caversham Road and the Former Scottish and Southern Electricity Site, North of Vastern Road. Also, a large section of the eastern elevation of Plot G (the tallest building of the Completed Development at minimum parameters) would be removed from the view by the development at 80 Caversham Road. The effect would be similar to that of the Interim Development Scenario.	Minor	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP 5 Road users traveling south on Westfield Road and Peppard Road Low Sensitivity	The mass of the Completed Development and cumulative schemes would rise up from behind the terraced houses on the west side of Westfield Road adding tall buildings to the largely low rise residential character of the viewpoint. The new buildings would appear lower on the skyline than	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP 5. Pedestrians on Westfield Road Low Sensitivity	the houses in the foreground and therefore would not dominate the view. They would provide a focal point marking the centre of Reading. The effect would remain the same as for the Completed Development in isolation.		**Permanent**, **local**, **beneficial effect** of **minor significance**
	At minimum parameters the outline elements of the Completed Development would not be visible. The cumulative schemes would therefore sit alongside Plot G with the effect similar to that of the Interim Development Scenario.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP 6 Road users on Southampton Street Low Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect would therefore remain the same as for the Completed Development in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP6. Pedestrians on Southampton Street Low/Medium Sensitivity	At minimum parameters the Completed Development would not be visible As a result, and given that no cumulative schemes are visible, the effect is negligible.	Negligible	**Negligible**
VP8 Users of the footpath off Dunsden Way High Sensitivity	At maximum parameters, the Completed Development would represent the highest urban features in a viewpoint with a limited urban presence on the skyline. The cumulative schemes would further add to the stepped cluster of buildings but appear lower on the skyline than the Completed Development at maximum parameters. Together, the cumulative schemes and the Completed Development would increase the urban presence of Reading town centre for users of the footpath. However, the effect would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**
	At minimum parameters the outline elements of the Completed Development would not be visible. Plot G would therefore sit alongside the cumulative schemes particularly the scheme at Broad Street that would appear above Thames Tower. The effect would remain the same as for the Interim Development Scenario.	Minor	**Permanent**, **local**, **adverse effect** of **moderate significance**
VP9 Road users of Chatham Street Low Sensitivity	The cumulative schemes at 52-55 Friar Street and 29-35 Station Hill Road would appear at similar heights to Plot E and be largely screened by tree cover. As a result, the cumulative effect would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP9 Pedestrians on Chatham Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	At minimum parameters the outline elements of the Completed Development would be largely imperceptible as they would sit very low on the skyline. As the cumulative schemes are largely screened, the effect would be similar to that of the Interim Development Scenario.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP10 Road users of Weldale Street Low Sensitivity	The upper elevations of the 22-storey hotel development at 29 – 35 Station Hill Road would be visible above Plot E but would continue to sit lower in the skyline than the cluster of buildings on the Site and would therefore not detract from the stepped profile composition of the Proposed Development at maximum parameters visible from this viewpoint. In the foreground, the mass of the cumulative scheme on land between Weldale Street and Chatham Street would remove an industrial building, and continue to reinforce the contemporary residential character of area. The massing would also frame the right side of the viewpoint. However, overall the effect would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP10, Pedestrians on Weldale Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**
	At minimum parameters the outline elements of the Completed Development would not be visible. Whilst the cumulative schemes would be visible, the effect would remain the same as for the Interim Development Scenario.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP12 Shoppers / pedestrians on Friar Street Low Sensitivity	Only Plot E of the Completed Development would be visible in this view therefore the effects are the same for both the Interim and Completed Development scenarios. The development of 52 to 55 Friar Street would be of similar height on Friar Street to the Proposed Development and the building on the left side of the frame. The effect would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP12. Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**
VP13 Pedestrians on Friar Street and Greyfriars Road Low Sensitivity	The cumulative scheme at 52 to 55 Friar Street and 12 Greyfriars Road would be of similar height to the apartments on the right of the frame and screen the view of the lower elevations of Plot A. However, the effect would remain the same as for the Completed Development in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP13. Road users on Friar Street and Greyfriars Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	At minimum parameters no elements of the Completed Development would be visible and although the cumulative scheme would be visible, the cumulative effect would remain negligible.	Negligible	**Negligible**
VP15 Pedestrians on Stanshawe Street Low Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect would therefore remain the same as for the Completed Development Scenario in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP 15 Road Users on Stanshawe Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**
	At minimum parameters 29-35 Station Road would be visible to the right of Plot G. However, the effect, at minimum parameters, would remain the same as for the Interim Development Scenario in isolation.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP16 Pedestrians on Tudor Road Low Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect would therefore remain the same as for the Completed Development Scenario in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP16, Road users on Tudor Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**
	There are no cumulative schemes visible from this viewpoint. The effect, at minimum parameters, would therefore remain the same as for the Interim Development Scenario in isolation.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP17 Pedestrians on Caversham Road Low Sensitivity	The cumulative scheme proposed on the site of the former sorting office on Caversham Road would add strong built form to the mid ground of the frame and replace the view of the lower elevations of the Completed Development. This cumulative scheme would appear lower on the skyline than the Completed Development at maximum parameters but add positively to the cluster of buildings that make up the focal point of the redeveloped area of central Reading and replace the view of the existing sorting office. The cumulative effect is therefore considered to be moderate beneficial rather than minor beneficial assessed for the Completed Development Scenario in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP 17, Road users on Caversham Road Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	At minimum parameters only the upper elevations of Plot G would be visible between the buildings making up the cumulative scheme at the former sorting office. The remaining buildings would be screened by the cumulative scheme. The cumulative effect would therefore be less than the Interim Development Scenario in isolation but remain of minor significance.	Minor	**Permanent, local, beneficial effect of minor significance**
VP18 Pedestrians on Caversham Bridge High Sensitivity	The Completed Development in combination with the cumulative schemes particularly the development at 80 Caversham Road would add new tall buildings to the frame in this viewpoint characterised by the attractive waterway of the River Thames, low-rise residential property and a tree lined river bank. The appearance of the buildings would provide a noticeable urban element to a view largely devoid of substantial buildings. This would be particularly noticeable to pedestrians using Caversham Bridge. Whilst the Cumulative Schemes would add additional built elements to the skyline the effect would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**
VP18, Road Users on Caversham Bridge Low Sensitivity			**Permanent**, **local**, **adverse effect** of **minor significance**
	At minimum parameters, the cumulative schemes would screen Plots A and C but continue to add urban features to the view meaning that the effect would be greater than for the Interim Development Scenario in isolation.	Moderate	**Permanent, local, adverse effect** of **major significance (minor** for Road users**)**
VP19 Pedestrians and users of the Park High Sensitivity	The Completed Development in combination with cumulative schemes would be prominent in the centre of the frame rising up above existing built form including Reading Mainline Railway Station. The buildings would appear lower on the skyline than the Christchurch pedestrian bridge. However, they are a considerably more prominent presence on the skyline than the existing buildings within the frame. The cumulative schemes would extend the built mass particularly in the right of the frame although the significance of the effect would remain the same as for the Completed Development Scenario.	Major	**Permanent**, **local**, **adverse effect** of **major significance**
	At minimum parameters Plot A would be entirely screened by the cumulative schemes; a small section of Plot C would be visible to the right of Plot G. Cumulative schemes continue to add urban features to the view. The significance of the effect would therefore be greater than for the Interim Development Scenario in isolation.	Moderate	**Permanent**, **local**, **adverse effect** of **major significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP20 Pedestrians on George Street crossing Reading Bridge Low/Medium Sensitivity	Only the cumulative scheme at 29 – 35 Station Hill Road would be visible from this viewpoint rising up adjacent to Thames Tower. Whilst it adds to the cluster of tall buildings that mark the commercial centre of Reading, the effect would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP 20 Road users on George Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**
	At minimum parameters the outline elements of the Completed Development would not be visible. However, Plot G, Thames Tower and the cumulative scheme at 29 – 35 Station Hill Road would create a cluster of tall buildings that mark the commercial centre of Reading. The effect would be the same as for the Interim Development Scenario in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP22 Pedestrians and users of the park High Sensitivity	Only a very small section of the top of the cumulative scheme at the former Sorting Office Caversham Road would be visible in this view above the tree cover. Therefore, the effect would remain the same as for the Completed Development in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **moderate significance**
	At minimum parameters, no elements of the Completed Development would be visible and given that only a very small section of the top of the cumulative scheme at the former Sorting Office, Caversham Road would be visible, the cumulative effect would remain the same as for the Interim Development Scenario in isolation.	Negligible	**Negligible**
VP23 Pedestrians on Forbury Road and Kenavon Drive Low Sensitivity	The tower at 29 – 35 Station Road would appear to the left of the Proposed Development but would be relatively discrete from this position. The effect would therefore remain the same as for the Proposed Development in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP 23. Road users on Forbury Road and Kenavon Drive Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**
	At minimum parameters the outline elements of the Completed Development would be largely imperceptible with only a very small section of Plot G visible low on the skyline. The tower at 29-35 Station Road would be relatively discrete from this position and therefore the cumulative effects are the same as for the Interim Development Scenario in isolation.	Negligible	**Negligible**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP24 Pedestrians / shoppers in Market Place Medium	The Bristol and West Arcade development would replace the buildings on the left side of the frame in the foreground with a contemporary mixed-use development with a four-storey frontage, creating a slightly higher skyline at this viewpoint. The development at 29-35 Station Road would also appear in front of Thames Tower, Plot C and Plot G and would provide a compact skyline profile with the Proposed Development in this view. However, the effect remains the same as for the Completed Development Scenario in isolation.	Moderate	**Permanent**, **local**, **beneficial effect** of **moderate significance**
	At minimum parameters the outline elements of the Completed Development would not be visible. Whilst 29-35 Station Road would partially screen Plot G, the effect is considered to remain the same as for the Interim Development Scenario in isolation.	Minor	**Permanent, local, beneficial effect** of **minor significance**
VP25 Pedestrians / shoppers on Friar Street Low Sensitivity	The profile of 29-35 Station Road would appear on the far right of the frame, extending above Thames Tower and Plot C (at maximum parameters). However, given that this cumulative screen only appears on the far right of the view, the effect would remain the same as for the Completed Development in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP25 Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**
	At minimum parameters the outline elements of the Completed Development would not be visible. However, Plot G and Plot E would still be visible. Given that the cumulative scheme at 29-35 Station Road only appears in the far right of this view, the cumulative effects remain the same as for the Interim Development Scenario in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP26 Pedestrians/shoppers on Friar Street Low Sensitivity	The cumulative scheme at 52 to 55 Friar Street and 12 Greyfriars Road immediately to the west of the Site would be barely perceptible from this viewpoint, being at an oblique angle, and would be of similar height on Friar Street to Plot E. The effect would therefore remain the same as for the Completed Development in isolation.	Moderate	**Permanent, local, beneficial effect** of **minor significance**
VP 26 Road users on Friar Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **minor significance**
	Given that only Plot E is visible from this viewpoint, the effects are the same as for the maximum parameter scheme.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP28 Pedestrians on Castle Street and St Mary's Butts Medium Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect at maximum parameters, would remain the same as for the Completed Development in isolation.	Moderate	**Permanent**, **local**, **adverse effect** of **moderate significance**
VP28 Road Users on Castle Street and St Mary's Butts Low Sensitivity			**Permanent**, **local**, **adverse effect** of **minor significance**
	There are no cumulative schemes visible from this viewpoint. The effect at minimum parameters, would remain the same as for the Interim Development Scenario in isolation.	Negligible	**Negligible**
VP29 Pedestrians on Station Hill Low Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect at maximum parameters, would remain the same as for the Completed Development in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP29 Road users on Station Hill Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**
	There are no cumulative schemes visible from this viewpoint. The effect at minimum parameters, would remain the same as for the Interim Development Scenario in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP30 Pedestrians on Garrard Street Low Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect at maximum parameters, would remain the same as for the Completed Development in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP30 Road Users on Road users on Garrard Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**
	There are no cumulative schemes visible from this viewpoint. The effect at minimum parameters, would remain the same as for the Interim Development Scenario in isolation.	Major	**Permanent, local, beneficial effect** of **moderate significance**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
VP31 Pedestrians on Garrard Street Low Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect at maximum parameters, would remain the same as for the Completed Development in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP 31 Road Users on Garrard Street Low Sensitivity			**Permanent**, **local**, **beneficial effect** of **moderate significance**
	There are no cumulative schemes visible from this viewpoint. The effect at minimum parameters, would remain the same as for the Interim Development Scenario in isolation.	Major	**Permanent**, **local**, **beneficial effect** of **moderate significance**
VP33 Pedestrians on Kings Meadow Road Low Sensitivity	The cumulative scheme at the Former Sorting Office Caversham Road would appear filtered through tree cover in the far right of the frame rising up above the existing multi-storey carpark but would go largely unnoticed from this viewing position.	Moderate	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP 33 Road users on Kings Meadow Road Low Sensitivity	The cumulative scheme at 29 – 35 Station Road would be visible from this viewpoint rising up adjacent to Thames Tower. Whilst it adds to the cluster of tall buildings that mark the commercial centre of Reading, the effect would remain the same as for the Completed Development in isolation.		**Permanent**, **local**, **beneficial effect** of **minor significance**
	At minimum parameters Plots A and C would be discreet and low on the skyline appearing at a similar height to the railway gantries in the midground. However, there would still be a cluster of tall buildings marking the commercial centre of Reading, comprising Plot G, Thames Tower and 29-35 Station Road but the effect would remain the same as for the Completed Development in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP34 Pedestrians on Pitts Lane Low Sensitivity	The cumulative schemes would further add to the tall buildings visible from this viewing position. However, their presence would continue to be largely unnoticed, particularly to road users, due to their distance from the viewing location and the pylons, trees and other town centre buildings providing screening. Therefore, the effect would remain the same as for the Completed Development in isolation.	Minor	**Permanent**, **local**, **beneficial effect** of **minor significance**
VP 34 Road Users on Pitts Lane		Negligible	**Negligible**

Viewpoint No and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
Low Sensitivity	At minimum parameters the outline elements of the Completed Development would not be perceptible from this viewing position. As described above, the cumulative schemes would be largely un-noticed from this location and the cumulative effect at minimum parameters would be the same as for the Interim Development Scenario in isolation.	Negligible	**Negligible**
VP35 Pedestrians on Kings Bridge as using the Kennet Side Path Medium Sensitivity	There are no cumulative schemes visible from this viewpoint. The effect at maximum and minimum parameters would remain the same as for the Completed Development and Interim Development Scenarios in isolation.	Negligible	**Negligible**
VP35 Road users on Kings Bridge Low Sensitivity			**Negligible**

Historic Environment

Construction

Archaeology

15.27. While the identification and recording of archaeological resources is beneficial to increase our understanding of the development of Reading, ultimately, archaeological remains are finite, and this resource would be permanently lost. The cumulative effect on archaeological remains during construction of the Proposed Development in combination with the schemes outlined in Table 15.1 would therefore likely lead to a permanent moderate adverse effect of moderate significance. This is because these schemes in combination with the Proposed Development would lead to a greater loss of archaeology, albeit preserved remains are likely to have already been truncated to some extent from previous development.

Built Heritage

15.28. Based on the combined impact of high-rise development outlined in Table 15.1 there would likely be a temporary adverse effect of minor significance on the settings of the surrounding heritage assets during the demolition and construction phases.

Completed Development

Archaeology

15.29. The combination of the Completed Development and the cumulative schemes would have no additional impact on buried archaeological remains beyond those that would occur during the demolition and construction phases.

Built Heritage

15.30. The Proposed Development and the schemes outlined in Table 15.1 would likely lead to an overall permanent adverse effect of minor to moderate significance depending on the final designs of these additional schemes and whether they restrict any significant sightlines or settings of surrounding Listed Buildings.

Air Quality

Construction

15.31. As noted within **Chapter 10: Air Quality**, the main effects to air quality as a result of construction works would be in relation to dust nuisance. With the implementation of appropriate mitigation measures, dust nuisance can be controlled such that there would be no significant adverse effects from the construction of the Proposed Development. Owing to the typical dispersal and deposition rates of dust with distance from their source and if, as per the Proposed Development, all cumulative schemes would implement their own CEMPs to mitigate dust nuisance effects, it is considered that cumulative dust effects from the Proposed Development and the cumulative schemes would be **negligible**.

15.32. Construction vehicle exhaust emissions from the combined construction traffic of the Proposed Development and the cumulative schemes could potentially give rise to cumulative residual effects on local air quality. However, this would depend upon the extent to which the implementation of the Proposed Development and the cumulative schemes overlap. In the worst-case scenario, the demolition and construction of the cumulative schemes would overlap with the construction of the Proposed Development, and use the same, or nearby construction traffic routes. However, it is generally the case that demolition and construction traffic adds only a very small proportion of additional traffic to the local highway network. In addition, it is considered that appropriate traffic management measures would be implemented to reduce the generation of cumulative construction traffic on the local road network. Based on professional judgement and experience, and with the implementation of appropriate construction traffic management plans, the cumulative effects is considered to be **negligible**.

15.33. The cumulative effects of construction plant emissions from the Site and cumulative scheme sites would be **negligible.**

Completed Development

15.34. Results of the ADMS modelling of the cumulative schemes is presented in Table 15.5.

Table 15.5: ADMS Modelling Results of the Cumulative Schemes

ID	Annual Mean NO_2 ($\mu g/m^3$)			Annual Mean PM_{10} ($\mu g/m^3$)			24-Hour Mean PM_{10} (No. of Days)			Annual Mean $PM_{2.5}$ ($\mu g/m^3$)		
	2026 Baseline	2026 With Development and Cumulative Schemes	Change	2026 Baseline	2026 With Development and Cumulative Schemes	Change	2026 Baseline	2026 With Development and Cumulative Schemes	Change	2026 Baseline	2026 With Development and Cumulative Schemes	Change
1	24.8	24.8	0.0	15.1	15.2	0.1	0	0	0	9.9	10.0	0.1
2	27.3	27.3	0.0	17.6	17.7	0.1	1	1	0	11.3	11.4	0.1
3	24.9	24.9	0.0	15.2	15.3	0.1	0	0	0	10.0	10.0	0.0
4	37.3	37.4	0.1	25.6	25.9	0.3	14	15	1	15.8	16.0	0.2

ID	Annual Mean NO_2 ($\mu g/m^3$)			Annual Mean PM_{10} ($\mu g/m^3$)			24-Hour Mean PM_{10} (No. of Days)			Annual Mean $PM_{2.5}$ ($\mu g/m^3$)		
	2026 Baseline	2026 With Development and Cumulative Schemes	Change	2026 Baseline	2026 With Development and Cumulative Schemes	Change	2026 Baseline	2026 With Development and Cumulative Schemes	Change	2026 Baseline	2026 With Development and Cumulative Schemes	Change
5	28.2	28.3	0.1	17.6	17.7	0.1	1	1	0	11.3	11.4	0.1
6	23.5	23.5	0.0	13.8	13.8	0.0	0	0	0	9.2	9.2	0.0
7	26.6	26.6	0.0	17.3	17.5	0.2	1	1	0	11.1	11.3	0.2
8	29.5	29.6	0.1	20.2	20.3	0.1	4	4	0	12.7	12.8	0.1
9	26.3	26.4	0.1	16.8	16.9	0.1	1	1	0	10.9	10.9	0.0
10	28.0	28.0	0.0	18.4	18.5	0.1	2	2	0	11.7	11.8	0.1
11	25.6	25.7	0.1	16.0	16.0	0.0	0	0	0	10.4	10.4	0.0
12	28.6	28.7	0.1	19.1	19.4	0.3	2	3	1	12.1	12.3	0.2
13	27.4	27.5	0.1	18.1	18.2	0.1	1	2	1	11.6	11.6	0.0
14	27.7	27.8	0.1	18.1	18.2	0.1	1	2	1	11.6	11.6	0.0
15	27.4	27.4	0.0	18.0	18.2	0.2	1	2	1	11.5	11.6	0.1

Nitrogen Dioxide

15.35. In 2026, concentrations are predicted to meet the NO_2 annual mean objective value of 40µg/m^3 at all receptor locations. Table 15.5 illustrates that the highest predicted annual mean NO_2 concentration (of 37.4µg/m^3 at Receptor 4 'with' the Proposed Development and cumulative schemes) is much less than 60µg/m^3 and as such the hourly objective is likely to be met at all existing receptors.

15.36. Using the magnitude of change descriptors outlined in Table 10.8 of **Chapter 10: Air Quality**, the Proposed Development and cumulative schemes are predicted to result in a 'negligible' impact on annual mean NO_2 concentrations at all receptor locations. The cumulative effect on NO_2 concentrations is not significant.

Particulate Matter (PM_{10} and $PM_{2.5}$)

15.37. As shown in Table 15.5, the concentrations of PM_{10} are predicted to be well below the annual and daily mean objective values in 2026 at all the receptor locations.

15.38. Using the magnitude of change descriptors outlined in Table 10.8 of **Chapter 10: Air Quality**, the Proposed Development and cumulative schemes are predicted to result in a 'negligible' impact on annual mean PM_{10} levels at all receptor locations and the cumulative effect is not significant.

15.39. There are no significance criteria in relation to daily mean PM_{10} concentrations. However, given the predicted concentrations are well below the daily mean PM_{10} objective, and no change is

predicted at all receptor locations, it is considered that the cumulative effect on daily mean PM_{10} levels is not significant.

15.40. The results in Table 15.5 indicate that the annual mean $PM_{2.5}$ objective of 25µg/m^3 is predicted to be met in all scenarios modelled both 'with' and 'without' the Proposed Development and cumulative schemes. Based on the criteria outlined in Table 10.8 of **Chapter 10: Air Quality**, a **negligible** impact is predicted at all receptor locations on annual mean $PM_{2.5}$ levels and the cumulative effect is not significant.

Noise and Vibration

Construction

15.41. In the event that the cumulative schemes located within 100m of the Site boundary were to be constructed concurrently with the Proposed Development, cumulative noise and vibration effects could occur predominantly to occupants of surrounding properties. In particular, residential occupants at Merchants Place, 125 Friar Street and closest properties on Vachel Road. The closest cumulative schemes to the Site boundary are 29-35 Station Road and 52-55 Friar Street. Accordingly, the likelihood of cumulative noise and vibration effects occurring during the demolition and construction works would be greatest for these cumulative schemes and the Proposed Development.

15.42. The cumulative demolition and construction effects would be minimised through implementation of CEMPs, ensuring no more than **temporary**, **short-term**, **local** effects of **minor** to **moderate adverse** significance would be experienced. This is consistent with the assessment of the Proposed Development in isolation.

15.43. In addition to construction noise and vibration generated on the Site, there would be the potential for cumulative effects to arise from an increased number of construction vehicles on the local road network. The principal roads impacted would be Greyfriars Road and Friar Street. Given the existing high noise levels in the area and existing traffic levels, the potential increase in noise levels from construction vehicles from the cumulative schemes would be at worse **minor adverse** to receptors on these road links, with **negligible** effects on the remaining roads.

Completed Development

15.44. The road traffic data provided by the transport consultants used in the noise assessment, includes for committed developments. As such cumulative effect on traffic flows alongside the Proposed Development is as reported within the ES, **negligible** with **permanent, local and minor adverse significance** on Greyfriars Road and Garrard Street.

15.45. On the presumption that noise from building plant and non residential uses are controlled through planning policy, it is considered reasonable to assume that similar mitigation measures and planning controls would be implemented for all cumulative schemes so that they would not in isolation, or together, give rise to unacceptable noise effects. Consequently, the likely cumulative effect of noise from the operation of building plant and non residential uses on surrounding receptors would be **negligible**. Parking, where provided within the cumulative schemes in close proximity to the Proposed Development, is assumed to be provided within the building envelope and would therefore remain a negligible effect. Where servicing and delivery is provided within the building envelope cumulative effects remain negligible. With regard to on-street servicing and delivery, cumulative effects are still likely to remain negligible due to high prevailing noise levels from road traffic on the local road network.

Ground Condition and Contamination

Demolition and Construction

15.46. Demolition and construction works associated with the other cumulative schemes within the vicinity of the Site would be required to adopt appropriate site management techniques, such as a Construction Environmental Management Plan, to minimise the potential for contamination of soils or controlled waters.

15.47. The cumulative risk of an accidental spillage is likely to be slightly increased due to the increased construction activity although the effect is likely to remain at worst, **minor adverse**.

15.48. The other cumulative schemes should also undertake a ground investigation and appropriate chemical testing of soils and groundwater to inform the detailed design process and satisfy planning requirements. Should remediation be necessary in light of the findings of the ground investigations and the proposed end-uses, this would represent a local improvement in ground and groundwater quality. However, the magnitude of effect is likely to remain **minor beneficial**.

Completed Development

15.49. Each cumulative scheme would be required to implement site specific measures to ensure that the ground conditions at their sites were suitable for the proposed end uses and that the buildings were appropriately designed and constructed for the residual ground conditions. There would therefore be no cumulative effect on future receptors from the residual ground conditions.

15.50. The other cumulative schemes would also be required to install drainage systems incorporating oil water interceptors and silt traps as necessary and store fuels and chemicals in accordance with legislative and best practice requirements. It is therefore considered that the cumulative effects to the ground and controlled waters would remain **negligible**.

Wind

15.51. A cumulative impact assessment has been undertaken to determine the effect of the Proposed Development in conjunction with known cumulative schemes located within a 360 m radius of the centre of the Site. As such the following developments were included within the wind tunnel model surrounding context in Configurations 4, 5, 6 and 7:

- 80 Caversham Road [182252/OUT];
- 29 – 35 Station Road [181930];
- 52 – 55 Friar Street and 12 Greyfriars Road [162210];
- Bristol and West Arcade, Market Place [180358];
- Land Between Weldale Street and Chatham Street [170326]; and
- Broad Street [182137].

15.52. Developments beyond a 360m radius of the centre of the Site would not be expected to substantially alter the wind conditions at the Site. As such, the cumulative scheme at Kenavon Drive [170509] was not been included on the wind tunnel model.

15.53. The Former Scottish and Southern Energy Site on Vastern Road has yet to be submitted for planning and therefore details are unavailable at time of testing. In any event, this Site would fall beyond the 360m radius of the centre of the Site.

Construction

15.54. Wind conditions during the construction works would be expected to gradually adjust from those of the Interim Development Scenario (Configuration 2), to those presented for the Proposed Development in the context of the cumulative schemes (Configurations 4 – 7). Comparing the results of the Maximum Parameter Development in the context of the existing surrounding buildings (Configuration 3) with those of the Maximum Parameter Development in the context of the cumulative surrounding buildings (Configuration 4) it would be expected that wind conditions in the Baseline Scenario and Interim Development Scenario in the context of the cumulative surrounding buildings would be similar to those presented for Configuration 1 and Configuration 2.

15.55. As discussed, for the Proposed Development in the context of the existing surrounding buildings, the wind environment during construction of the Proposed Development is assumed to be variable and as such, all effects would be **temporary**. As construction progresses, wind conditions adjusting from those presented for the Interim Development Scenario (Configuration 2) to those for the Maximum Parameter Development would represent a **moderate adverse** (significant) effect on off-Site thoroughfares and entrances at the north-western corner of the North Site and **minor adverse** (significant) effect on Garrard Street and at off-Site entrances on Greyfriars Road. Conditions on-Site would represent a **negligible** (not significant) effect.

15.56. Strong winds exceeding 20m/s for more than 0.025% of the time (approximately 2.2 hours per year) with the potential to be a safety concern to all pedestrians would occur off-Site at the junction of Station Hill and Greyfriars Road. Strong winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) with the potential to be a safety concern to cyclists and more vulnerable pedestrians would occur off-Site at the north-western corner of the North Site as well as on Garrard Street and Greyfriars Road until the installation of the landscaping scheme and wind mitigation measures. Strong winds at the north-western and north-eastern corners of Plot G and at Plot G roof terrace levels would be acceptable for a construction site where access is restricted and an appropriate health and safety procedure is in place.

15.57. Mitigation measures would therefore be required as per the Proposed Development in isolation.

15.58. It is not anticipated that the cumulative schemes would result in significantly different effects from those of the Proposed Development in the context of existing surrounding buildings.

Completed Development

South Site

15.59. As in the context of the existing surrounding buildings, wind conditions at the South Site reference the plots submitted in support of the 2019 Section 73 Applications which present the South Site in the context of a maximum parameter massing for the 2016 Consented Scheme. Wind conditions within the bounds of the South Site would be expected to remain similar to those presented in these figures in the context of the Maximum Parameter Development of the 2016 Consented Scheme as assessed.

Pedestrian Comfort

15.60. During the windiest season (Figure 15.2), wind conditions at the South Site would range from suitable for sitting to standing use with strolling use conditions at the junction of Friar Street and Station Road (locations 1 and 4 in Figure 15.2). Wind conditions would be expected to be similar to those presented for the 2019 S73 Applications. As such, wind conditions on proposed thoroughfares would represent a **minor beneficial** (not significant) to **moderate beneficial** (not

significant) effect, existing thoroughfares would have conditions representing a **negligible** (not significant) effect, on-Site entrance locations would have conditions representing a **negligible** (not significant) to **minor beneficial** (not significant) effect and conditions at existing entrance locations would represent a **negligible** (not significant) effect.

15.61. Wind conditions during the summer season would be suitable for sitting and standing use at ground (Figure 15.3) and roof terrace (Figure 15.4) levels. Within ground level amenity spaces and on balconies wind conditions at the South Site would represent a **negligible** (not significant) effect. Wind conditions at Plot E roof level would have conditions suitable for standing use representing a **minor adverse** (significant) effect prior to the application of wind mitigation measures. All other Plaza and roof terrace amenity spaces would have conditions representing a **negligible** (not significant) effect.

Strong Winds

15.62. There would be no instances of wind exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) at the South Site.

North Site

Configuration 4: Maximum Parameter Development with the Cumulative Surrounding Buildings

15.63. Discussion of the wind conditions at the Maximum Parameter Development with the cumulative surrounding buildings is based on the results presented in Figure 15.5 for the ground and terrace levels during the windiest season and Figure 15.6 for the ground and terrace levels during the summer season. Instances of strong winds with the potential to be a safety concern for cyclists and pedestrians are presented in Figure 15.7.

Pedestrian Comfort

15.64. During the windiest season (Figure 15.5), wind conditions in the Maximum Parameter Development scenario with cumulative surrounds would range from suitable for sitting use to being uncomfortable for all pedestrian use at the Proposed Development. Conditions would be similar to those for the Maximum Parameter Development in the context of the existing surrounding buildings (Configuration 3) with localised improvements on Tudor Road (measurement location 14), Station Hill (measurement locations 43), Greyfriars Road (measurement location 29), Garrard Street (measurement locations 96 – 98,), Station Road (measurement locations 73, 79 and 247) and at the north-western corner of Plot G (measurement locations 149 and 153).

15.65. Wind conditions during the summer season (Figure 15.6) would range from suitable from sitting to walking use, as in Configuration 3.

Thoroughfares

15.66. Wind conditions on off-Site thoroughfares would be similar to those in Configuration 3. Conditions would be windier than suitable on Greyfriars Road (measurement locations 36, 38), Station Hill (measurement locations 39 – 41, 43, 46, 50, 51) and Tudor Road (measurement locations 12, 14) during the windiest season (Figure 15.5). These conditions, up to two categories windier than suitable for pedestrian thoroughfare use would represent a **moderate adverse** (significant) to **minor adverse** (significant) effect.

15.67. Wind conditions on Garrard Street would be improved, and conditions on Station Hill, Tudor Road and Greyfriars Road not highlighted above and on Station Road and Stanshawe Road would remain

suitable for strolling use or calmer during the windiest season (Figure 15.5) representing a **negligible** (not significant) effect.

15.68. On-Site thoroughfare conditions would be similar to those in Configuration 3, one category windier than suitable between Plot C and Plot G (measurement location 149) and at the north-western corner of Plot G (measurement location 150) for pedestrian thoroughfare use representing a **minor adverse** (significant) effect. Remaining on-Site thoroughfares to the north of Plot G and between Plot G and Plot C would remain suitable for standing and strolling use during the windiest season representing a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Entrances

15.69. During the windiest season (Figure 15.5) wind conditions at entrances to existing surrounding buildings on Station Hill (measurement location 50) and Greyfriars Road (measurement locations 16, 17) would be similar to those in Configuration 3, two categories and one category windier than suitable respectively. Conditions on Tudor Road (measurement location 12) would be improved relative to Configuration 3, however, would remain one category windier than suitable. These conditions would also be windier than in the baseline scenario and would represent a **moderate adverse** (significant) to **minor adverse** (significant) effect. All remaining surrounding entrance locations would remain suitable for standing use or calmer, representing a **negligible** (not significant) effect.

15.70. Entrances to Plot G of the Proposed Development would remain similar to those in Configuration 3, suitable for standing use or calmer during the windiest season (Figure 15.5), representing a **negligible** (not significant) to **minor beneficial** (not significant) effect.

Ground Level Amenity Space

15.71. During the summer season (Figure 15.6), wind conditions at off-Site amenity spaces (measurement location 70) would remain suitable for sitting use, representing a **negligible** (not significant) effect.

15.72. Within on-Site amenity and café seating space in the western undercut of Plot G, conditions would be improved relative to Configuration 3, however, localised standing use conditions (measurement locations 135, 138 and 142) would persist during the summer season (Figure 15.6). A mix of sitting and standing use conditions would be suitable for a large mixed use amenity space provided seating provision is located in areas suitable for sitting use. Conditions within on-Site amenity space would therefore represent a **negligible** (not significant) effect.

Terrace Level Amenity Space

15.73. Wind condition at Plot G terrace levels would be improved relative to Configuration 3 on both the upper and lower terraces. During the summer season (Figure 15.6, inset) conditions would predominantly be suitable for sitting use with localised standing conditions at the eastern end of the lower terrace and south-western corner of the upper terrace. This mix would be suitable provided seating provision is located in areas suitable for sitting use. Conditions at terrace levels would therefore represent a **negligible** (not significant) effect.

Strong Winds

15.74. Instances of strong winds exceeding 20m/s for more than 0.025% of the time (approximately 2.2 hours per year) which would be a safety concern for all pedestrians would persist to the north-west of the Site (measurement locations 39, 41) on Station Hill (Figure 15.7).

15.75. Strong winds exceeding 15m/s for more than 0.025% of the time (approximately 2.2 hours per year) which would have the potential to be a safety concern for cyclists and more vulnerable pedestrians would no longer occur at four measurement locations (12, 29, 50, 107), however, strong winds would persist at seven measurement locations (14, 33, 36, 38, 40, 43, 46, 51) to the north-west and west of the North Site, four measurement locations on Garrard Street (20, 98, 109, 114) and four on-Site measurement locations around Plot G (144, 149, 150) (Figure 15.7).

15.76. At Plot G terrace level (Figure 15.7, inset) strong winds would occur at measurement location 174. This area would be inaccessible to the public and therefore no wind mitigation would be required.

Mitigation and Residual Effects

15.77. As described in the cumulative effects section above, without mitigation, wind conditions would range from **negligible** (not significant) to **moderate adverse** (significant) with instances of strong winds to the north west and west of the Site. These conditions would be similar to, or locally calmer than, those for the Completed Development Scenario – Maximum Parameter Development with Existing Surrounding Buildings (Configuration 3). As wind conditions would generally be no worse than those in the context of the existing surrounding buildings, wind mitigation measures developed for the Proposed Development in Chapter 13 would remain valid for the Proposed Development in the context of the cumulative surrounding buildings.

15.78. With the implementation of the measures detailed in Chapter 13, wind conditions would be expected to range from representing a **moderate adverse** (significant) to **moderate beneficial** (not significant) effect as detailed for Development Options 1, 2 and 3.

Daylight, Sunlight and Overshadowing

15.79. The cumulative scenario consists of the detailed Phase 1 and 2, and the outline maximum parameter scheme for Phase 3 in the context of the surrounding existing environment including relevant cumulative schemes. This scenario assesses the potential daylight, sunlight and overshadowing effects of the Proposed Development and relevant cumulative schemes on the surrounding receptors and amenity spaces. Cumulative effects of light pollution are not assessed as all nearby cumulative schemes comprise residential or hotel uses and, thus are unlikely to result in light spillage to sensitive receptors. Cumulative effects of solar glare are not assessed because all cumulative schemes are too far from the Proposed Development and sensitive receptors to alter the solar glare effects or are obscured by buildings nearby.

15.80. Professional judgement has been applied to identify the list of cumulative schemes for consideration in this assessment, so as to ensure that only the cumulative schemes with the potential to generate effects relating to daylight, sunlight and overshadowing, in conjunction with the Proposed Development, are included within the cumulative effects assessment. The cumulative schemes considered in the assessment are as follows:

- 80 Caversham Road (182252/OUT);
- 29-35 Station Road, Reading RG1 1LG (181930); and
- 52-55 Friar Street and 12 Greyfriars Road, Reading RG1 1DX (162210).

15.81. This scenario is illustrated on drawing numbers 5847/76/03/04, 5847/76/03/05 and 5847/76/03/06 (**Technical Appendix 14.1**).

Construction

15.82. The likely effects in relation to the daylight and sunlight amenity, overshadowing for the surrounding properties, and amenity areas would vary throughout the demolition and construction works, depending on the level of obstruction caused.

15.83. The effects during demolition would be beneficial until the point of construction. As construction works progress, the effect of the new buildings would steadily increase in magnitude as the superstructure is built and then clad. Those effects that are perceptible, as the superstructure and cladding progress, would be similar to those once the Proposed Development is complete and operational, as presented below. It is therefore considered that the completed Proposed Development represents the worst-case assessment in terms of likely daylight, sunlight and overshadowing effects.

15.84. During the demolition and construction phase, a number of tall cranes are likely to be present on-Site, however their size and temporary presence would lead to generally imperceptible effects of a temporary nature. As such, the overall effect would range from being **temporary, beneficial effects during** demolition, then gradually changing from **beneficial** to **permanent, local effects** of **negligible** to **major adverse significance**, once the Proposed Development is complete, as set out in the assessment of the Cumulative Scenario below.

15.85. The effects presented for the Cumulative Scenario do not differ from the Completed Development Scenario.

Completed Development

15.86. This scenario considers the Proposed Development comprising the approved Reserved Matters details for Plots E and F (Phase 1); detailed application for Plot G (Phase 2); and outline Maximum Parameters for Plots A, B, C and D (Phase 3) and nearby cumulative schemes.

15.87. The cumulative schemes considered in the assessment are as follows:

- 80 Caversham Road (182252/OUT);
- 29-35 Station Road, Reading RG1 1LG (181930); and
- 52-55 Friar Street and 12 Greyfriars Road, Reading RG1 1DX (162210).

15.88. All remaining cumulative schemes are too far from the Site to result in cumulative effects to the sensitive receptors.

Daylight

15.89. The potential daylight impacts on surrounding residential properties arising from the Proposed Development and cumulative schemes have been assessed against the Baseline Scenario in regards to VSC and NSL in accordance with the BRE's criteria. The full daylight assessment for the Proposed Development and cumulative schemes can be found within **Technical Appendix 14.2** and is summarised in Table 15.6 below.

15.90. A total of 1,212 windows serving 869 rooms have been assessed within 63 surrounding residential buildings in terms of daylight. Overall, of the 1,212 windows assessed for VSC, 327 (52%) would meet the BRE's criteria. Of the 869 rooms assessed for NSL, 526 (61%) would meet the BRE's criteria.

15.91. The 25 properties highlighted in grey in Table 15.6 would experience no or little alteration (below 20%), and the effect on daylight to these properties would therefore be **negligible**.

The remaining 38 buildings are discussed in detail in the following paragraphs

Table 15.6 Effects to VSC and NSL to Surrounding Sensitive Receptors

Address	VSC						NSL					
			Below BRE Guidelines						Below BRE Guidelines			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
1-15 Tanfields	18	18	0	0	0	0	10	6	2	0	2	4
Reada Court	14	14	0	0	0	0	10	10	0	0	0	0
1 Sackville Street	4	2	2	0	0	2	4	1	1	2	0	3
3 Sackville Street	7	7	0	0	0	0	5	3	1	1	0	2
5 Sackville Street	5	4	1	0	0	1	5	1	4	0	0	4
7 Sackville Street	6	5	1	0	0	1	4	3	0	0	1	1
9 Sackville Street	4	4	0	0	0	0	4	2	1	1	0	2
11 Sackville Street	4	4	0	0	0	0	4	2	1	1	0	2
13 Sackville Street	3	3	0	0	0	0	3	2	1	0	0	1
15 Sackville Street	5	5	0	0	0	0	5	2	1	2	0	3
17 Sackville Street	5	5	0	0	0	0	4	1	3	0	0	3
19 Sackville Street	7	6	1	0	0	1	4	1	3	0	0	3
21 Sackville Street	3	3	0	0	0	0	3	1	1	1	0	2
23 Sackville Street	4	4	0	0	0	0	4	3	1	0	0	1
25 Sackville Street	6	6	0	0	0	0	5	4	1	0	0	1
27 Sackville Street	6	6	0	0	0	0	4	4	0	0	0	0
29 Sackville Street	4	3	1	0	0	1	4	3	1	0	0	1

Address	VSC						NSL					
			Below BRE Guidelines						Below BRE Guidelines			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
5-21 Tudor Road (Friary Court)	52	52	0	0	0	0	39	38	1	0	0	1
Montrose House	20	15	5	0	0	5	20	20	0	0	0	0
125 Friar Street	28	28	0	0	0	0	3	2	1	0	0	1
127 Friar Street	6	6	0	0	0	0	5	3	2	0	0	2
1-29 Projection East	94	14	11	19	50	80	66	24	29	8	5	42
13 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
136-137 Friar Street	9	9	0	0	0	0	4	4	0	0	0	0
1-41 Icon House	54	6	3	9	36	48	38	9	4	2	23	29
144 Friar Street	2	2	0	0	0	0	2	2	0	0	0	0
1-45 Projection West	138	66	9	16	47	72	110	63	10	12	25	47
7-11 Station Road	57	57	0	0	0	0	24	24	0	0	0	0
8 Stanshawe Road	5	5	0	0	0	0	5	5	0	0	0	0
10 Stanshawe Road	5	5	0	0	0	0	4	4	0	0	0	0
12 Stanshawe Road	2	2	0	0	0	0	2	2	0	0	0	0
14 Stanshawe Road	4	4	0	0	0	0	3	3	0	0	0	0
15 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0
16 Stanshawe Road	3	3	0	0	0	0	3	3	0	0	0	0
17 Stanshawe Road	3	3	0	0	0	0	2	2	0	0	0	0

Address	VSC						NSL					
			Below BRE Guidelines						Below BRE Guidelines			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
18 Stanshawe Road	6	6	0	0	0	0	3	3	0	0	0	0
19 Stanshawe Road	3	3	0	0	0	0	3	3	0	0	0	0
30 Garrard Street	250	32	15	20	183	218	160	78	19	5	58	82
32 Friar Street	7	5	2	0	0	2	5	3	0	2	0	2
33 Friar Street	4	0	3	1	0	4	4	1	0	0	3	3
34 Friar Street	4	2	2	0	0	2	3	0	0	1	2	3
49-51 Greyfriars Road	33	0	0	0	33	33	24	0	0	0	24	24
5 Vachel Road	5	1	4	0	0	4	5	2	1	2	0	3
7 Vachel Road	6	4	2	0	0	2	4	4	0	0	0	0
9 Vachel Road	4	3	1	0	0	1	4	4	0	0	0	0
11 Vachel Road	5	5	0	0	0	0	5	5	0	0	0	0
13 Vachel Road	6	6	0	0	0	0	6	6	0	0	0	0
15 Vachel Road	5	5	0	0	0	0	5	5	0	0	0	0
17 Vachel Road	10	10	0	0	0	0	4	4	0	0	0	0
19 Vachel Road	10	10	0	0	0	0	4	4	0	0	0	0
20-24 Vachel Road	16	8	8	0	0	8	12	12	0	0	0	0
21-23 Vachel Road	8	8	0	0	0	0	8	8	0	0	0	0
25 Vachel Road	4	4	0	0	0	0	4	4	0	0	0	0
27-31 Vachel Road	12	12	0	0	0	0	12	12	0	0	0	0

Address	VSC						NSL					
			Below BRE Guidelines						Below BRE Guidelines			
	Total No. of Windows	No. Windows that meet BRE criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total	Total No. of Rooms	No. Rooms that meet the 0.8 times former value criteria	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
53 Greyfriars Road	13	6	0	1	6	7	9	4	0	0	5	5
9-11 Stanshawe Road	9	5	0	0	4	4	8	5	1	1	1	3
Alexia Court-3 Tudor Road	31	20	1	0	10	11	12	10	0	0	2	2
Bridewell & Samuel House - Student Housing	67	10	8	18	31	57	57	16	7	9	25	41
Building to Rear of 136-137 Friar Street	6	6	0	0	0	0	1	1	0	0	0	0
The Gateway Public House - 31 Greyfriars Road	11	1	2	0	8	10	7	2	0	0	5	5
Belmont Court	21	20	1	0	0	1	21	21	0	0	0	0
Malcom Place	39	29	10	0	0	10	39	24	9	4	2	15
18-29 Regent Court	24	24	0	0	0	0	24	24	0	0	0	0
Total	1,212	627	93	84	408	585	869	526	106	54	183	343

1-15 Tanfields

15.92. A total of 18 windows serving 10 rooms were assessed for daylight within this building.

15.93. For VSC, all windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.94. For NSL, six of the 10 (60%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.95. Of the four affected rooms, two would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect whilst two would experience an alteration of greater than 40% which is considered a major adverse effect.

15.96. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor adverse significance**.

15.97. The effects presented for the Cumulative Scenario do not differ from the Completed Development scenario.

1, 5, 7 and 29 Sackville Street

15.98. A total of 19 windows serving 17 rooms were assessed for daylight within this terrace of residential properties. With all four properties affected in the same manner and to the same degree they have been reported as a group.

15.99. For VSC, 14 of the 19 (74%) windows assessed windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.100. The five affected windows experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

15.101. For NSL, eight of the 17 (47%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.102. Of the nine affected rooms, six would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect, two would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect and one would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

15.103. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon these building is considered **permanent, local** and of **minor to moderate adverse significance**.

15.104. The effects presented for the Cumulative Scenario differ from the Completed Development Scenario which was minor adverse overall. The additional effects can be attributed to the 52-55 Friar Street and 12 Greyfriars Road scheme.

3 and 9 – 25 Sackville Street (odds)

15.105. A total of 48 windows serving 41 rooms were assessed for daylight within this terrace of residential properties. With all 14 properties affected in the same manner and to the same degree they have been reported as a group.

15.106. For VSC, 47 of the 48 (98%) windows assessed windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.107. The affected window experiences an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

15.108. For NSL, 21 of the 41 (51%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.109. Of the 20 affected rooms, 14 would experience an alteration in NSL between 20-29.9% which is considered a minor adverse effect and six would experience an alteration between 30-39.9% which is considered a moderate adverse effect.

15.110. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon these building is considered **permanent, local** and of **minor adverse significance**.

15.111. The effects presented for the Cumulative scenario do not differ from the Completed Development scenario.

5-21 Tudor Road (Friary Court)

15.112. A total of 52 windows serving 39 rooms were assessed for daylight within this residential building.

15.113. For VSC, all windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect

15.114. For NSL, 38 of the 39 (97%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.115. The affected room would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect.

15.116. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **negligible**.

15.117. The effects presented for the Cumulative Scenario do not differ from the Completed Development Scenario.

Montrose House, 20-24 Vachel Road and Belmont Court

15.118. A total of 57 windows serving 53 rooms were assessed for daylight within these residential buildings. With all three buildings affected in the same manner and to the same degree they have been reported as a group.

15.119. For VSC, 43 of the 57 (75%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.120. Of the 14 affected windows, all would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

15.121. For NSL, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.122. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon these building is considered **permanent, local** and of **minor adverse significance**.

15.123. The effects presented for the Cumulative Scenario do not differ from the Completed Development Scenario.

125 Friar Street

15.124. A total of 28 windows serving three rooms were assessed for daylight within this building.

15.125. For VSC, all windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.126. For NSL, one of the three (67%) rooms assessed would meet the BRE's criteria and is therefore considered to experience a negligible effect.

15.127. The affected room would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect.

15.128. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor adverse significance**.

15.129. The effects presented for the Cumulative Scenario differ from the Completed Development Scenario which was negligible overall. The additional effects can be attributed to the 52-55 Friar Street and 12 Greyfriars Road scheme.

127 Friar Street

15.130. A total of six windows serving five rooms were assessed for daylight within this building.

15.131. For VSC, all windows assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.132. For NSL, three of the five (60%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.133. Of the two affected rooms, both would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect.

15.134. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor adverse significance**.

15.135. The effects presented for the Cumulative Scenario do not differ from the Completed Development Scenario.

1-29 Projection East

15.136. A total of 94 windows serving 66 rooms were assessed for daylight within this building.

15.137. For VSC, 14 of the 94 (15%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.138. Of the 80 affected windows, 11 would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 19 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 50 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

15.139. For NSL, 24 of the 66 (36%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.140. Of the 42 affected rooms, 29 would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and eight would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining five rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.141. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate to major adverse significance**.

15.142. The effects presented for the Cumulative Scenario differ from the Completed Development Scenario which was moderate adverse overall. The additional effects can be attributed to the 29-35 Station Road scheme.

1-41 Icon House

15.143. A total of 54 windows serving 38 rooms were assessed for daylight within this building.

15.144. For VSC, six of the 54 (11%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.145. Of the 48 affected windows, three would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and nine would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 36 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

15.146. For NSL, nine of the 38 (24%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.147. Of the 29 affected rooms, four would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and two would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 23 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.148. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **major adverse significance**.

15.149. The effects presented for the Cumulative Scenario differ from the Completed Development Scenario which was moderate adverse overall. The additional effects can be attributed to the 29-35 Station Road scheme.

1-45 Projection West

15.150. A total of 138 windows serving 110 rooms were assessed for daylight within this building.

15.151. For VSC, 66 of the 138 (48%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.152. Of the 72 affected windows, nine would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 16 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 47 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

15.153. For NSL, 63 of the 110 (57%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.154. Of the 47 affected rooms, 10 would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and 12 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 25 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.155. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate to major adverse significance.**

15.156. The effects presented for the Cumulative Scenario are the same as those for the Completed Development Scenario.

30 Garrard Street

15.157. A total of 250 windows serving 160 rooms were assessed for daylight within this building.

15.158. For VSC, 32 of the 250 (13%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.159. Of the 218 affected windows, 15 would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 20 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 181 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

15.160. For NSL, 78 of the 160 (49%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.161. Of the 82 affected rooms, 19 would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and five would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 58 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.162. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate to major adverse significance**.

15.163. The effects presented for the Cumulative Scenario are the same as for the Completed Development Scenario.

32 Friar Street

15.164. A total of seven windows serving five rooms were assessed for daylight within this building.

15.165. For VSC, five of the seven (71%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.166. Of the two affected windows, both would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

15.167. For NSL, three of the five (60%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.168. Of the two affected rooms, both would experience an alteration in NSL between 30 and 39.9% which is considered a moderate adverse effect.

15.169. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor adverse significance**.

15.170. The effects presented for the Cumulative Scenario are the same as for the Completed Development Scenario.

33 Friar Street

15.171. A total of four windows serving four rooms were assessed for daylight within this building.

15.172. For VSC, all four windows assessed see losses greater than recommended by the BRE.

15.173. Of the four affected windows, three would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect whilst one would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect.

15.174. For NSL, one of the four (25%) rooms assessed would meet the BRE's criteria and is therefore considered to experience a negligible effect.

15.175. Of the three affected rooms, all would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

15.176. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.177. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

34 Friar Street

15.178. A total of four windows serving three rooms were assessed for daylight within this building.

15.179. For VSC, two of the four (50%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.180. Of the two affected windows, both would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

15.181. For NSL, all three rooms assessed see losses greater than recommended by the BRE.

15.182. Of the three affected rooms, one would experience an alteration in NSL between 30 and 39.9% which is considered a moderate adverse effect whilst two would experience an alteration in excess of 40% which is considered a major adverse effect.

15.183. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.184. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

49-51 Greyfriars Road

15.185. A total of 33 windows serving 24 rooms were assessed for daylight within this building.

15.186. For VSC, all 33 windows assessed see losses greater than recommended by BRE.

15.187. Of the 33 affected windows, all would experience an alteration in VSC greater than 40% which is considered a major adverse effect.

15.188. For NSL, all 24 rooms assessed see losses greater than recommended by BRE.

15.189. Of the 24 affected rooms, all would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

15.190. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **major adverse significance**.

15.191. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

5 - 9 Vachel Road (odds)

15.192. A total of 15 windows serving 13 rooms were assessed for daylight within this row of buildings. With all three properties affected in the same manner and to the same degree they have been reported as a group.

15.193. For VSC, eight of the 15 (53%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.194. Of the seven affected windows, all would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

15.195. For NSL, ten of the 13 (77%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.196. Of the three affected rooms, one would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect whilst two would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect.

15.197. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor adverse significance**.

15.198. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

53 Greyfriars Road

15.199. A total of 13 windows serving nine rooms were assessed for daylight within this building.

15.200. For VSC, six of the 13 (46%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.201. Of the seven affected windows, one would experience an alteration in VSC between 30 and 39.9% which is considered a moderate adverse effect whilst six would experience an alteration in excess of 40% which is considered a major adverse effect.

15.202. For NSL, four of the nine (44%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.203. Of the five affected rooms, all would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

15.204. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate to major adverse significance**.

15.205. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

9-11 Stanshawe Road

15.206. A total of nine windows serving eight rooms were assessed for daylight within this building.

15.207. For VSC, five of the nine (56%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.208. The four affected windows would experience an alteration in excess of 40% which is considered a major adverse effect.

15.209. For NSL, five of the eight (63%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.210. Of the three affected rooms, one would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect whilst one would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining room would experience an alteration greater than 40% which is considered a major adverse effect.

15.211. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor to moderate adverse significance**.

15.212. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

Alexia Court-3 Tudor Road

15.213. A total of 31 windows serving 12 rooms were assessed for daylight within this building.

15.214. For VSC, 20 of the 31 (65%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.215. Of the 11 affected windows, one would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect whilst the remaining 10 would experience an alteration in VSC greater than 40% which is considered a major adverse effect.

15.216. For NSL, 10 of the 12 (83%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.217. Of the two affected rooms, both would experience an alteration in NSL greater than 40% which is considered a major adverse effect.

15.218. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.219. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

Bridewell & Samuel House - Student Housing

15.220. A total of 67 windows serving 57 rooms were assessed for daylight within this building.

15.221. For VSC, 10 of the 67 (15%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.222. Of the 57 affected windows, eight would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect and 18 would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 31 windows would experience an alteration in excess of 40% which is considered a major adverse effect.

15.223. For NSL, 16 of the 57 (28%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.224. Of the 41 affected rooms, seven would experience an alteration in NSL between 20-29.9% which is considered a minor adverse effect and nine would experience an alteration between 30-39.9% which is considered a moderate adverse effect. The remaining 25 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.225. This property is student accommodation which has a transient population and thus may be considered less sensitive from a daylight perspective.

15.226. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate to major adverse significance**.

15.227. The effects presented for the Cumulative Scenario differ from the Completed Development Scenario which was moderate adverse overall. The additional effects can be attributed to the 52-55 Friar Street and 12 Greyfriars Road scheme.

The Gateway Public House - 31 Greyfriars Road

15.228. A total of 11 windows serving seven rooms were assessed for daylight within this building.

15.229. For VSC, one of the 11 (9%) windows assessed would meet the BRE's criteria and is therefore considered to experience a negligible effect.

15.230. Of the 10 affected windows, two would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect whilst eight would experience an alteration in excess of 40% which is considered a major adverse effect.

15.231. For NSL, two of the seven (29%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.232. All five affected rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.233. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate to major adverse significance**.

15.234. The effects presented for the Cumulative Scenario are the same as those of the Completed Development scenario.

Malcolm Place

15.235. A total of 39 windows serving 39 rooms were assessed for daylight within this building.

15.236. For VSC, 29 of the 39 (74%) windows assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.237. All 10 affected windows would experience an alteration in VSC between 20 and 29.9% which is considered a minor adverse effect.

15.238. For NSL, 24 of the 39 (62%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.239. Of the 15 affected rooms, nine would experience an alteration in NSL between 20 and 29.9% which is considered a minor adverse effect and four would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining two rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.240. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor to moderate adverse significance**.

15.241. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

Sunlight

15.242. The full sunlight assessment can be found in **Technical Appendix 14.2** of this ES and the summary results are presented in Table 15.7.

15.243. Of the 368 rooms assessed for sunlight, 276 (75%) would meet the BRE's criteria for both annual and winter PSH and are therefore considered to experience a negligible effect.

15.244. The 14 buildings highlighted in grey in Table 15.7 experience little or no change in sunlight levels with the completed Proposed Development and cumulative schemes in place and are therefore considered to experience a negligible effect. The remaining 10 affected buildings are discussed in detail following Table 15.7.

Table 15.7 Effects to PSH to Surrounding Sensitive Receptors

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Annual PSH			Winter PSH		
			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
1-15 Tanfields	6	6	0	0	0	0	0	0
Reada Court	10	10	0	0	0	0	0	0
3 Sackville Street	1	1	0	0	0	0	0	0
15 Sackville Street	1	1	0	0	0	0	0	0
17 Sackville Street	1	0	0	1	0	0	0	1
19 Sackville Street	1	0	0	0	0	0	0	1
25 Sackville Street	1	1	0	0	0	0	0	0
27 Sackville Street	1	1	0	0	0	0	0	0
29 Sackville Street	1	1	0	0	0	0	0	0
5-21 Tudor Road (Friary Court)	39	39	0	0	0	0	0	0
1-29 Projection East	15	7	0	0	8	0	0	0
136-137 Friar Street	1	1	0	0	0	0	0	0
1-41 Icon House	16	7	1	1	5	0	0	9
1-45 Projection West	83	76	2	3	2	0	0	0
7-11 Station Road	20	20	0	0	0	0	0	0
18 Stanshawe Road	1	1	0	0	0	0	0	0
30 Garrard Street	58	32	1	5	20	0	0	8
33 Friar Street	1	1	0	0	0	0	0	0

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Annual PSH			Winter PSH		
			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
49-51 Greyfriars Road	22	0	0	0	22	0	0	22
53 Greyfriars Road	6	0	0	0	6	0	0	6
9-11 Stanshawe Road	3	2	0	0	1	0	0	0
Alexia Court-3 Tudor Road	12	9	0	1	2	0	0	2
Building to Rear of 136-137 Friar Street	1	1	0	0	0	0	0	0
The Gateway Public House - 31 Greyfriars Road	4	0	0	0	4	0	0	4
Malcom Place	39	35	0	3	1	0	0	4
18-29 Regent Court	24	24	0	0	0	0	0	0
Total	368	276	4	14	71	0	0	57

17 and 19 Sackville Street

15.245. For annual PSH, one of the two (50%) rooms assessed within these buildings would meet the BRE's criteria and are therefore considered to experience a negligible effect. The second room see a loss between 30 and 39.9% which is considered a moderate adverse effect.

15.246. For winter PSH, the two rooms assessed would experience a loss greater than 40% which is considered major adverse.

15.247. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.248. The effects presented for the Cumulative Scenario differ from the Completed Development Scenario which were negligible overall. The additional effects can be attributed to the 52-55 Friar Street and 12 Greyfriars Road scheme.

1-29 Projection East

15.249. For annual PSH, seven of the 15 (47%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining eight rooms see losses greater than 40% which is considered a major adverse effect.

15.250. For winter PSH, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.251. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.252. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

1-41 Icon House

15.253. For annual PSH, nine of the 16 (56%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.254. Of the seven rooms affected annually, one would experience an alteration in annual PSH between 20 and 29.9% which is considered a minor adverse effect and one would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining five rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.255. For winter PSH, seven of the 16 (44%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.256. All nine rooms affected in the winter, would experience an alteration in excess of 40% which is considered a major adverse effect.

15.257. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.258. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

1-45 Projection West

15.259. For annual PSH, 76 of the 83 (90%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.260. Of the seven rooms that don't meet the BRE's criteria for annual PSH, two would experience an alteration in annual PSH between 20 and 29.9% which is considered a minor adverse effect and three would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining two rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.261. For winter PSH, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.262. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.263. The effects presented for the Cumulative Scenario are the same as those of the Completed Development scenario.

30 Garrard Street

15.264. For annual PSH, 32 of the 58 (55%) rooms assessed within this building would meet BRE's criteria and are therefore considered to experience a negligible effect.

15.265. Of the 26 rooms that don't meet the BRE's criteria for annual PSH, one would experience an alteration in annual PSH between 20 and 29.9% which is considered a minor adverse effect and five would experience an alteration between 30 and 39.9% which is considered a moderate adverse effect. The remaining 20 rooms would experience an alteration in excess of 40% which is considered a major adverse effect.

15.266. For winter PSH, 50 of the 58 (86%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining eight rooms experience losses greater than 40% which is considered a major adverse effect.

15.267. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **major adverse significance**.

15.268. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

49-51 Greyfriars Road

15.269. For both annual PSH and winter PSH, all 22 rooms assessed within this building see losses greater than 40% which is considered a major adverse effect.

15.270. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **major adverse significance**.

15.271. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

53 Greyfriars Road

15.272. For both annual PSH and winter PSH, all six rooms assessed within this building see losses greater than 40% which is considered a Major Adverse effect.

15.273. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **major adverse significance**.

15.274. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

9-11 Stanshawe Road

15.275. For annual PSH, two of the three (67%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining room sees losses greater than 40% which is considered a major adverse effect.

15.276. The one affected room faces almost due east and the high-angle sunlight is intercepted by a porch, therefore the alteration in annual PSH is a result of the architecture of 9-11 Stanshawe Road itself.

15.277. For winter PSH, all rooms assessed would meet the BRE's criteria and so are considered to experience a negligible effect.

15.278. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **moderate adverse significance**.

15.279. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

Alexia Court-3 Tudor Road

15.280. For annual PSH, nine of the 12 (75%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.281. Of the three rooms affected annually, one would experience an alteration in annual PSH between 30 and 39.9% which is considered a moderate adverse effect whilst two would experience an alteration in excess of 40% which is considered a major adverse effect.

15.282. For winter PSH, 10 of the 12 (83%) rooms assessed would meet the BRE's criteria and are therefore considered to experience a negligible effect. The remaining two see losses greater than 40% which is considered a major adverse effect.

15.283. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor adverse significance**.

15.284. The effects presented for the Cumulative Scenario are the same as those of the Completed Development scenario.

The Gateway Public House - 31 Greyfriars Road

15.285. For both annual PSH and winter PSH, all four rooms assessed within this building see losses greater than 40% which is considered a major adverse effect.

15.286. The affected rooms are known to be bedrooms which are less sensitive in terms of sunlight within the BRE Guidelines. This building captures all its light from across the Site, which in the Baseline Scenario is underdeveloped given its central location. As a result, any significant development of the Site would lead to reduced levels of annual and winter PSH levels. In addition, all windows face almost due east where they only have the potential to capture half the available sunlight.

15.287. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **major adverse significance**.

16. Summary of Mitigation, Monitoring and Enhancement Measures

16.1. The likely significant effects of the Proposed Development are described in the preceding technical Chapters of this ES. Where significant potential effects are identified, methods to mitigate or monitor the likely significant potential effects have been described. It is anticipated that implementation of such mitigation and monitoring measures would be required by condition on any planning consent or where relevant, through the Section 106 Agreement or Community Infrastructure Levy.

16.2. In order to assist Reading Borough Council in identifying the mitigation and monitoring measures assumed in the assessment of residual effects, Tables 16.1 and 16.2 present a summary of these measures during construction and on completion respectively. These tables do not summarise all the potential and residual effects, rather they identify what mitigation and monitoring should be implemented in order to achieve the residual effects identified within the preceding technical chapters.

16.3. This EIA was undertaken in parallel with the design process. As a consequence, many measures to mitigate likely significant adverse environmental effects have been incorporated into the scheme design. Such measures are inherent in the design and have therefore not been identified in the following tables - these measures form part of the Proposed Development that would be approved as part of a future planning approval. Similarly, assessment of the potential effects of the Proposed Development have assumed implementation of relevant legislation and therefore this has not been listed.

Table 16.1: Summary of Mitigation & Monitoring Measures During Demolition and Construction

Mitigation, Monitoring or Enhancement Measure	Effect being mitigated, monitored or enhanced	Possible Method of Implementation
Construction Environmental Management Plan incorporating a Demolition Management Statement and Construction Management Statement	Adverse environmental effects during demolition and construction from: • Noise and Vibration – CEMP to include the requirement for adoption of quieter deconstruction methods where work is undertaken within 15m of a sensitive receptor and adoption of CFA piling and pressed sheet piling techniques (rather than driven or impact piles, where possible); • Air Quality / Dust; • Waste Generation; • Ecological Habitat loss; • Handling and storage of potentially hazardous liquids on-Site; • Drainage and Spill control; • Construction Traffic including provision of a Traffic Logistics Plan; • Temporary Visual intrusion; • Site Lighting and lighting within the proposed commercial buildings (during construction); and • Disturbance or losses of Archaeological Sources.	Planning Condition
Implementation of job brokerage schemes, apprenticeships and training schemes	Job creation during demolition and construction.	Section 106 agreement

Mitigation, Monitoring or Enhancement Measure	Effect being mitigated, monitored or enhanced	Possible Method of Implementation
Programme of archaeological investigation and recording	Adverse effects during demolition and construction on as yet unknown buried archaeological remains.	Planning Condition
Vibration monitoring	Adverse effects during demolition and construction piling. Should CFA piling be undertaken at a distance of less than 10m then it is recommended that monitoring is undertaken to ensure threshold levels agreed with RBC are not exceeded.	Planning Condition
Further ground investigation, and remediation (if necessary)	Adverse effects during demolition and construction from potential sources of contamination on soils and groundwater.	Planning Condition
Further ground gas monitoring and implementation of gas protection measures (if necessary)	To further characterise the concentrations of ground gas.	Planning Condition
Preparation and implementation of an Asbestos Risk Assessment, and Asbestos Discovery Plan)	Adverse effects during demolition and construction from the potential release of asbestos fibres during earth movements. Required prior to commencement of demolition work.	Planning Condition
Site Waste Management Plan	Adverse effect during demolition and construction from the disposal of contaminated spoil and demolition waste.	Planning Condition
Foundation Works Risk Assessment (FWRA)	Adverse effects during demolition and construction from the introduction of new pathways through piling.	Planning Condition
Provision of landscaping in accordance with the submitted landscape plan to mitigate wind conditions	Adverse effects on pedestrian comfort and safety arising from wind conditions	Planning Condition

Table 16.2: Summary of Mitigation & Monitoring Measures for the Proposed Development

Mitigation, Monitoring or Enhancement Measure	Effect being mitigated, monitored or enhanced	Method of Implementation
Ecological Management Plan	Enhancement of biodiversity through provision of green roofs, landscaping and bird and bat boxes.	Planning Condition
Contributions towards primary health care facilities	Impact of additional residents on primary health care facilities	Financial contributions
Contributions towards early years, primary and secondary school provision	Impact of additional residents on early years, primary and secondary school provision.	Financial contributions
Provision of wheelchair accessible homes and accessibility and adaptability of homes	Housing needs	Section 106

Mitigation, Monitoring or Enhancement Measure	Effect being mitigated, monitored or enhanced	Method of Implementation
Provision of an Estate Management Plan, Security Management Plan and Operational Waste Management Plan	Management and maintenance of public open space, control on the occupants of the food and beverage units to ensure that there is no over-concentration of hot food takeaways, provision of community uses, security management and waste management.	Section 106
Implementation of a Travel Plan	Reduce emissions to air through the implementation of a travel plan. A Travel Plan would be prepared to reduce the number of car trips associated with the Development, and encourage walking, cycling and use of public transport.	Planning Condition
Provision of Electric Vehicle Charging Points	Provision of electric vehicle charging points to encourage the switch to low emission vehicles to benefit air quality.	Planning Condition
Incorporation of mitigation to achieve suitable Plant Noise Limits	Adverse effects due to the generation of noise from fixed mechanical plant and building services.	Planning Condition
Implementing Servicing and Delivery controls such as agreement of servicing hours	Adverse effects due to generation of noise from servicing and delivery	Planning Condition
Implementing suitable acoustic design measures where sensitive residential uses (bedrooms / living rooms) are located above service yard / car park access points.	Adverse noise effects at the ingress / egress to service yards and car parks.	Planning Condition
Sound insulation (Non-Residential Uses)	Standard controls relating to opening hours of non-residential uses and use of outside space would also minimise potential noise effects on sensitive receptors. Detailed design to ensure adequate sound insulation is incorporated into the façade.	Planning Condition
Provision of appropriate ventilation/ extraction to ensure that no nuisance, disturbance or loss of amenity is caused by odour or fumes to nearby properties as a result of the commercial kitchen, as set out in the Defra Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (January 2005).	Kitchen Extract Odour	Planning Condition
Storage of fuel tanks for backup generators and cleaning chemicals etc on hardstanding or within appropriately bunded areas. Provision of oil water interceptors on the drainage system as required. Management and maintenance of electricity substations.	Future ground conditions.	Planning conditions

Mitigation, Monitoring or Enhancement Measure	Effect being mitigated, monitored or enhanced	Method of Implementation
Provision of landscaping in accordance with the submitted landscape plan to mitigate wind conditions	Adverse effects on pedestrian comfort and safety arising from wind conditions	Planning condition
Wind tunnel testing (for Phase 3 only)	Pedestrian safety and amenity. Development massing and landscaping to be designed to mitigate wind safety issues and to ensure the wind conditions within and surrounding the Proposed Development are suitable for the intended use of the area.	Planning Condition
Daylight, Sunlight and Overshadowing Assessment and consideration of setbacks and articulation as part of Phase 3 Detailed Design.	Daylight, sunlight and overshadowing conditions.	Planning Condition

15.288. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.

Malcolm Place

15.289. For both annual PSH and winter PSH, 35 of the 39 (90%) rooms assessed within this building would meet the BRE's criteria and are therefore considered to experience a negligible effect.

15.290. Of the four rooms that don't meet the BRE's criteria for annual PSH, three would experience an alteration in annual PSH between 30 and 39.9% which is considered a moderate adverse effect and one would experience an alteration in excess of 40% which is considered a major adverse effect.

15.291. The four rooms that don't meet the BRE's criteria for winter PSH would experience an alteration in excess of 40% which is considered a major adverse effect

15.292. Based on professional judgement, the overall effect of the Proposed Development and cumulative schemes upon this building is considered **permanent, local** and of **minor adverse significance**.

15.293. The effects presented for the Cumulative Scenario are the same as those of the Completed Development Scenario.