



Kings Meadow View

Environmental Statement

Volume 1: Main Report

On behalf of **abrdn**

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1 Introduction

1.1 Project Background

1.1.1 This Environmental Statement (ES) has been prepared by Stantec UK Ltd (Stantec) on behalf of abrdn ('the Applicant') in relation to an outline planning application for the redevelopment of land at Forbury Retail Park (hereafter referred to as 'the Site') for a residential-led development in Reading (hereafter referred to as the 'Proposed Development'). This ES presents the findings of the Environmental Impact Assessment (EIA) and identifies the likely significant environmental effects of the Proposed Development during demolition, construction and operation.

1.1.2 The description of the Proposed Development is as follows:

"Outline application for comprehensive redevelopment, including demolition of existing structures, comprising a residential-led mixed use scheme of up to 820 units (Class C3) and up to 5,500 sqm (GEA) of commercial uses (Class E) together with ancillary and associated development including new and enhanced pedestrian routes and vehicle access routes, open spaces, hard and soft landscaping, basement, and basement car parking providing up to 200 car parking spaces, and up to 53 car parking spaces serving the commercial uses, up to 860 cycle parking spaces and servicing facilities, sewer diversion and associated works, with details of layout, scale, external appearance and landscaping reserved."

1.1.3 The Site is located within the administrative boundary of Reading Borough Council (RBC). The Site is approximately 2.65 hectares in area and currently comprises of buildings and hardstanding. The current uses on the Site comprise retail stores including Home Sense, Furniture Village and the fast-food chain KFC. On the Site, there is a surface car park with 313 spaces. A Site Location Plan is provided in **Appendix A.1**.

1.2 Terms and Definitions

1.2.1 For ease of reference, the following terms have been used throughout the ES (unless the context dictates otherwise):

- 'the Site' – the site area being developed pursuant to the Proposed Development (the extent of which is shown on the Site Location Plan at **Appendix A.1**);
- 'Proposed Development' – the residential-led development for which planning permission is being sought (as described in **Chapter 3** and plans provided in **Appendix A.2**);
- 'the Applicant' – abrdn;
- 'RBC' – Reading Borough Council;
- Application Drawings – plans submitted as part of the planning application (as shown in **Appendix A.2**); and
- Application Description – formal application description (as outlined in **Section 1.1** and **Section 3.1**).

EIA Terms:

- Primary mitigation – measures which are designed to be an inherent part of the Proposed Development;

- Secondary mitigation – measures to mitigate identified likely significant effects which require further activity to be achieved, and do not form an inherent form of the Proposed Development;
- Tertiary mitigation – measures taken to achieve other legislative requirements or actions considered as standard practice;
- Impact – in relation to the outcome of the project (e.g. the generation of emissions to air);
- Effect – the consequent implication in environmental terms (e.g. the reduction in local air quality);
- As proposed for this EIA: Short-term effect duration – less than two years; Medium-term effect duration – two years to five years; Long-term effect duration – over five years.

1.3 The Environmental Statement and Other Documents

- 1.3.1 This ES presents the findings of an EIA undertaken in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended), referred to as the 'EIA Regulations'.
- 1.3.2 The Proposed Development is considered to be EIA development (as defined) because it is development that falls within paragraph 10(b) of Schedule 2 of the EIA Regulations that has the potential to give rise to significant environmental effects by virtue of its size, nature and location. The Applicant has voluntarily undertaken an EIA in accordance with the EIA Regulations.
- 1.3.3 Running concurrently with the design process, the EIA has sought to identify any likely significant environmental effects, to identify appropriate design and construction measures and apply good practice both to mitigate any likely significant adverse environmental effects and to maximise the environmental opportunities which might arise as a consequence of the construction and operation of the Proposed Development. The EIA has also sought to determine the residual beneficial and adverse environmental effects remaining after mitigation measures have been incorporated.
- 1.3.4 The ES comprises the following volumes:
- **Volume 1: Main Report (this document)**
 - **Chapter 2:** description of the Site and surrounding area;
 - **Chapter 3:** summary of the Proposed Development;
 - **Chapter 4:** outlines the demolition and construction works, and proposed site management;
 - **Chapter 5:** methodology adopted to undertake the EIA;
 - **Chapter 6:** summary of the planning and policy context;
 - **Chapter 7-13:** technical chapters including Socioeconomics (**Chapter 7**), Noise and Vibration (**Chapter 8**), Air Quality (**Chapter 9**), Heritage (**Chapter 10**), Daylight, Sunlight, Overshadowing and Solar Glare (**Chapter 11**), Wind and Microclimate (**Chapter 12**) and Townscape and Visual (**Chapter 13**) which document the assessments of likely significant effects of the Proposed Development;
 - **Chapter 14:** assessment of impact interactions.

- **Volume 2: Appendices**
- **Non-Technical Summary.**

1.3.5 The other documents submitted alongside the planning application include:

- Design and Access Statement (DAS);
- Planning Statement;
- Statement of Community Involvement;
- Design Codes;
- Retail Statement (RS);
- Health Impact Assessment (HIA);
- Energy Statement;
- Sustainability Statement;
- Waste Management Strategy;
- Site Waste Management Plan (SWMP);
- Phase 1 Ground Condition Assessment;
- Ecological Assessment Report (EAR);
- Arboricultural Impact Assessment;
- Transport Assessment;
- Framework Travel Plan;
- Financial Viability Assessment;
- Flood Risk Assessment and SuDS Strategy;
- Drainage Strategy; and
- Fire Statement.

1.4 Project Team

1.4.1 The project team for this EIA is shown in **Table 1.1**. In accordance with Regulation 18(5)(b) of the EIA Regulations, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare the ES is provided in **Appendix A.3**.

Table 1.1: EIA Project Team

Project Team Member	Team Position
Stantec	EIA Coordination
	Socioeconomics

Project Team Member	Team Position
	Air Quality
	Townscape and Visual
Sandy Brown	Noise and Vibration
Montagu Evans	Heritage
EB7	Daylight, Sunlight, Overshadowing and Solar Glare
RWDI	Wind and Microclimate

1.5 Environmental Statement Availability

- 1.5.1 This ES is available for viewing online via the publicly available RBC planning portal: http://planning.reading.gov.uk/fastweb_PL/welcome.asp. Electronic copies of the ES and Non Technical Summary may be obtained free of charge
- 1.5.2 It can also be viewed at RBC planning offices: Civic Offices, Bridge Street, Reading, RG1 2LU. Please contact RBC by telephone on 0118 937 3787 to make arrangements to view the ES at the Council office.

2 Site and Surrounding Area

2.1 The Site

- 2.1.1 The Site of the Proposed Development is at Forbury Retail Park, Forbury Road, RG1 3JD in Reading Town Centre and located at grid reference SU720737. A Site Location Plan is provided at **Appendix A.1**.
- 2.1.2 The existing Site is approximately 2.65 hectares (ha) in area and generally flat at 43.5 m above ordnance datum (AOD). The majority of the Site comprises buildings and hardstanding. Around the Site entrance and car park there are landscaped areas including semi-mature trees and mown grassland. The Site comprises 10 retail stores including Home Sense, Furniture Village and the fast-food chain KFC, as well as a telephone answering company. There are also warehouse servicing areas behind the stores, to the north of the Site. The Site includes a surface car park with 313 spaces. None of the existing on-site buildings are listed.
- 2.1.3 Pedestrian routes are currently provided from Forbury Road to the retail units. A Thames Water trunk sewer crosses the Site, entering it from the south until the approximate centre of the Site before splitting east and west and crossing the Site laterally. The pipeline is 1400 mm in diameter at its smallest point.

2.2 The Surrounding Area

- 2.2.1 To the south of the Site is Forbury Road (A329). To the east of the Site lies Kenavon Drive and the area of Forbury Retail Park which is a separate site to the Proposed Development, which includes retail stores, car parking and a fast-food drive through. Located to the south of the Site is St James Church and Reading Gaol (the former HM Prison), and further beyond this lies the medieval Abbey Ruins. To the southwest is Forbury Gardens and adjacent to the site to the west lies two office blocks. To the north the Great Western Railway is separated from the Site by lower level lines from Reading station to Guildford and Waterloo. Napier Road and Kings Meadow lie beyond the railway to the north.
- 2.2.2 The adjacent railway running parallel to the north boundary of the Site and associated embankments containing scrub and scattered trees is partly designated under Policy EN12 RBC Local Plan as an 'Area of Identified Biodiversity Interest'. The area surrounding the railway line is also safeguarded by Crossrail.
- 2.2.3 The Site is located within Reading town centre which mainly extends to the west and south of the Site and contains a range of services and facilities including supermarkets, shops, restaurants, pharmacies and gyms.
- 2.2.4 To the south east of Forbury Retail Park is Huntley Wharf. The Site benefits from planning permission ref: 170509, granted in October 2018, for the demolition of the existing retail structures and the erection of new buildings ranging between 2 and 11 storeys, providing 765 residential units, 5 commercial units and associated works to the public realm, including a new riverside square and landscaping. Construction of the development began in July 2019 and is scheduled to be complete prior to construction of the Proposed Development, and therefore falls within the future baseline of the surrounding area.
- 2.2.5 The River Thames is located approximately 240m to the north of the Site and the River Kennet is located approximately 290m to the south of the Site.

2.3 Environmental Context

Transport and Access

- 2.3.1 The Reading (Main) Station is located approximately 475 m from the western Site boundary, which has direct links to London Paddington and surrounding towns and cities including Oxford, Swindon and Basingstoke.
- 2.3.2 Multiple bus stops are located within close proximity to the Site, providing links to Reading Town Centre, Wokingham Town Centre and High Wycombe. The closest bus stop (Forbury Retail Park) is located just outside the Site boundary on Kenavon Drive which serves the 42-bus route to locations in the northern side of Reading.
- 2.3.3 Further information on transport and access is provided in the **Transport Assessment** report submitted in support of the application.

Air Quality

- 2.3.4 An Air Quality Management Area (AQMA) has been declared by RBC for an area covering all the major arterial roads and mainline railway in and out of the town as well as the central area. The AQMA covers the Site.
- 2.3.5 **Chapter 9** provides further information and assessment on air quality.

Noise and Vibration

- 2.3.6 The main noise sources at the Site are vehicular movements on the surrounding road network (Forbury Road and Kenavon Drive), and train movements on the lower-level London Waterloo and Guildford Line closest to the Site, and the Great Western mainline which is slightly further north.
- 2.3.7 **Chapter 8** provides further information and assessment on noise and vibration.

Heritage

- 2.3.8 None of the existing buildings on the Site are listed. However, there are a number of heritage assets located on the southern side of Forbury Road.
- 2.3.9 The Scheduled Monument of 'Reading Abbey: a Cluniac and Benedictine monastery and Civil War earthwork' is located to the south west of the Site in the Forbury Gardens area separated by St James Roman Catholic Church. There are a number of listed buildings nearby including Reading Gaol (formerly Her Majesty's Prison) (Grade II), Reading Abbey Ruins (Grade I), The Plummery Wall (Grade II), St James's Presbytery (Grade II), 10 Abbot's Walk (Grade II) and the archway connecting Forbury Gardens to Abbey Ruins (Grade II*).
- 2.3.10 The area also falls within an Area of Archaeological Potential under policy EN2: Areas of Archaeological Significance within Reading Local Plan.
- 2.3.11 **Chapter 10** provides further information and assessment of heritage.

Townscape and Visual

- 2.3.12 The Site is not within a Green Belt, within a landscape planning designation or Conservation Area.

- 2.3.13 The Site is located within National England's National Character Area Profile 115 Thames Valley – NE379, which contains a diverse landscape of urban settlements, sub-urban settlements, infrastructure, transport corridors, historic parks and is of an urban character. The Character Area as a whole is defined as environmentally important given its designations, parks and woodlands.
- 2.3.14 The Site lies within Character Area 10: Forbury Retail Park within RBC's Tall Building Strategy (2008, reviewed 2018 as an update note (EV031)). The area is characterised as having a medium townscape sensitivity to the inclusion of tall buildings.
- 2.3.15 **Chapter 13** includes further information and assessment of townscape and visual.

Ground Conditions

- 2.3.16 Geological maps of the area show the Site is expected to comprise White Chalk, overlain by River Terrace Deposits. However, historical borehole records held by the British Geological Survey (BGS) archive within the vicinity of the Site indicate the River Terrace Deposits are generally absent from the area of the Site, with Alluvium directly overlying the White Chalk. In addition, Made Ground associated with the previous and current development of the Site will be present overlying the natural strata.
- 2.3.17 Historically, the southeast of the Site was occupied by buildings associated with the neighbouring Huntley and Palmers biscuit factory. This area of the Site is within an area of known potential for contaminated land associated with the wider use of the biscuit factory.
- 2.3.18 The **Phase 1 Ground Condition Assessment**, submitted as part of the outline application, will provide further details on Ground Conditions.

Hydrology and Flood Risk

- 2.3.19 The majority of the Site lies within Flood Zone 1 which is defined as land which has less than 1 in 1000 (0.1%) annual probability of sea or river flooding, which is determined as a very low risk. However, there are small areas of low risk (with a chance of flooding of 0.1%-1%) and medium risk (with a chance of flooding between 1-3.3%) surrounding the existing retail units, and a very small area of high risk (chance of flooding >3.3%) at the most southerly part of the Site opposite Forbury roundabout.

Biodiversity

- 2.3.20 No statutory designated areas of European, International or National importance for nature conservation are located within or adjacent to the Site.
- 2.3.21 The closest statutorily designated area is Lodgewood and Sandford Mill Site of Special Scientific Interest (SSSI) which is located approximately 6 km east. The Site does not fall within any SSSI Impact Risk Zone relating to this designated site. The RBC Local Plan indicates that the Site is not covered by any nature conservation policy.
- 2.3.22 The adjacent railway which runs parallel to the northern boundary of the Site and its associated embankments supporting scattered trees and scrub is partly designated as an 'Area of Identified Biodiversity Interest' under Policy EN12 of the RBC Local Plan. The habitat consists of semi-mature trees and mown grassland, which are not ideal conditions for notable species. Species present may potentially support limited numbers of legally protected species, including nesting birds and foraging / commuting bats. However, the Site mainly comprises buildings therefore the suitability to support birds and bats is likely to be low or negligible.

- 2.3.23 Along the southern boundary of the Site along Kenavon Drive are a number of trees that are subject to Tree Preservation Orders (TPO). Accordingly, the development proposals seek to retain the trees and enhance the landscaped area surrounding the trees.
- 2.3.24 The **Ecological Assessment Report (EAR)** provides further details on Biodiversity on the Site.

3 The Proposed Development

3.1 Introduction

3.1.1 This chapter sets out the description of the Proposed Development for which outline planning permission is sought and which has been used for assessment purposes.

3.1.2 The description of development is as follows:

“Outline application for comprehensive redevelopment, including demolition of existing structures, comprising a residential-led mixed use scheme of up to 820 units (Class C3) and up to 5,500 sqm (GEA) of commercial uses (Class E) together with ancillary and associated development including new and enhanced pedestrian routes and vehicle access routes, open spaces, hard and soft landscaping, basement, and basement car parking providing up to 200 car parking spaces, and up to 53 car parking spaces serving the commercial uses, up to 860 cycle parking spaces and servicing facilities, sewer diversion and associated works, with details of layout, scale, external appearance and landscaping reserved.”

3.1.3 The Proposed Development will provide up to 820 units across 1 bed, 2 bed and 3 bed configurations, with up to 200 car parking spaces located in the basement, commercial space, and 53 car parking spaces associated with this commercial space. A dedicated secure cycle storage will be provided at ground floor level to the base of each residential block.

3.1.4 The Proposed Development description should be read in conjunction with the plans provided in **Appendix A.2**, the Design Codes and the Design and Access Statement. The full set of application drawings which have been submitted as part of the planning application and which have been assessed as part of the EIA are as follows:

- 18111-SQP-ZZ-GF-DR-A-PL00001 – Site Location Plan;
- 18111-SQP-ZZ-GF-DR-A-PL00002 – Demolition Plan;
- 18111-SQP-ZZ-GF-DR-A-PL00003 – Existing Site Levels Plan;
- 18111-SQP-ZZ-GF-DR-A-PL00004 – Proposed Sewer Location / No Build Zone;
- 18111-SQP-ZZ-GF-DR-A-PL00006 – Proposed Land Use, Ground Level;
- 18111-SQP-ZZ-05-DR-A-PL00007 – Proposed Land Use, Typical Floor of Upper Levels;
- 18111-SQP-ZZ-B1-DR-A-PL00008 – Maximum Deviation Plan, Basement;
- 18111-SQP-ZZ-GF-DR-A-PL00009 – Maximum Deviation Plan, Ground Level;
- 18111-SQP-ZZ-05-DR-A-PL00010 – Maximum Deviation Plan, Typical Floor of Upper Levels;
- 18111-SQP-ZZ-B1-DR-A-PL00011 – Site Levels, Basement;
- 18111-SQP-ZZ-GF-DR-A-PL00012 – Site Levels, Ground Floor;
- 18111-SQP-ZZ-05-DR-A-PL00013 – Site Levels, Maximum Building Heights.

3.1.5 As set out in the description of development, details of layout, scale, external appearance and landscaping are reserved. Therefore the layout presented within the applications drawings is used for assessment purposes only.

- 3.1.6 The Proposed Development is to include up to 5,500 sqm of Class E space. The assessments presented in **Chapter 7-13** are based on the most relevant methodology for the chapter topic and therefore Class E is assessed based on different uses to assess a 'worst case scenario' for the discipline. For example, for **Chapter 8: Noise and Vibration**, this assesses the Class E use as a gym.

3.2 Quantum of Development

- 3.2.1 The Site is approximately 2.65 hectares (ha) in area. The Proposed Development will include residential dwellings and commercial space accommodated within 12 blocks.
- 3.2.2 The Proposed Development is to include West Block Buildings 1-4 which will be mixed-use development (Class C3/E) and also consist of car parking and servicing to the use classes on the Site. West Block Building 1 and Building 4 are joined by a single level link between the two buildings. It is expected that the Western Blocks will be constructed within the first phase of development.
- 3.2.3 Central Block Buildings 1 and 2 to the north of the Site comprise only of residential dwellings (Class C3), whilst Central Block Buildings 3 and 4 also includes a small area of commercial space (Class E). East Block Buildings 1-4 are primarily for residential dwellings (Class C3), with a small area of commercial space located within East Block Building 4 (Class C3/E). The Central Blocks are expected to be constructed within Phase 2 of the development, whilst the Eastern Blocks are expected to be constructed within Phase 3.

3.3 Heights and Massing

- 3.3.1 The buildings of the Proposed Development will be configured surrounding three courtyards. The Proposed Development is anticipated to be up to 12 storeys with building heights graduating down towards the south and western sides of the Site.

3.4 Access

Pedestrian and Cycle

- 3.4.1 Pedestrian and cycle routes will be provided as part of the Proposed Development to improve permeability and accessibility. There will be routes along the northern and southern Site boundaries surrounding the residential blocks as well as permeating between the various buildings on Site. These new routes on the Site will connect to existing pedestrian footpaths along Forbury Road.
- 3.4.2 The Proposed Development is to provide up to 860 cycle parking spaces which includes dedicated secure cycle storage at ground floor level to the base of the residential blocks.

Private Vehicle Access

- 3.4.3 The main vehicular access to the Proposed Development will be from Forbury Road on the south-western Site boundary. This access will be used for accessing both the residential basement car park as well as the at-grade commercial car park.
- 3.4.4 The eastern access to the Site will be maintained for servicing and emergency vehicles.
- 3.4.5 Up to 200 car parking spaces are to be provided as part of the Proposed Development, located in a single basement. The basement car parking spaces will service the residential units and can be accessed from entering the south-western Site boundary and using a ramp to reach the basement level.

- 3.4.6 A further 53 ground level parking spaces are expected to be provided for use by the general public to access the 5,500 sqm of Class E space.

3.5 Utilities

- 3.5.1 As a result of the Proposed Development, the existing Thames Water trunk sewer within the Site boundary will be diverted. The sewer will be relocated along Kenavon Drive and will run parallel to the perimeter of the southern, eastern and northern site boundaries. This is shown in the parameter plans in [Appendix A.2](#).

3.6 Landscaping and Amenity

- 3.6.1 The buildings of the Proposed Development will be configured surrounding three courtyards including two Goods Yard public courtyards and the Upper Podium private residential gardens.
- 3.6.2 The Proposed Development will include landscaping, the majority of which will be within the public realm at street level. Trees and green infrastructure will be incorporated into public open amenity spaces, and the variety of green spaces will increase the ecological value of the Site and enhance biodiversity. Green infrastructure is also located around each of the blocks on the Site and along the Site boundary which acts as screening from sensitive receptors both on and off-Site.

3.7 Drainage

- 3.7.1 The Proposed Development provides opportunities for the provision of sustainable drainage techniques. Surface water runoff will be managed through the use of Sustainable Urban Drainage Systems (SuDS). Hard landscaping specifications could also include permeable surfaces to further ensure that the risk of flooding is reduced. Further SuDS are proposed in the form of blue roofs and site attenuation.

3.8 Energy and Sustainability

- 3.8.1 Energy and sustainability have been incorporated into the design process for the Proposed Development to reduce energy use and carbon emissions. The Energy Statement demonstrates that the Proposed Development will be electric-led and comprises the use of heat pumps.
- 3.8.2 A range of features have been incorporated into the design of the Proposed Development to help increase the sustainability of the proposal, including:
- Target of achieving BREEAM 'Excellent' accreditation for non-residential buildings;
 - No combustion on-site, utilising renewable technologies including high efficiency heat pumps and supplementary PV;
 - Design and layout of the site has been considered to increase natural daylight levels, reduce number of north-facing dwellings as far as possible, reducing overheating risk in summer and retaining thermal energy from heating systems in winter;
 - Managing waste sustainably through construction and operation of the Proposed Development and the provision of sufficient recycling and waste storage facilities;
 - Designing to reduce water consumption with the use of low flow sanitaryware items and using an intelligent system for irrigation which measures moisture levels to better regulate water use;

- Using materials with a low life-cycle impact, seeking to follow the Green Guide to Specification and incorporate A or A+ rated construction materials, where possible;
- Encouraging sustainable transport methods by reducing private car parking spaces, providing ample cycle storage and being located in walking distance to Reading (Main) train station.

3.8.3 These measures contribute towards a reduction in CO₂ emissions which meet the targets set out in Policy H5 of the Reading Borough Local Plan and achieves a 50% improvement over the baseline. This is set out in the Energy Statement (Method, 2023) submitted as part of the outline planning application.

3.9 Primary Mitigation

3.9.1 In accordance with the guidance from the Institute of Environmental Management and Assessment (IEMA), assessments within each topic section have taken account of primary mitigation which is inherent and embedded in the scheme design. Key primary mitigation include the following, and further details is provided within each discipline chapter where applicable:

- A Demolition Construction Environmental Management Plan (DCEMP) will be secured by a suitably worded planning condition and will set out the environmental issues and management procedures to be adopted during the demolition and construction works on Site to help control potential temporary adverse impacts to the environment and local community;
- The design process has been informed by the project's environmental team to result in a design that is sensitive to the environmental context;
- Consideration of height, scale and massing of the Proposed Development to be sensitive to the surrounding landscape and receptors – for example, graduating building heights down to the south and western sides of the Site;
- Inclusion of cycle and pedestrian routes and secure cycle storage to encourage sustainable transport methods and reduce reliance on car use;
- Implementation of a drainage strategy and incorporating SuDS;
- All-electric energy strategy, with no proposed combustion sources on the Site;
- Electric vehicle charging facilities for residential and commercial elements of the Proposed Development;
- Implementation of a Site Waste Management Plan (SWMP).

3.10 Consideration of Alternatives

3.10.1 Regulation 18(3) of the EIA Regulations sets out the minimum requirements as to the content of an ES. Regulation 18(3)(d) in particular requires details of the reasonable alternatives considered to be set out. Schedule 4 of the EIA Regulations, which sets out further information to be included in Environmental Statements, also makes reference to reasonable alternatives as follows: *“a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects”*.

- 3.10.2 The guidance in the PPG on Environmental Impact Assessment states that “*Where alternative approaches to development have been considered, the Environmental Statement should include a description of the reasonable alternatives studied which are relevant to the Proposed Development and its specific characteristics and provide an indication of the main reasons for the choice made, including a comparison of environmental effects*”.
- 3.10.3 Whilst environmental effects are relevant when choosing between alternatives, other factors are also relevant. In addition to environmental effects, the main selection criteria which the Applicant has considered when choosing between the alternatives include planning policy, viability, design quality, market requirements and site constraints and opportunities.
- 3.10.4 The following provides an outline of the reasonable alternatives considered in relation to the Proposed Development, the main reasons for choosing the Proposed Development in preference to them, and a high-level comparison of environmental effects associated with the alternative designs.

No Development

- 3.10.5 The aspiration of the Proposed Development is to provide a new residential-led development to form the eastern fringe of Reading town centre.
- 3.10.6 The Site is allocated under Policy CR13b: Forbury Retail Park within the RBC Local Plan (November 2019), which allocates the Site for a new-residential community, including additional retail, leisure and community uses. There is a policy aspiration for the Site to come forward to provide residential dwellings in a more defined urban environment than currently exists, of a medium to high density. Therefore, if the Proposed Development was not brought forward, RBC would not fulfil this policy objective.

Alternative Sites

- 3.10.7 As stated above, the Site is allocated for residential-led development in the RBC Local Plan. No other sites have therefore been considered given the allocation of the Site within RBC’s local policy document and that the Site is in the control of the Applicant.

Alternative Forms of Development

Type of Use

- 3.10.8 Given Policy CR13b: Forbury Retail Park in the RBC Local Plan which allocates the Site for a new residential community, the uses of the Proposed Development fulfil the policy requirement and will contribute to developing Reading Town Centre. The Proposed Development responds to the RBC vision of providing a new community at the eastern fringes of the town centre. Therefore no alternative uses for the Site have been considered for the Proposed Development.

Massing Distribution

- 3.10.9 The massing distribution has been considered in order to minimise impacts to views, heritage settings of surrounding assets, and in relation to daylight and sunlight, and wind. An iterative design process has been carried out for the Proposed Development, with testing of massing models for daylight and wind throughout the process.
- 3.10.10 A public and stakeholder consultation was held virtually and in person on the 8th and 10th of February 2023 respectively, where the illustrative scheme was refined following feedback received.

3.10.11 The following considerations were incorporated into the final massing design to respond to the environmental context of the Site and its surroundings:

- Graduating building heights down towards the south and western sides of the Site to reduce impacts on adjacent properties and increase daylight into open spaces;
- Step backs incorporated into the top floors of buildings along the south of the Site to reduce viewing impact of the scheme when observed from Forbury Road and Kenavon Drive;
- Change of building layout and design from cluster formations of buildings on podium levels to distinct residential blocks with a rational landscaping strategy, to take account inclusivity and creating active and accessible public realm spaces;
- Increased separation distances between buildings to enhance daylight and sunlight performance;
- Podium removed to central and eastern blocks to lower heights of all associated buildings;
- Proposed basement level to house the majority of ancillary uses – including dedicated residential parking, plant rooms and refuse stores.

3.11 Summary

3.11.1 The design of the Proposed Development has been developed through consultation with key stakeholders, and consideration of the environmental context of the Site (See [Section 5.6](#)). A number of massing options were tested, and have been refined through the design process, with the final option selected to reduce visual impacts in agreement with RBC.

4 Demolition, Construction and Site Management

4.1 Introduction

- 4.1.1 This chapter presents information on the demolition and construction of the Proposed Development and the management of construction on Site.
- 4.1.2 It is proposed that a DCEMP is to be secured by means of a suitability worded planning condition. The DCEMP will outline the arrangements and management practices adopted to reduce the environmental effects of demolition and construction and which will be agreed with RBC prior to the commencement of demolition and construction.

4.2 Demolition and Construction Works

- 4.2.1 Typical working hours will be within the restrictions imposed by the local Environmental Health Officer at RBC. The hours are anticipated to be as follows:
- Monday-Friday: 08:00-18:00;
 - Saturday: 08:00-13:00;
 - Sunday and Bank Holidays: No Working.
- 4.2.2 There may be certain occasions when work outside these hours may be necessary. In the event of this, work would only be carried out following consultation and agreement with RBC.

4.3 Demolition and Construction Management

- 4.3.1 All of the demolition and construction operations carry with them a range of considerations to be dealt with in their design, preparation and execution. Best practice in demolition and construction management will be required to reduce the potential environmental effects and disruption that could be caused by the construction works. This will reduce potential disruption to affected communities, services and habitats.
- 4.3.2 The DCEMP will provide further details on how demolition and construction will be managed, including:
- Parking;
 - Storage of materials;
 - Dust management controls;
 - Noise and vibration management control;
 - Waste management;
 - Site security;
 - Lighting management; and
 - Local environmental considerations (e.g. in relation to noise and dust mitigation).
- 4.3.3 It is anticipated that the key activities in relation to the demolition and construction elements of the Proposed Development are likely to include:
- Demolition and Site clearance, including the crushing of demolition materials for re-use on Site where appropriate e.g. using concrete demolition arisings for piling for new buildings;

- Excavation of basement and earthworks;
- Installation and piling of foundations;
- Construction of building structure, cladding and glazing and internal walls and partitions;
- Installation of fixtures, fittings and building services;
- Utility upgrades and connections; and
- External landscaping, highway and drainage works.

4.4 Demolition and Construction Traffic

- 4.4.1 Traffic will be generated during the demolition and construction period as a result of bringing plant and materials to the Site, transporting demolition material off site and due to construction personnel accessing the Site.
- 4.4.2 All construction workers will be encouraged to use public transport and cycle links to reduce car trips associated with construction workers travelling to and from the Site.
- 4.4.3 The number of lorry movements, hours of operation and any lorry holding areas will need to be agreed in advance with RBC.
- 4.4.4 Where possible, all delivery and waste removal vehicles should be planned to be within the hours of 09:30 and 15:30 hours to avoid peak periods.
- 4.4.5 No vehicle waiting will be permitted in neighbouring streets. Vehicles will only deliver in accordance with their allocated slot, booked through a Delivery Management System.
- 4.4.6 Wheel washing facilities to be established on Site and any vehicle that enters the Site to be cleaned before re-entering the public road network.

4.5 Demolition and Construction Waste

- 4.5.1 Waste arising from the demolition and construction works will be carefully managed throughout this period. Waste will be managed as part of the DCEMP so there is compliance with legislation and to reduce costs associated with waste disposal. A Site Waste Management Plan has been submitted with the planning application to document the waste arrangements at the Site.
- 4.5.2 The demolition and construction works will be undertaken in accordance with legal requirements. It is proposed that waste will be reduced by following the waste hierarchy, avoiding waste during construction and diverting as much waste as possible from final disposal to more sustainable waste management options, through application of the following principles:
 - Reduction;
 - Re-use;
 - Recovery (i.e recycling); and
 - Disposal (i.e. landfill/incineration).
- 4.5.3 Further details on construction waste management are outlined in the Site Waste Management Plan.

5 Assessment Method

5.1 Introduction

- 5.1.1 This chapter describes the process by which the EIA has been carried out. It includes a discussion of the relevant regulations, the EIA process, consultations and the overarching assessment methods applied. Details of the technical method followed for each topic are presented in each of the **Chapters 7-13** as appropriate.

5.2 EIA Regulations

- 5.2.1 The Town and County Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the EIA Regulations) implement EC Directive 85/337/EEC, as amended, into domestic legislation. The initial Directive and its three amendments have been codified by Directive 2011/92/EU. A new Directive 2014/52/EU was implemented in 2014 and the provisions and requirements were enacted in the UK on 16 May 2017 to form the EIA Regulations.
- 5.2.2 To ensure that the provisions of the EIA Regulations continue to be implemented in the same way or equivalent way following the exit of the UK from the EU at the end of the transition period, appropriate amendments were made by The Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018. There has been no substantive change to EIA requirements as a result of the departure of the UK from the EU.
- 5.2.3 The EIA Regulations set out the procedures for undertaking an EIA and the information which is required in an ES and such procedure has been followed in this assessment.

5.3 EIA Process

- 5.3.1 In general terms, the main stages in the EIA are as follows:
- **Screening** – determining whether a proposed projects falls within the remit of the EIA Regulations;
 - **Scoping** – determining the extent of issues to be considered in the assessment and reported in the ES;
 - **Establishing Baseline** – drawing together and reviewing existing available data and undertaking surveys to determine the existing and future baseline conditions;
 - **Assessment and Iteration** – assess likely significant effects of development, evaluate alternatives, provide feedback to design team on potential adverse impacts, modify development or impose parameters, incorporate mitigation, assess effects of mitigated development;
 - **Preparation of the ES**; and
 - **Consultation** and **Decision Making**.

5.4 Screening

- 5.4.1 Due to the sensitivity of the environment and the characteristics of the Proposed Development, the Applicant has voluntarily agreed to undertake an EIA. Therefore, no EIA screening request was prepared for the Proposed Development.

5.5 Scoping

- 5.5.1 A request for a Scoping Opinion (supported by a Scoping Report) was submitted to RBC on 24th February 2023 and is provided in **Appendix A.4**. Following consultation with statutory consultees, a Scoping Opinion was received from RBC on 18th April 2023 and is provided in **Appendix A.5**.
- 5.5.2 Within the Scoping Opinion, a number of specific comments have been identified and are taken into account and considered for inclusion in the subsequent ES. Each of the topic chapters of this ES identify the specific comments within the Scoping Opinion and how they have been addressed within the chapter.
- 5.5.3 The ES has responded to the comments within the Scoping Opinion and the key points are summarised below:
- Broadening the scope of the socio-economic assessment to include additional analysis on education and healthcare provision;
 - Incorporating the Huntley Wharf development into the future baseline of the assessment instead of as a committed development;
 - Completing additional viewpoints (Viewpoint 6 from Caversham Bridge and Viewpoint 17 from the A4 (London Road) looking west) to inform **Chapter 13** (Townscape and Visual Impact);
 - Updates to include additional schemes within the list of committed developments, by considering factors such as distance, scale and intervisibility.
- 5.5.4 As a result, this ES has been prepared to fulfil the requirements of the Scoping Opinion and in compliance with Regulation 18(4)(a) of the EIA Regulations which requires an ES to be based on the most recent scoping opinion issued.

5.6 Consultation

- 5.6.1 In addition to consultation to agree the scope of the EIA, consultation with relevant statutory and non-statutory bodies has been undertaken throughout the EIA and design process. **Section X.3** of each of the technical discipline chapters (**Chapters 7-13**) provides a summary of consultation undertaken in relation to that discipline.
- 5.6.2 As part of the EIA process, the following consultees have been consulted to agree the detailed scope of the assessment, to provide information, to discuss assessment methods and findings, and/or agree mitigation measures and design responses. A summary of key consultees is included below:
- RBC;
 - Historic England;
 - Environmental Health Officer (RBC);
 - Landscape Officer.
- 5.6.3 The EIA has given due regard to the requirements of the consultees and their assistance is gratefully acknowledged.

5.7 Assessment Assumptions

- 5.7.1 The following assumptions have been used to ensure that the EIA provides a robust assessment of likely significant effects of the Proposed Development:
- The Proposed Development will be progressed through the detailed design stage in line with the development envelope used for assessment purposes as documented in **Chapter 3**, plans provided in **Appendix A.2**, and the Design Codes. Detailed design will come forward within the parameters assessed within this ES;
 - The Proposed Development will be constructed in accordance with the programme documented in **Chapter 4**;
 - Planning conditions or planning obligations (meeting the relevant legal tests) will be imposed as identified in this ES to secure appropriate mitigation measures (e.g. implementation of a DCEMP);
 - The assessment of likely significant cumulative effects has assumed that the committed developments identified in **Section 5.11** will be built out as set out in the documents supporting those planning applications; and
 - A DCEMP will be secured through condition to reduce the environmental effects of demolition and construction based on up-to-date details of demolition and construction.

Phasing Assumptions

- 5.7.2 Demolition and construction of the Proposed Development are expected to take place over approximately seven and a half years from early 2025 to mid-2032. It is anticipated that the enabling and demolition will take place from approximately January 2025 to March 2025.
- 5.7.3 The construction is expected to take place across three phases as follows:
- Phase 1: March 2025-September 2027;
 - Phase 2: September 2027-February 2030;
 - Phase 3: February 2030-July 2032.

5.8 Uncertainty and Limitations

- 5.8.1 The prediction of future effects inevitably involves a degree of uncertainty. Where necessary, the technical chapters describe the principal factors giving rise to uncertainty in the prediction of likely environmental effects and the degree of the uncertainty.
- 5.8.2 Confidence in the predictions has been achieved by employing accepted assessment methodologies e.g. Institute of Environmental Management and Assessment (IEMA). Uncertainty inherent within the prediction has been described. The ES has sought to provide a robust assessment of the likely significant effects of the Proposed Development.
- 5.8.3 Further limitations in preparing this ES are noted in each of the technical chapters.

5.9 Assessing Effects

Establishing Baseline Conditions

- 5.9.1 A range of Site surveys and data collection exercises have been used to identify environmental conditions at the Site and in the surrounding area to provide a basis for the subsequent assessment work. The surveys undertaken are reported in each of the technical chapters.
- 5.9.2 It should be noted that some of the technical surveys and assessments on which the EIA is based on are too detailed and lengthy for incorporation into **Volume 1** of this ES. In such instances, the technical survey and assessment reports are provided in full as an appendix to this ES (**Volume 2**), with a relevant summary and the reference for the full survey or assessment provided in the ES. The geographical scope of these appended surveys and assessments has been based on the likelihood for significant effects.
- 5.9.3 The EIA has assessed the likely significant effects of the Proposed Development against baseline conditions in the same year as the Site currently stands (i.e. providing an assessment of 'do something' and 'do nothing'). As required by the EIA Regulations, each chapter has also considered as appropriate the likely evolution of current baseline conditions without implementation of the Proposed Development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of available environmental information and scientific knowledge. The EIA has therefore used these future baseline conditions within the assessment of effects, and this is specified where applicable in each technical chapter.

Assessing Demolition and Construction Effects

- 5.9.4 The EIA has assessed the likely environmental effects that could occur during demolition and construction. The assessment of likely environmental effects during the demolition and construction phases has been based on available information and reasoned judgements based on professional experience to enable the likely environmental effects to be identified.
- 5.9.5 Demolition and construction effects will be temporary and long-term duration. The potential duration and intermittency of effects is identified as appropriate in the relevant topic chapters.
- 5.9.6 In judging the significance of demolition and construction effects, it has been assumed that DCEMP that will be secured via a planning condition and will adequately address mitigation measures in relation to demolition and construction effects.

Assessing Operational Effects

- 5.9.7 To provide an assessment that is generally consistent between topic chapters, the EIA has focused on assessing the likely environmental effects of the operational development. This approach ensures that the full environmental effects of the Proposed Development has been considered.
- 5.9.8 The assessment has been undertaken for the Proposed Development on the assumption that the Site as a whole will be complete by 2032. Where worst case effects could occur during an earlier year then such an assessment has been undertaken and this is reported in the relevant topic chapter.
- 5.9.9 Given the likely long lifespan of the Proposed Development, no assessment of the decommissioning of the Proposed Development has been undertaken.

5.10 Mitigation and Enhancement

- 5.10.1 The incorporation of mitigation measures, which are measures to avoid or reduce for adverse effects, is an integral part of the design and EIA processes. The primary (embedded) mitigation for the Site is set out in **Section 3.8**.
- 5.10.2 The EIA Regulations require an ES to contain *“a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment”*.
- 5.10.3 As part of the design process suitable mitigation measures were incorporated into the Proposed Development to mitigate potentially significant environmental effects. This mitigation is termed "embedded mitigation" and has been considered as part of the EIA process and reported in each of the topic chapters in this ES. Such measures have included sensitively designed massing for buildings and Sustainable Drainage Systems (SuDS).
- 5.10.4 Secondary (further) mitigation measures and opportunities for environmental enhancement have also been identified through the EIA process. Such mitigation and enhancement measures are identified in the topic chapters of this ES, along with how it is proposed that they be secured.
- 5.10.5 A hierarchy of methods for mitigating significant adverse effects has been followed; these are, in order of preference:
- **Avoidance** – designing a development in such a way that avoids effects on the environment (e.g. avoiding siting residents at levels that could be affected by flood risk).
 - **Reduction** – design the Proposed Development or employ construction methodologies such that significant effects identified are reduced (e.g. graduating building heights to the south to reduce massing and impacts on heritage assets).
 - **Compensation** – providing off-site enhancement in order to compensate for where on-site mitigation has not been possible (e.g. financial contributions towards local infrastructure).
 - **Enhancement** - opportunities that the Proposed Development may provide to enhance the local and wider environment (e.g. ecological enhancement or provision of jobs).
- 5.10.6 Environmental effects remaining after mitigation measures have been incorporated are termed “residual effects” and these are fully described in the ES.

5.11 Assessment of Cumulative Effects

- 5.11.1 The EIA Regulations require the assessment to consider the cumulative effects that may result from the Proposed Development when considered in combination with other developments in the surrounding area. The purpose of this assessment is to consider likely significant effects that could arise as a result of several developments in close proximity causing minor and not significant effects on a receptor, which cumulatively could result in a significant effect.
- 5.11.2 ‘Approved developments’ are considered to be developments authorised by planning permissions that are in the course of being built out and development authorised by planning permissions which are capable of implementation but have not yet been implemented. Planning applications that have been submitted but not yet determined have also been considered where there is a likelihood that the application may be granted planning permission before this application is determined.
- 5.11.3 A review of approved developments was undertaken to identify major developments (development of 10 or more dwellings, floor space of > 1,000sqm, or with a site area of > 1 ha)

within 2 km of the Proposed Development, as only major developments are considered to have potential for cumulative effects. It was considered that significant cumulative effects are unlikely with developments outside of this area due to the dense urban nature of the surrounding area.

- 5.11.4 The Scoping Report set out the list of committed developments which were to be considered as part of the ES. The Scoping Opinion from RBC added additional schemes that should be considered which have been reviewed by the EIA coordination team. Factors such as distance, scale and intervisibility have been considered and where there is not considered to be potential for likely significant cumulative effects, these have been scoped out of the committed developments list.
- 5.11.5 The list of approved developments assessed within the ES are included within **Appendix A.6**. This list contains all surrounding qualifying developments, and then provides details as to whether each development has been scoped in or out of the assessment. A plan of the locations of each development is provided in **Appendix A.7**.
- 5.11.6 Each topic chapter has considered the most appropriate way to assess cumulative effects within their assessment.

5.12 Impact Interactions

- 5.12.1 **Chapter 14** provides the assessment of impact interactions i.e. receptors being affected by more than one environmental effect and therefore potentially being subject to a more significant combined effect than the individual effects reported in each of the topic chapters.
- 5.12.2 The approach adopted for the assessment is in accordance with the methodology set out above, with further details provided in **Chapter 14**.

5.13 Significance Criteria

- 5.13.1 The two principal criteria for determining significance of an environmental effect are the magnitude of the effect and the sensitivity of the receptor. In addition, the likelihood of the effect occurring is also considered as appropriate.
- 5.13.2 The approach to assessing and assigning significance to an environmental effect has relied upon such factors as consideration of the EIA Regulations, guidelines, standards or codes of practice, the advice and views of statutory consultees and other interested parties, and professional judgement.
- 5.13.3 The following questions are relevant in evaluating the significance of likely environmental effects:
- Is the effect direct, indirect or cumulative?
 - Does the effect occur over the short, medium or long term?
 - Is the effect permanent or temporary?
 - Is it positive, neutral or adverse effect?
 - Is the effect reversible or irreversible?
 - Does the effect increase or decrease with time?
 - Is the effect of local, regional, national or international importance?
 - Are health standards or environmental objectives threatened?

- Are mitigating measures available and is it reasonable to require these?

5.13.4 Specific significance criteria have been prepared for each specialist topic, based on the generic criteria, for adverse and beneficial effects, set out in **Table 5.1**.

Table 5.1: Significance Criteria

	Level of Effect	Criteria
Significant	Substantial	These effects are assigned this level of significance as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of national or regional importance. A change at a borough scale site or feature may also enter this category
	Major	These effects are likely to be important considerations at a borough scale and may become key factors in the decision-making process.
	Moderate	These effects, while important at a local scale, are not anticipated to be key decision-making issues.
Not Significant	Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
	Negligible or No Effect	Either no effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. Such effects should not be considered by the decision-maker.

5.13.5 Effects that are described as ‘substantial’, ‘major’ or ‘moderate’ are determined to be *significant*; and effects that are described as ‘minor’ or ‘negligible’ are determined to be *not significant* in the context of the EIA Regulations.

5.14 Monitoring

5.14.1 The EIA Regulations introduce the requirement for the monitoring of significant adverse environmental effects where appropriate and that a schedule of proposed monitoring should be set out in an ES.

5.14.2 Each chapter of the ES therefore identifies the proposed monitoring arrangements for that topic. As stated in the EIA Regulations, every effort should be made to ensure that *“the type of parameters to be monitored and the duration of the monitoring are proportionate to the nature, location and size of the development and the significance of its effects on the environment.”*

6 Planning Policy Context

6.1 Introduction

- 6.1.1 This section summarises the key planning policy documents that have informed and set the context of the EIA process. Topic chapters set out specific policies within these documents and how they have informed the topic assessment. Further detail on relevant policies is set out in the Planning Statement submitted with the application.
- 6.1.2 Further policy commentary and appraisal is included in the Planning Statement (Montagu Evans, 2023) submitted as part of the outline planning application.

6.1 National Planning Policy Context

National Planning Policy Framework

- 6.1.1 The National Planning Policy Framework 2021 (NPPF) sets out the Government's approach to planning matters and is a material consideration in the determination of planning application. At the heart of the framework is a presumption in favour of sustainable development. Paragraph 8 sets out sustainable development with three overarching objectives:

"a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

- 6.1.2 This is supported by guidance in the national PPG that helps interpret policy for delivery and includes a section specifically to provide guidance on EIA.

6.2 Local Planning Policy and Guidance

Local Policy

RBC Local Plan (November 2019)

- 6.2.1 The RBC Local Plan was adopted in November 2019. It sets out the planning policies for development in Reading up to 2036 and is a material planning consideration when determining planning applications. The objectives of relevance to the Proposed Development include those relating to making efficient use of the land supply in Reading, particularly using previously developed land to create more homes. In addition, the RBC Local Plan's objectives seek to improve the quality of life for residents by enhancing accessibility to facilities and green space, and ensuring the new developments are erected in a sustainable manner. The policies of relevance to the Proposed Development include:

- Policy CC1: Presumption in favour of sustainable development;
- Policy CC2: Sustainable Design and Construction;
- Policy CC7: Design and the Public Realm;
- Policy CR2: Design in Central Reading;
- Policy RI5: Impact of Main Town Centre Uses.

6.2.2 The RBC Local plan identifies under the east side area of Reading to be a major opportunity area under Policy CR13.

6.2.3 **Policy CR13b: Forbury Retail Park** refers to a wider area within which the Site that the Proposed Development is located. Allocation CR13b allocates the site for the focus of a new residential community, and, alongside residential, additional retail, leisure and community uses at a scale to serve the Kenavon Drive area would be appropriate. It should include a new area of open space and enhance the frontage to the canal, including a buffer zone to the top of the canal bank to reflect its wildlife significance. Implementing this policy may involve complete redevelopment or using new additional development to improve the existing urban form of the area. The Site constitutes circa 40% of the Site allocation.

6.2.4 Some parts of the Site are likely to be implemented in the long term. The indicative potential of the 6.99 ha Area b is for 1,230 – 1,840 dwellings and no net gain of retail, but this does not represent a cap.

6.2.5 As noted in **Chapter 2**, the Site is also located within the Central Area of Reading. The local plan sets out the strategy for the central area of Reading identifying the existing and proposed locations of various land uses and pedestrian and cycle desire lines. The Site is identified within the central area as a an 'Opportunity for major development'.

The Reading 2050 Vision (September 2017)

6.2.6 The Reading 2050 Vision launched in September 2017, to assist in the delivery of a strategic long-term vision to support growth and prosperity within Reading. A core focus of the vision is for Reading to become a sustainable and smart city by 2050.

6.2.7 The vision was produced by the University of Reading, Reading UK and Barton Willmore. It is not a statutory document but helps provide a context for the Local Plan and its policies. Some of the components of the vision which relate to the Proposed Development are sharing success to support and enable thriving communities, delivering a real sense of place and identity, and embedding technology to deliver innovation and low carbon living for all.

RBC Sustainable Design and Construction SPD (December 2019)

6.2.8 The SPD was adopted in December 2019 and sets out the council's commitment to producing sustainable buildings. The SPD is intended to guide developers on the implementation of key sustainability policies that are set out in the Local Plan, and therefore is a material consideration in the determination of planning applications.

7 Socio-economics

7.1 Introduction

- 7.1.1 This chapter presents the likely significant socio-economic effects associated with the Proposed Development. This section sets out the relevant policies, approach and methodology used within this socio-economic assessment and presents the results of the assessment. It has been prepared by Stantec's Development Economics Team. The team are Members of the Institute for Economic Development and specialise in developing socio-economic baselines and impact assessments with a particular focus on economic development and regeneration projects throughout the UK.
- 7.1.2 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A**.

7.2 Policy Context, Legislation, Guidance and Standards

- 7.2.1 There is no legislation relating to the assessment of socio-economic impacts. The summary below provides an overview of the policies of specific relevance to this socio-economic assessment.

National Policy

National Planning Policy Framework

- 7.2.2 National planning policy is contained principally in the National Planning Policy Framework (NPPF, July 2021). At the centre of the NPPF is the principle of sustainable development, with three overarching objectives: economic, social and environmental.
- 7.2.3 The social objective supports strong, vibrant and healthy communities by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being (paragraph 8).
- 7.2.4 The economic objective is to help build a strong, responsive, and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure (paragraph 8).
- 7.2.5 Significant adverse impacts on these objectives should be avoided and, wherever possible, alternative options which reduce or eliminate such impacts should be pursued. Where significant adverse impacts are unavoidable, suitable mitigation measures should be proposed or compensatory measures should be considered (paragraph 32).
- 7.2.6 So that sustainable development is pursued in a positive way, the NPPF states that 'plans should promote a sustainable pattern of development that seeks to: meet the development needs of their area; align growth and infrastructure; improve the environment; mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects' (paragraph 11).
- 7.2.7 The NPPF requires planning authorities to work proactively with applicants to secure developments that will improve the economic, social and environmental conditions of the area (paragraph 38). Significant weight should be placed on the need to support sustainable economic growth (paragraph 81).

- 7.2.8 Planning policies and decisions should aim to achieve healthy, inclusive and safe places that promote social interaction; are safe and accessible; and enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example, through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling (paragraph 92).
- 7.2.9 To provide the social, recreational and cultural facilities and services the community needs, planning policies and decisions should ensure an integrated approach to considering the location of housing, economic uses and community facilities and services (paragraph 93).
- 7.2.10 In respect of education, the NPPF states that it is important that a sufficient choice of school places is available to meet the needs of existing and new communities, with local authorities taking a proactive, positive and collaborative approach to meeting this requirement through: giving greater weight to the need to create, expand or alter schools through the preparation of plans and decisions on applications; and working with school promoters, delivery partners and statutory bodies to identify and resolve key planning issues before applications are submitted (paragraph 95).
- 7.2.11 The NPPF is supported by Planning Practice Guidance (PPG)ⁱ on a range of different topics. Guidance is provided in respect of Environmental Impact Assessments, but socio-economic considerations are not specifically addressed.

Planning Practice Guidance (PPG)

- 7.2.12 The PPG supports the NPPF and covers a wide range of categories. Guidance is provided in respect of EIA, but socio-economic considerations are not specifically addressed. However, PPG categories which are of relevance to socio-economics and to this Proposed Development are:
- Effective use of land (HM Government, 2019);
 - Housing needs of different groups (HM Government, 2021);
 - Housing supply and delivery (HM Government, 2019); and
 - Open space, sports and recreation facilities, public rights of way and local green space (HM Government, 2014).

Local Planning policy

Reading Borough Council (RBC) Local Plan (November 2019)

- 7.2.13 The RBC Local Plan was adopted in November 2019. It sets out the planning policies for development in Reading up to 2036 and is a material planning consideration when determining planning applications. The objectives of relevance to the Proposed Development include those relating to making efficient use of the land supply in Reading, particularly using previously developed land to create more homes. In addition, the RBC Local Plan's objectives seek to improve the quality of life for residents by enhancing accessibility to facilities and green space, and ensuring the new developments are erected in a sustainable manner. The policies of relevance to the Proposed Development include:
- Policy CC1: Presumption in favour of sustainable development;
 - Policy CC2: Sustainable Design and Construction;
 - Policy CC7: Design and the Public Realm;

- Policy CR2: Design in Central Reading; and
- Policy RI5: Impact of Main Town Centre Uses.

7.2.14 The RBC Local Plan identifies an area in the east side area of Reading (where the Site is located) to be a major opportunity area under Policy CR13, referred to as the East Side Major Opportunity Area.

7.2.15 **Policy CR13b: Forbury Retail Park** refers to a 6.99 hectare area of land in the East Side Opportunity Major Area, within which the Site of the Proposed Development is located, and states the following:

“This site would be the focus of the new residential community, and, alongside residential, additional retail, leisure and community uses at a scale to serve the Kenavon Drive area would be appropriate. It should include a new area of open space and enhance the frontage to the canal, including a buffer zone to the top of the canal bank to reflect its wildlife significance. Implementing this policy may involve complete redevelopment or using new additional development to improve the existing urban form of the area. Some parts of the site are likely to be implemented in the long term.”

7.2.16 Policy CR13b states that there is the indicative potential for 1,230 – 1,840 dwellings, with no net gain of retail.

The Reading 2050 Vision (September 2017)

7.2.17 The Reading 2050 Vision launched in September 2017, to assist in the delivery of a strategic long-term vision to support growth and prosperity within Reading. A core focus of the vision is for Reading to become a sustainable and smart city by 2050.

7.2.18 The vision was produced by the University of Reading, Reading UK and Barton Willmore. It is not a statutory document but helps provide a context for the Local Plan and its policies. Some of the components of the vision which relate to the Proposed Development are sharing success to support and enable thriving communities, delivering a real sense of place and identity, and embedding technology to deliver innovation and low carbon living for all.

7.2.19 The assessment has also been informed by:

- The Housing Strategy for Reading (2020-2025);
- The Berkshire (including South Bucks) Strategic Housing Market Assessment (2016);
- Berkshire Functional Economic Market Area Study (2016);
- Homes and Communities Agency (HCA) Additionality Guidance;
- HCA Employment Densities Guide; and
- The Thames Valley and Berkshire Strategic Economic Plan.

7.3 Consultation

7.3.1 This socio-economic assessment chapter has been developed via a desk-based assessment of the Proposed Development and the socio-economic conditions within the study area. The scope of this chapter has been subject to engagement and feedback from Reading Borough Council who provided a detailed opinion on the scoping report. The scope of this chapter has been expanded as a result of the feedback provided to include an assessment of the Proposed Development's impact on demand for nursery provision and dentists.

- 7.3.2 No consultation has taken place with public sector organisations or delivery agencies during the development of this draft chapter.

7.4 Assessment Methodology

- 7.4.1 This assessment broadly follows the EIA Methodology set out in **Chapter 5** of this ES. This Section sets out the discipline specific guidance relating to assessment approach, study areas, effect significance criteria and assumption and limitations.
- 7.4.2 The assessment comprises the following stages:
- Identification of current and future baseline conditions with respect to the above topics using information and statistics available in the public domain;
 - Assessment of likely significant effects of the Proposed Development on the environment by reviewing the baseline conditions and determining the change attributable to the Development using published formulae and guidance to assess effects;
 - Recommendation of mitigation or enhancement measures, if necessary;
 - Assessment of residual effects assuming implementation of the mitigation/ enhancement measures;
 - Assessment of the cumulative schemes described within **Chapter 5: Assessment Method** for the potential to have likely significant cumulative effects on the environment when combined with the Development.

Scope of Assessment

- 7.4.3 The scope of this assessment is summarised in **Table 7.1 below**. Construction phase effects on housing, education, and open space have been scoped out of the assessment, as it is expected that the construction workforce and their families would not move to the area and therefore not create any additional demand. As such, it is considered that there is no potential for significant adverse effects relating to the construction phase. Beneficial impacts will relate to employment generation during construction.

Table 7.1: Summary of chapter scope

Topic	Impact
CONSTRUCTION	
Jobs	Employment generation (direct and indirect);
OPERATIONAL	
Jobs	Change in operational employment resulting from the commercial uses provided within the Proposed Development in comparison with existing employment provided at the site of the Proposed Development.
Homes	Delivery of new housing.
Education	Demand from the new residential population for education both for pre-school, primary and secondary schools.
Healthcare	Demand for GP and dental provision.
Recreation and Public Access	Impact of the Proposed Development on public open space.

- 7.4.4 Demand for other types of health care facilities has been scoped out of the assessment. Services are provided predominantly by the private sector (pharmacist and opticians) that will

have an opportunity to establish businesses in the proposed local centre, but certainty of provision cannot be influenced by the Applicant. Hospital based services are available in a range of facilities in the borough and neighbouring boroughs.

Study Area

- 7.4.5 The diversity of socioeconomic effects is such that a variety of study areas is appropriate.

Labour Market & Business Study Area

- 7.4.6 Labour and economic effects will be assessed within the Reading Borough Council (RBC) Local Authority Boundary, across the South East and at the national level (England). This approach provides an assessment at local, regional and national level against a baseline using the most up-to-date data sources (e.g. 2021 Census). An assessment using travel to work areas was considered but discounted due to a lack of up-to-date baseline data meaning the assessment would rely on 2011 Census outputs.
- 7.4.7 Using the RBC Local Authority boundary represents a change from the proposed approach in the socio-economic scoping chapter where an assessment based on the Central Berkshire Functional Economic Market Area (FEMA) was proposed. The FEMA is based on a travel to work area geography. The revised approach means up-to-date data (2022) can be used to assess baseline conditions rather than 2011 Census data as the 2021 Census travel to work area data is not yet available. Reverting to 2011 Census data would not account for any socio-economic changes that have occurred during the last decade resulting from conditions such as the Covid-19 pandemic and the more recent economic downturn.

Housing Market Study Area

- 7.4.8 The Housing Market Study Area adopted for this assessment corresponds with the Western Berkshire Housing Market Area (WBHMA) (covering Bracknell Forest, Wokingham Borough, Reading Borough and West Berkshire) as identified within the Berkshire (with South Bucks) Strategic Housing Market Assessment (SHMA, 2016).

Education Study Area

- 7.4.9 The maximum statutory walking distance to school for children aged under 8 years is 2 miles¹. The Study Area has therefore been defined as local schools (primary and secondary) within 2 miles of the Site. The Study Area takes account of existing schools, catchment areas and planned additional school capacity (including that identified within the Local Plan (2019) and supporting documents).

Healthcare Study Area

- 7.4.10 The healthcare study area is defined as the National Health Service (NHS) Berkshire West Clinical Commissioning Group (CCG) which represents GP practices in Berkshire West. The CCG was established on 1st April 2018, following the merger of Newbury, Wokingham, North and West Reading and South Reading CCGs.

Recreation and Public Access Study Area

- 7.4.11 Defined as the Site and surrounding area within 1km including access to Forbury Gardens, Reading Station and the Kennet & Avon Canal.

¹ Paragraph 5.2 of the Department of Education (2014) New home to school travel and transport guidance.

Baseline Data Collection

- 7.4.12 To inform the assessment a desk-based review of publicly available data has been undertaken to establish relevant baseline socio-economic conditions in the vicinity of the Proposed Development and across the identified Study Areas, as well as to consider how these conditions compare with the regional and national average. The following socio-economic indicators were considered:
- Current demographic characteristics, including population size and age structure;
 - Future population projections;
 - Current housing market characteristics including housing stock profile and housing targets (including affordable housing), as informed through relevant planning policy documentation;
 - Current and future education provision and capacity for primary schools and secondary schools within the corresponding Study Areas;
 - Current primary healthcare facilities, specifically the capacities of GPs informed by publicly available information of registered patient rolls, number of GPs, and existing capacity or demand pressure; and
 - Current labour market characteristics, including working age population profile (level of economic activity, occupation and skills profiles) as well as the workplace economy profile (employment by industry and earnings).

Topic Specific Methodologies

Housing

- 7.4.13 Household size is calculated by dividing the number of households (Census Table TS001) by the resident population living in households (Table TS041).
- 7.4.14 Existing baseline housing conditions in respect of the type and tenure of homes have been informed by the ONS, 2021 Census and the Berkshire Strategic Housing Market Assessment (SHMA) (2016).
- 7.4.15 The impact of the Proposed Development on the local housing stock is a qualitative assessment based on the contribution that the Proposed Development will make to the identified housing requirements for as set out in the adopted Reading Borough Local Plan (adopted November 2019) that guides development up to 2036.
- 7.4.16 Affordability is explored with reference to the Affordable Housing Supplementary Planning Document (adopted March 2021) and the aspiration to deliver around 500 new affordable homes per year to 2036. Affordability has been assessed using Office for National Statistics data.

Education (Early Years, Primary and Secondary Phase)

- 7.4.17 Baseline conditions in respect of the existing numbers of pupils on each individual school roll, along with current school capacities, have been informed by Admissions Day data and data gathered from Brighter Futures for Children. Data relates to 2019, the latest data available at the time of writing. This data has been used to determine baseline surplus or deficit school places and future baseline conditions to 2027 (the furthest year for which secondary level forecasts are available).

- 7.4.18 For primary and secondary education, the assessment is quantitatively based on the number of primary/secondary pupils generated by the Proposed Development versus the level of surplus or deficit forecast primary/secondary school places, plus primary mitigation.
- 7.4.19 For the purposes of this assessment, secondary education is defined as school years 7 to 11 (children aged 11 to 15 years).

Open Space

- 7.4.20 For analysis of current public open space provision (children's play areas, teenage provision, amenity space, playing pitches, outdoor sport, natural and semi natural open space, allotments) this has been defined as the Site and surrounding area within 1km including access to Forbury Gardens, Reading Station and the Kennet & Avon Canal.
- 7.4.21 Impact assessment of new provision within the Proposed Development is considered at site level. It is not possible at this stage in the design process to assess provision against Local Plan Policy for walking catchments as the exact location of the public open space has not been determined.

Healthcare (GP and dentist provision)

- 7.4.22 Baseline conditions for GP provision are assessed through reference to the NHS GP Workforce Statistics, which provide total patient list size for individual GP practices and the number of full time equivalent (FTE) GPs at each practice. To determine whether existing GP provision is under or over-capacity, GP to patient ratios of selected practices have been compared to the Healthy Urban Development Unit (HUDU) standard of 1 GP for every 1,800 people. This, however, is an approximate guide only as workload is also affected by population characteristics such as health and age.
- 7.4.23 The assessment of likely significant effects has been quantitatively based on the number of future residents anticipated to live in the Proposed Development versus the number of surplus or deficit patient places within the selected GP provision. To assess the worst-case, it has been assumed that all residents of the Proposed Development will be new to the area and will draw from local NHS GP resources.
- 7.4.24 Baseline conditions for dentist provision have been assessed through reference to the workforce dataset within the NHS Dental Statistics for England which details the number of practices and dentists in England. The demand for dentist places is based on the number of NHS dentists per 1,000 population in England compared to the additional number of residents generated by the Proposed Development. NHS Dental Statistics for England show there were 24,272 dentists performing NHS activity in England during 2021-22 providing an average of 2,329 people per NHS dentist or 0.43 dentists per 1,000 population².
- 7.4.25 Further consideration of the effects of the Proposed Development on health and wellbeing are considered within the stand-alone Health Impact Assessment submitted with the application.

Labour Market and Business

- 7.4.26 Baseline employment conditions in relation to residential economic activity and occupations have been informed by the ONS, Annual Population Survey (APS), for the 12 months to September 2022. Qualification levels of residents has been informed from the ONS, APS for the 12 months to December 2021, which is the latest data available for qualification levels.

² Population per Dentist based on NHS dentist numbers and the Mid Year Population estimate for England. Source: Office for National Statistics, 2021.

- 7.4.27 Baseline conditions related to the number and size of the business base have been sourced from the Office for National Statistics, UK Business Counts. The data quoted refers to 2022, the latest available data.
- 7.4.28 Baseline employment conditions in relation to the number of jobs (workplace-based) by industrial sector, have been sourced from the ONS, Business Register and Employment Survey (BRES) 2021. The BRES provides a count of employees, excluding self-employment jobs and government-supported trainees and HM Forces.
- 7.4.29 Baseline conditions regarding resident wages have been sourced from the Annual Survey of Hours and Earnings, Office for National Statistics. The dataset provides wage mean and median wage levels at a Local Authority, regional and national level. The data presented refers to 2022, the latest available data.
- 7.4.30 Assessment is quantitatively made based on the number of jobs created. The number of direct jobs generated during the construction phase has been assessed using the construction cost of the Proposed Development, construction sector output and spend within the construction sector on salaries.
- 7.4.31 The number of direct jobs generated during the operational phase has been calculated using a combination of approaches. Direct jobs created by the Proposed Development's Commercial space have been calculated. For the purposes of this chapter these spaces are assumed to accommodate retail uses as is typical at ground floor below residential developments. The employment impact result from this commercial space has been calculated using job/floorspace densities sourced from the Homes and Communities Agency (HCA), Employment Densities Guide, 3rd Edition, November 2015, applied to the floorspace assumptions by Use Class.
- 7.4.32 Direct jobs arising from the Proposed Development's local food store have been estimated based on use class A1 from the HCA Employment Densities Guide³.
- 7.4.33 Direct jobs arising from the Proposed Development's 'other retail' / takeaway' use have been estimated based on use class A3 from the HCA Employment Densities Guide⁴.
- 7.4.34 Guidance from the HCA, Additionality Guide, 2014 (Additionality Guide) and more recently, HM Treasury Green Book, establishes that direct jobs generated by the Proposed Development would most likely be subject to a degree of 'displacement' (the level of employment likely to be lost, moved or adversely affected by the employment created as a result of the Proposed Development); 'leakage' (referring to the number of jobs likely to be taken up by people outside the Labour Market Study Area), and; 'multiplier effects' (the additional economic benefit that will be derived as a direct result of the income earned by the new employment as an indirect result of the supply chain linkages).
- 7.4.35 These factors are collectively known as 'additionality' factors. They enable quantification of the employment effect to the Labour Market Study Area, that is, the net increase in the number of employed residents in the Labour Market Study Area attributable to the Proposed Development and the jobs it is expected to generate. The additionality adjustments assumed in this assessment are presented in **Table 7.18**.

³ Employment densities for A1 Uses have been adopted as this maps to the new E classification densities are not available for the new use classes introduced in 2020.

⁴ Employment densities for A1 and A3 Uses have been adopted as this maps to the new E classification densities are not available for the new use classes introduced in 2020.

Effect Significance Criteria

Labour Market Sensitivity

- 7.4.36 For employment effects, the availability of labour and skills is critical in accommodating the demands, needs and requirements of the Proposed Development. The sensitivity of the labour market has been defined in relation to:
- The availability of skilled labour in the Labour Market Study Area, relative to regional and national averages.
 - The proportion of employment in relevant sectors (e.g. construction, manufacturing, wholesale and retail trade) within the Labour Market Study Area.
 - The availability of labour (including the unemployed) within the Labour Market Study Area.
 - Relevant education and training provision provided by institutions serving the Labour Market Study Area.
 - Plentiful labour and / or skills capacity results in a low sensitivity, whilst limited labour and / or skills capacity results in a high sensitivity. Sensitivity criteria relating to employment are shown in **Table 7.2**.

Table 7.2: Labour market sensitivity

Sensitivity	Example
High	There is a shortfall of appropriate labour and skills. The Proposed Development would therefore lead to labour market pressure and distortions (i.e. skills and capacity shortages, import of labour, wage inflation).
Medium	There is a low or limited supply of appropriate labour and skills. The Proposed Development may therefore lead to labour market pressure or distortions.
Low	There is a readily available supply of appropriate labour and skills. The Proposed Development is therefore unlikely to lead to labour market pressure or distortions.

Source: Stantec (2022)

Sensitivity of Other Receptors

- 7.4.37 For wider socio-economic effects including changes to the housing market, education, healthcare, and community infrastructure, receptor sensitivity has been determined with reference to the importance of the receptors established in the baseline conditions and the extent to which any change upon these could affect their performance or livelihood. The sensitivity of relevant receptors has therefore been defined on a case-by-case basis and is explained within the assessment for each individual receptor.

Magnitude of Change

- 7.4.38 The magnitude of change from the construction and operation of the Proposed Development on identified socio-economic receptors is determined using the criteria set out in the **Table 7.3** below. The assessment of predicted Magnitude of Change from the Proposed Development has been informed by publicly available information sources at the time of this assessment.

Table 7.3: Magnitude of Change Criteria

Magnitude	Type of Change	Criteria
High	Adverse	Employment changes: the number of jobs lost in the Study Area would be 250 or greater (based upon the EU definition of small and medium enterprises (European Commission, 2003). Other socio-economic changes: adverse changes to identified receptors would be observed on an international, national or regional scale. Changes are likely to be experienced over the long term (i.e. 5+ years).
	Beneficial	Employment changes: the number of jobs created in the Study Area would be 250 or greater. Other socio-economic changes: beneficial changes to identified receptors would be observed on an international, national or regional scale. Changes are likely to be experienced over the long term (i.e. 5+ years).
Medium	Adverse	Employment changes: the number of jobs lost in the Study Area would be 50 or greater, but fewer than 250. Other socio-economic changes: Noticeable adverse changes, judged to be important at a local scale, to identified receptors. Changes are likely to be experienced over the medium term (i.e. 3-5 years).
	Beneficial	Employment changes: the number of jobs created in the Study Area would be 50 or greater, but fewer than 250. Other socio-economic changes: Noticeable beneficial changes, judged to be important at a local scale, to identified receptors. Changes are likely to be experienced over the medium term (i.e. 3-5 years).
Low	Adverse	Employment changes: the number of jobs lost in the Study Area would be greater than 10, but fewer than 50. Other socio-economic changes: Small scale adverse changes to identified receptors at the local level only. Changes are likely to be experienced over the short term (i.e. 1-2 years).
	Beneficial	Employment changes: the number of jobs created in the Study Area would be greater than 10, but fewer than 50. Other socio-economic changes: Small scale beneficial changes to identified receptors at the local level only. Changes are likely to be experienced over the short term (i.e. 1-2 years).
Negligible	Adverse	Employment changes: the number of jobs lost in the Study Area would be less than 10. Other socio-economic changes: very small-scale adverse changes to identified receptors at the local level only. Changes are likely to be experienced over the short term (i.e. less than 6 months).
	Beneficial	Employment changes: the number of jobs gained in the Study Area would be less than 10. Other socio-economic changes: very small-scale beneficial changes to identified receptors at the local level only. Changes are likely to be experienced over the short term (i.e. less than 6 months).
	No Change	No change would be perceptible, either beneficial or adverse.

Significance Matrix of Socio-economic Effects

7.4.39 In line with standard EIA practice, a matrix-based approach is adopted to consider the sensitivity of identified receptors in tandem with the likely magnitude of change from the Proposed Development. This method allowed the level and significance in EIA terms of all predicted socio-economic effects to be determined. The EIA significance matrix adopted in this assessment is detailed in the table below.

Table 7.4: Significance matrix

Sensitivity	Magnitude of change			
	High	Medium	Low	Negligible
High	Substantial	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor/ Negligible	Negligible

7.4.40 The duration of temporary environmental effects is defined as follows:

- Short-term – Less than two years.
- Medium-term – Two years to five years.
- Long-term – Five years to ten years.

7.4.41 For the purposes of undertaking the assessment in accordance with the EIA Regulations, only effects determined to be moderate or greater are considered significant in EIA terms.

Assumptions and Limitations

- The outline application proposes a flexible use class (E) for the non-residential elements of the Proposed Development to enable sufficient flexibility to respond to local needs at the time of delivery. To assess this aspect of the Proposed Development, assumptions have been made based on judgement by the EIA Team follows. Local Food store – estimated 2,750m². The assumed net internal area will support 138 gross jobs based on an assumed employment density ratio of 1 job per 15sqm.
- Other retail / takeaway – estimated 2,750m². The assumed net internal area will support 138 gross jobs based on an assumed employment density ratio of 1 job per 15sqm.

7.4.42 These assumptions have been made by the EIA team as they represent typical ground floor uses below residential accommodation blocks. The worst-case scenario (highest employment density of 15 sq.m per employees based on the range of 15-20 sq.m stated in employment density guidance⁵) has been assumed for the purposes of this assessment only.

7.4.43 The construction cost has been estimated using BCIS benchmarks for schemes in Reading. The labour market construction impacts will vary depending on the contraction value of the scheme.

7.4.44 The assessment relies on secondary survey data published by the Government and its official statistics authority (the ONS). Each data source has methodological limitations related to data collection and the data only represents the socio-economic context at a specific point in time.

7.4.45 The following assumptions have been adopted in this assessment:

- At the time of writing, COVID-19 has resulted in changes to socio-economic conditions, but there is no evidence to indicate the long-term implications of these changes. This assessment utilises some data primarily collected after the global disruption caused by the COVID-19 pandemic and it is unclear if the trends identified will continue in longer

⁵ Source: Employment Density Guidance, 3rd Edition. HCA, November 2015.

term. However, the available baseline data remains representative and appropriate to inform a robust and proportionate assessment of the Proposed Development.

- The latest Berkshire Strategic Housing Market Assessment (SHMA) relates to 2016, since which time the position has changed as reported in the SW Maidenhead SPD. The position as set out in the latter is used in this assessment where appropriate. Likewise, the Eastern Berkshire Functional Economic Market Area Study (FEMA) from 2016 is outdated, but remains the most comprehensive assessment available at the present time.

7.5 Baseline Conditions

Existing Baseline

Housing Market

- 7.5.1 The 2021 Census reports that there are 67,682 households in the Reading area and the average household size is 2.57 persons per household, slightly larger than the regional and national average persons per household at 2.44 and 2.41 persons per household respectively.
- 7.5.2 Accommodation within the Reading area is mainly characterised by a relatively even mix of semi-detached, terraced properties and flats. There are significantly lower detached properties compared to the Southeast and England, being approximately 16% and 11% lower respectively.

Table 7.5: Household Accommodation Types

Type	Reading	SE Region	England
Detached	12.2%	28%	23%
Semi-detached	25.9%	32%	28%
Terraced	28.2%	21%	23%
Flats	26.9%	17%	17%
Other ⁶	6.7%	5.5%	5.5%
Total	100%	100%	100%

Source: Household Accommodation Types NOMIS (TS044), Census 2021

- 7.5.3 **Table 7.6** below presents the tenure of properties within Reading, the South East and England. Just over half of properties in Reading are owner occupied. Owner occupation is noticeably lower than the corresponding figures for the South East and England, being 15% and 11% higher than Reading average respectively.
- 7.5.4 Almost a third of properties in Reading are privately rented, noticeably higher than the South East and England averages where 13.6% and 17.1% of properties are privately rented.

Table 7.6: Tenure (Housing Study Area)

Tenure	Reading	SE Region	England
Owned	50.4%	65.7%	61.3%
Shared Ownership	1.3%	1.4%	1%
Social Rent	16.1%	13.6%	17.1%
Private Rent	31.9%	19.2%	20.5%

⁶ Converted buildings, shared house (including bedsits), commercial building (room over shops, hotels, temporary structures).

Tenure	Reading	SE Region	England
Living rent free	0.2%	0.1%	0.1%
Total	100%	100%	100%

Source: Tenure (Housing Study Area), NOMIS (TS054), Census 2021

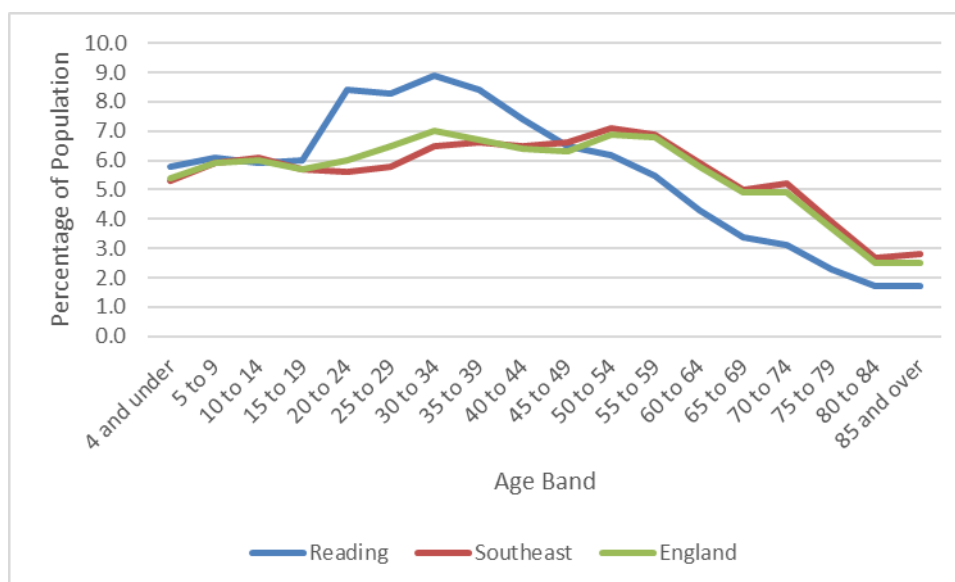
Housing Need

- 7.5.5 Reading is in a regional housing market area (Berkshire Western Housing Market Area), with an objectively assessed need for dwellings, showing that over time, the affordability in Reading is becoming increasingly challenging.
- 7.5.6 The need for housing is substantial in Reading. Of the 16,077 homes needed in the Housing Market Area, 15,847 will be delivered in Reading Borough, which equates to 689 dwellings per annum. The Reading Corporate Plan⁷ highlights that there needs to be housing due to intense affordability issues for those in lower income roles, which could have the potential to cause issues such as homelessness and rough sleeping.

Population

- 7.5.7 Reading had a population of 173,200 people in 2021. The age profile of Reading's population is noticeably different to that of the South East and England. In particular, a large proportion of young working age residents particularly between the ages of 25-40. Approximately 25% of the population is in this range, whilst in the Southeast and England, the age group accounts for approximately 19% and 20% respectively. As a result, just over 12% of Reading's population is aged over 65 compared to 20% in the South East and 19% in England.

Figure 7.1: Proportion of Population by Age Band



Source: Proportion of population by 5-year age band, Nomis, ONS Census 2021

- 7.5.8 Looking forward, the ONS population projections indicate a decline in the number of children and the working age population in Reading by 2041. Over a 40% increase in the number of residents aged 65+ is projected by 2041. This will lead to almost 18% of the population being aged 65 or over.

⁷ <https://images.reading.gov.uk/2023/03/Reading-Borough-Council-Corporate-Plan-2022-25-v19.pdf>

Table 7.7: Population Projections

Population Projections	Ages	2021	2031	2041	Percentage Change	Proportion of Pop by 2041
Reading	Age 0-15	33,808	29,971	30,013	-12.64%	18.02%
	Age 16-64	109,479	109,691	106,872	-2.44%	64.16%
	Age 65+	20,952	25,596	29,696	41.73%	17.83%
Southeast	Age 0-15	1,778,621	1,663,819	1,667,176	6.68%	16.88%
	Age 16-64	5,655,858	5,713,251	5,664,950	0.16%	57.34%
	Age 65+	1,847,844	2,246,394	2,546,631	37.82%	25.78%
England	Age 0-15	10,913,822	10,387,050	10,524,366	-3.70%	17.15%
	Age 16-64	35,406,739	36,056,306	36,228,027	2.32%	59.05%
	Age 65+	10,668,992	12,945,733	14,601,606	36.86%	23.80%

Source: Population Projections by Age, NOMIS, ONS Census 2021

Table 7.8: Total Population Projections

	Age	2021	2031	2041	Percentage Change
Reading	All Ages	164,240	165,251	166,574	1.42%
Southeast	All Ages	9,282,327	9,623,461	9,878,751	6.43%
England	All Ages	56,989,572	59,389,107	61,353,966	7.66%

Source: Population projections by Age, NOMIS, ONS Census 2021

Education

7.5.9 All three and four-year-olds in England are eligible for up to 570 free hours of childcare per year. This is usually taken as 15 hours a week for 38 weeks a year. Parents and guardians are offered flexibility in how the free childcare entitlement is used and can choose, for example, to take fewer hours over more weeks⁸. Free childcare is also available for some two years olds depending on the economic criteria of a child's parents or guardians.

7.5.10 The need for early years education can be met in various ways including:

- School run maintained nursery classes.
- Pre-schools that may be run by schools, or the private or voluntary sector.
- Day nurseries offering childcare and early year education for children from 0 to 5 years old. This provision is market led and many day nurseries are run as small private operations.
- Child minders.
- Breakfast, after school and holiday clubs.

7.5.11 **Table 7.9** below summarises the available nursery provision within two miles of the Proposed Development.

⁸ Source: <https://www.gov.uk/help-with-childcare-costs/free-childcare-and-education-for-2-to-4-year-olds>

Table 7.9: Total Population Projections

Nursery school Capacity	Location	Capacity	Children enrolled	Spare Capacity
Forbury Gardens Day Nursery	0.3 miles away	95	93	2
Co-operative Childcare LTd	0.4 miles away	86	110	-24
The Wigwam Day Nursery (No report)	0.4 miles away			0
Banana Moon Day Nursery ~ Caversham	0.6 miles away	74	33	41
Rainbow day nursery	0.6 miles away	59	70	-11
Kennet Day Nursery	0.6 miles away	64	93	-29
Caversham Nursery School 0 to 3's	0.7 miles away	33	35	-2
Greyfriars Day Nursery	0.7 miles away	80	142	-62
Mary Seacole Day Nursery & Family Support Unit	0.7 miles away	52	24	28
Honey Bee Day Care	0.8 miles away	60	28	32
Park Day Nursery	0.9 miles away	90	98	-8
Playday (Caversham) Ltd	1.2 miles away	48	55	-7
Orchard Day Nursery	1.2 miles away	54	57	-3
Chiltern Nursery & Training College (CNTC)	1.2 miles away	165	190	-25
Northumberland Day Nursery & Pre-School	1.2 miles away	55	55	0
Western Elms Nursery	1.4 miles away	48	39	9
Pine Rivers Kindergarten	1.4 miles away	43	43	0
Berkeley Gardens Day Nursery	1.4 miles away	98	129	-31
Abbeymore Nursery	1.4 miles away	124	68	56
Little Tots Nurseries Ltd	1.5 miles away	44	52	-8
The Bees Knees Day Nursery	1.5 miles away	41	41	0
Sure Start Whitley Day Nursery	1.7 miles away	62	98	-36
Little Dragons	1.8 miles away	64	57	7
Emmer Green Kindergarten	1.8 miles away	80	85	-5

Nursery school Capacity	Location	Capacity	Children enrolled	Spare Capacity
MonkeyMoos Day Care ~ Highdown	1.8 miles away	28	50	-22

Source: Reading Borough Council and Brighter Futures for Children 2023

7.5.12 Nursery school provision in the Education Study Area is offered at 25 settings as shown in the table above. In total there is a total of 1,745 nursery school places. Most of the providers are currently over capacity resulting in a total enrolments exceeding capacity by 98 places.

7.5.13 Primary school provision in the Education Study Area is offered at 14 schools as shown in **Table 7.10**. In total there is a primary school capacity of 293 primary school places across the 14 schools identified.

Table 7.10: Primary School Capacity

School	Location	Age	School Capacity	Pupils Enrolled	Spare Capacity
Alfred Sutton Primary School	148 Wokingham Rd, Reading RG6 1JR	6-11	630	628	2
Redlands Primary School	Lydford Road, Reading, Berkshire, RG1 5QH	6-11	210	207	3
New Town Primary School	School Terrace Reading RG1 3LS	6-11	420	375	45
St Johns C of E Primary School	St John's CE Primary School 121-147 Orts Road Reading Berkshire RG1 3JN	6-11	420	397	23
Katesgrove Primary School	Dorothy St, Reading RG1 2NL	6-11	630	619	11
Coley Primary School and Nursery	Wolseley St, Reading RG1 6AZ	6-11	210	202	8
All Saints Infant School	Brownlow Rd, Reading RG1 6NP	6-11	60	60	0
Oxford Road Community School	146 Oxford Rd, Reading RG1 7PJ	6-11	210	210	0
Battle Primary School	Cranbury Rd, Reading RG30 2TD	6-11	420	406	14
Wilson Primary School	Wilson Rd, Reading RG30 2RT	6-11	420	418	2
Civitas Academy	90a Great Knollys St,	6-11	420	366	54

School	Location	Age	School Capacity	Pupils Enrolled	Spare Capacity
	Reading RG1 7HL				
EP Collier Primary School	6 Ross Rd, Reading RG1 8DZ	6-11	420	341	79
Thameside Primary School	Thameside School, Harley Rd, Caversham, Reading RG4 8DB	6-11	420	394	26
St Anne's Catholic Primary School	Washington Rd, Caversham RG4 5AA	6-11	210	184	26

Source: Department for Education School Place Planning Tables 2021

- 7.5.14 Most primary schools identified are shown to be either at full capacity or nearing capacity. However, others show significant capacity with over 20 places available at six out of fourteen local primary schools, resulting in a spare capacity of 293 school places locally.
- 7.5.15 Secondary school provision in the Education Study Area is offered at two schools as shown in **Table 7.11** below.

Table 7.11: Secondary School Capacity

School	Location	Age	School Capacity	Pupils Enrolled	Spare Capacity
Maiden Erlegh School	Maiden Erlegh School in Reading 81 Crescent Road Reading RG1 5SL	11-16	900	887	13
Kendrick School	41-43 London Rd, Reading RG1 5BN	11-18	920	830	90

Source: Department for Education School Place Planning Tables 2021

- 7.5.16 There is limited school capacity in Maiden Erlegh School according to the latest DfE data. However, at Kendrick School there is a greater level of spare capacity of 90 student places meaning there are 103 spare secondary school places locally.
- 7.5.17 Overall, for both primary and secondary schools in close proximity to the Proposed Development, there is a low sensitivity due to existing over almost 300 primary school places across 14 schools and over 100 secondary school places.

Healthcare

- 7.5.18 Five GP practices have surgeries accepting new patients, and whose patient catchment area includes the Proposed Development as shown in **Table 7.12**.

Table 7.12: Healthcare provision

Practice Name	GP's FTE	Nurse FTE	Patients	GP / Patient Ratio	Nurse / Patient Ratio
Abbey Medical Centre	1	2	2,402	2,402	1,201
Reading Walk-In Health Centre	N/A	N/A	13,000	N/A	N/A
Melrose House	7	2	15,000	2,143	7,500
Milman Road Health Centre	11	5	20,000	1,818	4,000
University Health Centre	15	8	33,000	2,200	4,125

Source: HealthGIS GP Finder v4.0; NHS Digital General Practice Data

- 7.5.19 Four GP practices have patient loads above the 1,800-patient per NHS GP benchmark identified within the Healthy Urban Development Unit (HUDU)'s model⁹ suggesting these practices are operating at full capacity. However, demands on health practitioners time relates to the demographics of the people on the register as well as underlying health, and the other practices may also be under strain.
- 7.5.20 The data indicates that the sensitivity is high reflecting a declining workforce and rising workload.

Open Space

- 7.5.21 The Reading Open Spaces Strategy Update Note 2018 published in January 2018 states that Reading's total amount of recreational public open space remains broadly in line with the national guidelines, having only slightly increased since the last assessment, it is still unevenly distributed across the town. Residents in and around the town centre are still further away from POS than residents in outer wards. In the town centre, historical development patterns make it difficult to introduce new areas of POS without large-scale redevelopment. Due to the high cost of land in the town centre, the Council is unable to acquire land outright for new POS. Thus, POS is normally achieved as part of wider development proposals.
- 7.5.22 According to the Reading Open Spaces Strategy Update Note 2018, between 2007 and 2017 there has been the following loss/gain of open space in the Borough:
- Unrestricted open space – gain of 11.248ha;
 - Limited open space – loss of 28.097ha; and
 - Restricted open space – loss of 2.154ha.
- 7.5.23 **Figure 7.2** shows the location of public open space within the vicinity of the site, with details provided in **Table 7.13** for the key sites of public open space. In summary, open space provision within the study area includes:
- Three children's play areas, two located at Kings Meadow located within study area and an outdoor play area at Canal Way Park.
 - Approximately 1,200m² of allotments at Adler Road.

⁹ Source: Healthy Urban Development Unit, (2009). HUDU Model

- An estimated 213,000m² of natural and semi natural open space provided across four sites, of which, 97,000m² is within the study area.

Figure 7.2: Open Space Provision

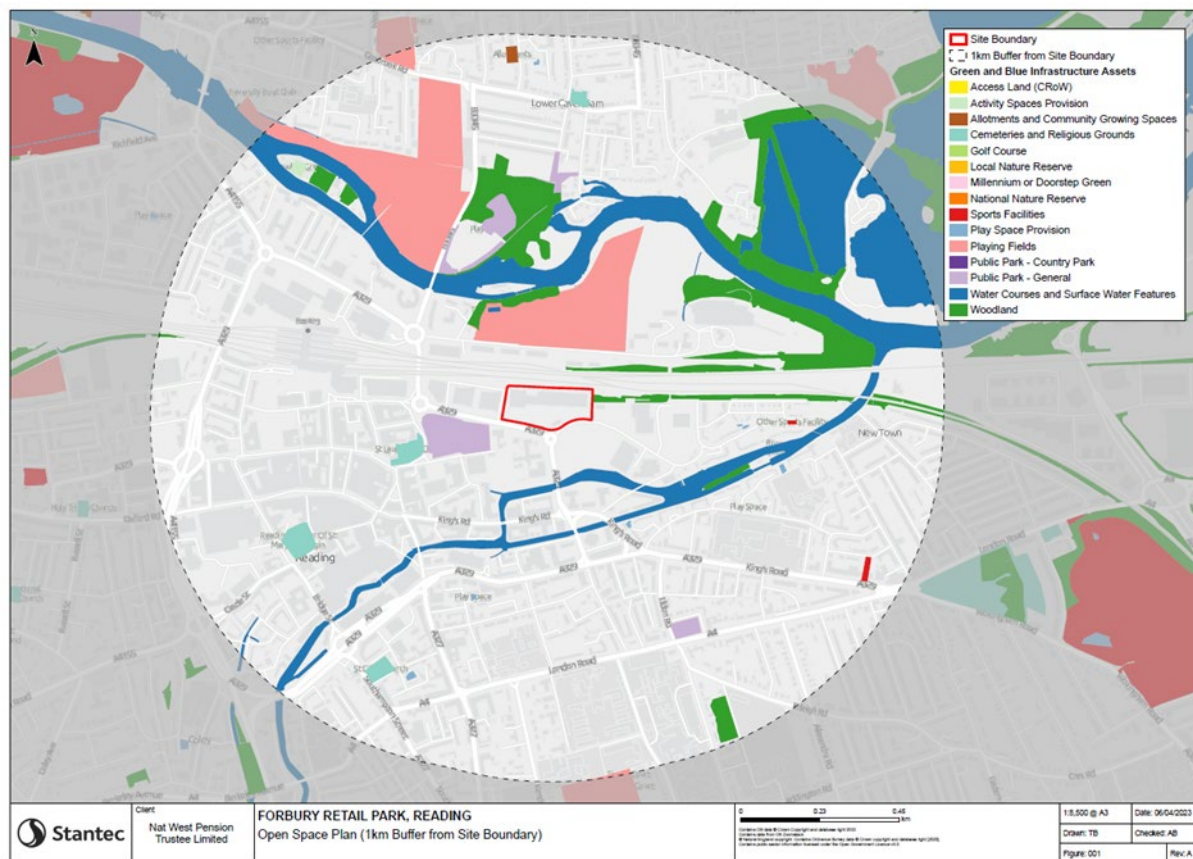


Table 7.13: Key Public Open Space within 1km of the Site

Open Space	Address	Description	Distance from Site ¹⁰
Children and Teenage Play			
Kings Meadow	Napier Rd, Reading RG1 8AB	Two children's play areas located within this open space	0.2km
Canal Way Park	12 Florence Walk, Reading RG1 3HH	Childrens outdoor play area within small park	0.7km
Allotments			
Ardler Road Allotments	Reading RG4 5AE	Approximately 1,200m ² of allotment within a housing estate	0.7km
Natural and semi-natural open space			
Kings Meadow	Napier Rd, Reading RG1 8AB	Approximately 97,000 m ² of open green space	0.2km

¹⁰ The distance from the site is calculated on a direct line approach and does not take account of distances using the highway of public footpaths.

Open Space	Address	Description	Distance from Site ¹⁰
Christchurch Meadow	George St, Caversham, Reading RG4 8BY	Approximately 93,000 m ² of open green space	0.6km
Forbury Garden Public Park	Forbury Gardens, Reading	Approximately 19,000m ² of open public green space	0.5km
Vix Gardens	Eldon Square, Reading RG1 4DP	Approximately 4,000m ² of open public green space	0.9km

Labour market and business

Economic Activity

- 7.5.24 Reading has a higher economic activity rate at 83.5% and employment rate 80.8% than both the regional and national averages. Conversely, Reading has a slightly higher unemployment rate in the region compared to the regional but lower than the national average. There is a difference of 0.1% from the local to regional level and 0.7% from the local to national level for unemployment. Reading also has lower economically inactive rate than both the regional and national figures.

Table 7.14: Economic Activity and Inactivity

Economic Activity & Inactivity	Reading (%)	Southeast (%)	England (%)
Economic activity rate - aged 16-64	83.5	80.4	78.7
Employment rate - aged 16-64	80.8	78.0	75.7
Unemployment rate - aged 16-64	3.2	3.1	3.8
Economically inactive - aged 16-64	16.5	19.6	21.3

Source: Annual Population Survey, ONS (2022)

Industry

- 7.5.25 Reading's economy is dominated by service sector employment. Key sectors of employment include information and communication (15.9%); professional, scientific, and technical activities (14.2%); wholesale, and retail trade; and admin and other support (both accounting for 12.4%) of employment.
- 7.5.26 Of these key sectors, Reading is shown to have a substantially greater amount of employment (approximately 10% higher) within the information and communication sector than both the Southeast and England. The high presence of those in the information and communication sector in Reading contributes towards the relatively high wages compared to the national average.
- 7.5.27 In contrast, Reading is also shown to have significantly lower employment within the manufacturing sector than the Southeast and England, being 1.5% compared to 5.8% and 7.5% to the regional and national averages respectively.

Table 7.15: Industry of Employment (Percentages)

Sector	Reading (%)	Southeast (%)	England (%)
Agriculture, forestry, and fishing	0.0	0.7	0.6
Mining and quarrying	0.0	0.1	0.1
Manufacturing	1.5	5.8	7.5
Electricity, gas, steam, and air conditioning supply	1.1	0.4	0.4
Water supply; sewerage, waste management and remediation activities	2.2	1.0	0.7
Construction	2.0	5.6	4.8
Wholesale and retail trade; repair of motor vehicles and motorcycles	12.4	15.8	14.4
Transportation and storage	3.5	5.1	5.2
Accommodation and food service activities	5.3	7.3	7.5
Information and communication	15.9	5.5	4.6
Financial and insurance activities	3.1	2.8	3.6
Real estate activities	1.3	1.7	1.8
Professional, scientific, and technical activities	14.2	9.2	9.3
Administrative and support service activities	12.4	8.9	9.0
Public administration and defence; compulsory social security	3.5	3.3	4.3
Education	5.3	9.6	8.7
Human health and social work activities	11.5	13.0	13.3
Arts, entertainment, and recreation	1.3	2.3	2.3
Other service activities	1.3	2.1	1.9
Undifferentiated goods-and services-producing activities of households for own use	0.0	0.0	0.0
Activities of extraterritorial organisations and bodies	0.0	0.0	0.0

Source: Business Register and Employment Survey, ONS (2021)

Productivity

- 7.5.28 The Gross Value Added per worker by job filled in the local authority of Reading is £71,504 per job filled which is significantly higher than the Southeast and England. The difference between Reading and the regional GVA figure is £9,576 per job filled whereas the difference to the national figure is £12,946.

Table 7.16: GVA Per Job Filled

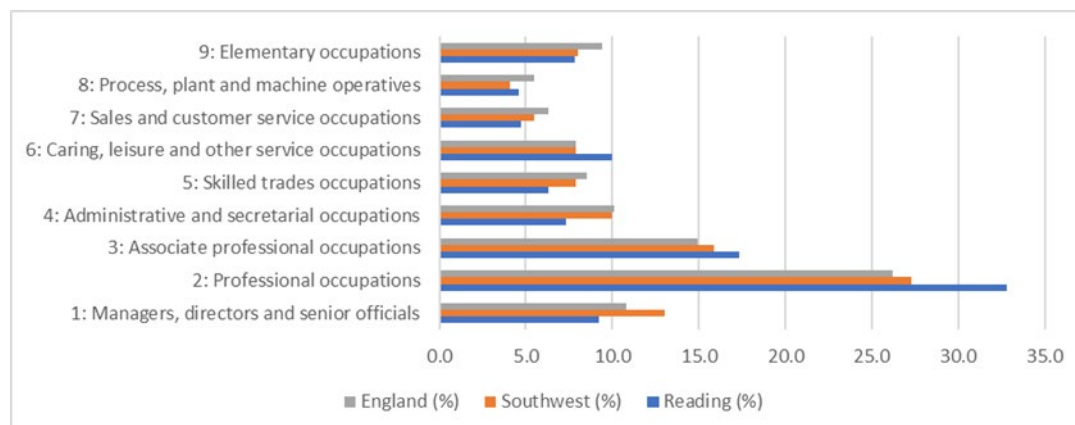
Area	Gross Value Added per job filled (£)
Reading	£71,504
Southeast	£61,928
England	£58,558

Source: Productivity, GVA per filled job, ONS (2022)

Occupations

- 7.5.29 Reading's occupational profile is reflective of a high value economy. Over a third of Reading's population are employed within professional occupations while a further 16% are employed in associate professional occupations. A further 8% of the population are employed in manager, directors and senior officials positions. The proportion of employees within these three occupations is higher than the regional and national averages.

Figure 7.3: Percentage of all employment by occupation



Source: Annual Population Survey, ONS (2022)

Wages

- 7.5.30 An analysis of the Annual Survey of Hours and Earning identifies the variations in wages that exist between Reading and the national and regional average, with the mean pay in Reading being £862.30 per week. This is approximately 9.5% and 12.6% higher than the regional (£765.50) and national (£766.20) averages respectively. In addition, the annual percentage change in wages in Reading (11.1%) is also higher than the recorded regional and national annual percentage change (2.9% and 3.9% respectively).

Table 7.17: Annual Survey of Hours and Earnings

Weekly Pay - Gross	Reading	Southeast	England
Number of jobs	85,000	2,812,000	16,575,000
Median Pay	£727.10	£664.30	£645.60
Annual percentage change - median	11.4%	4.5%	5.3%
Mean Pay	£862.30	£765.50	£766.20
Annual percentage change - mean	11.1%	2.9%	3.9%

Source: Annual Survey of Hours and Earnings, ONS (2022)

Skills and Education

- 7.5.31 An analysis of the Annual Population Survey demonstrates the level of qualifications held by the resident population of Reading, the South East and England.
- 7.5.32 Reading's population is highly educated when compared to both the South East and the national averages. Over half (55.2%) of the Reading population is educated up to National

Vocational Qualification (NVQ) 4 or higher level, which is 10% and 12% higher than the regional and national averages respectively.

- 7.5.33 Only 3.8% of Reading's working age population (aged 16-64) have no qualifications, which is 1.3% less than the regional average of 5% and 2.6% lower than the national average of 6.4%.

Table 7.18: Qualifications of residents aged 16-64 (2021)

Level of Qualification (% of population)	Reading (%)	Southeast (%)	England (%)
NVQ4+ - aged 16-64	55.2	45.2	43.2
NVQ3+ - aged 16-64	68.3	63.8	61.4
NVQ2+ - aged 16-64	81.1	80.7	78.1
NVQ1+ - aged 16-64	91.1	90.4	87.7
Other qualifications (NVQ) - aged 16-64	5.1	4.6	5.9
No qualifications (NVQ) - aged 16-64	3.8	5.0	6.4

Source: Annual population survey, ONS (December 2021)

Future Baseline

- 7.5.34 The future baseline, upon completion of the Proposed Development, for socio-economic provision is likely to reflect that of the current baseline.

7.6 Primary Mitigation

- 7.6.1 This section sets out mitigation that is embedded into the design of the Proposed Development relevant to the assessment of socioeconomic effects.
- 7.6.2 The scope and design of the Proposed Development includes primary mitigation to avoid, prevent or minimise significant adverse socioeconomic effects and to enhance beneficial effects. The scheme design cost includes private residents' gardens throughout the site to improve access to open space and nature. The provision of up to 5,000 sqm of Class E commercial floorspace acts to reduce the level of employment loss generated from the closure units at Forbury Retail Park.

7.7 Potential Effects

Construction Phase

- 7.7.1 **Gross impacts:** The total construction cost of the Proposed Development is estimated to be £237,900,000.
- 7.7.2 Analysis of the Business Population Estimates for the UK and Regions (ONS, 2022) found that turnover per worker in South East England's construction sector stands at £177,677. Dividing the total construction costs by the turnover per worker in the construction sector in the South East indicates that the project will support a total of 1,338 gross per year equivalent jobs during the construction phase. Based on an industry standard that equates 10 PYE to 1 full time equivalent job, this results in 134 FTE.
- 7.7.3 **Net Additional Impact:** Only a proportion of total construction employment would occur within the Labour Market Study Area due to mobility of labour, competition from externally located construction firms and supply chains. To take account of these factors, the additionality

assumptions detailed in Table 7.19 below have been used to calculate the net construction employment, estimated using the gross construction employment from the Proposed Development.

Table 7.19: Construction Additionality Assumptions

Data	Reading	UK	Comments
Deadweight	0%	0%	It has been assumed that, in the absence of this intervention, the site would remain unchanged and so 0% deadweight has been assumed both locally and nationally.
Leakage	55%	0%	A significant proportion of the site's workforce (55%) is expected to reside outside of Reading based on census 2011 travel to work data. None of the workforce are expected to reside outside of the UK and therefore 0% has been assumed nationally.
Displacement	25%	50%	Given current high levels of demand for construction staff, it has been assumed that there will be some displacement locally and therefore 25% displacement has been used. Nationally it is likely that construction workers will be displaced from other construction projects and therefore a medium level of displacement has been assumed (50%)
Multiplier	1.25	2.7	Multipliers have been sourced from the HCA Additionality Guide Fourth Edition 2014. A local composite multiplier of 1.25 has been used for Reading based upon an average sub-regional composite multiplier outlined in BEIS additionality guidance. A national composite multiplier of 2.7 has been applied based on a national construction sector average produced by Oxford Economics.

Source: Stantec

- 7.7.4 Using the additionality assumptions from the table above, the 134 gross temporary construction per year equivalent jobs created by the Proposed Development are expected to support approximately 111 FTE (1108 net per year equivalent jobs) in Reading and 181 FTE (1807 net additional per year equivalent jobs) in the UK over the construction period within the assessed Labour Market Study Area.
- 7.7.5 The significance of the construction phase jobs impact is identified as having **low sensitivity** due to the Proposed Development being unlikely to lead to labour market pressure. A **medium beneficial** magnitude of change is generated as the change in employment is greater than 50, but fewer than 250. This results in a **minor beneficial significance**.

Operational Phase

Homes

- 7.7.6 The Proposed Development provides nearly 5% of the entire Borough's housing requirement within the Local Plan period to 2036 (excluding completions and commitments). The scale of development is likely to attract people from beyond Reading and be of regional importance towards meeting the annual completions target in the WBHMA.
- 7.7.7 This constitutes a low sensitivity and a medium magnitude of change due to the scale of development proposed. Overall, the Proposed Development will have a minor **beneficial** significance.

Jobs

7.7.8 Gross Employment: The following outlines the gross direct employment in terms of full time equivalent (FTEs) which will be derived from the operational phase of the Proposed Development. The following areas assume Gross External Area (GEA) based upon the information available for this assessment. This has been converted into Gross Internal Area (95% of GEA) and Net Internal Area (85% of GEA) to align with employment densities which have been sourced from the 2015 HCA Employment Densities Guide Third Edition. An occupancy rate of 75% has been assumed for the commercial development as a conservative estimate of the occupancy which is anticipated for this Proposed Development. For the purpose of this assessment the 'worst case' scenario has been assumed given the delivery of the site will replace existing commercial floorspace.

7.7.9 Based on the assumed uses and floor spaces, for assessment purposes, as set out in the Assumptions and Limitations in **Section 7.4**, the Proposed Development would generate the following job creation and losses:

- Local Food store – estimated 2,750m². Based on the assumed net employment area, this will support 138 FTE jobs based on an assumed employment density ratio of 1 job per 15sqm.
- Other retail / takeaway – estimated 2,750m². Based on the assumed net employment area, this will support 138 FTE jobs based on an assumed employment density ratio of 1 job per 15sqm.

Table 7.20: Operation Additionality Assumptions

Data	Reading	UK	Comments
Deadweight	25%	25%	It has been assumed that, in the absence of this intervention, the Site would remain as an operational retail park. However, a conservative estimate of 25% has been assumed as deadweight both locally within Reading and nationally.
Leakage	55%	0%	A significant proportion of the site's workforce (55%) is expected to reside outside of Reading based on census 2011 travel to work data. None of the workforce are expected to reside outside of the UK and therefore 0% has been assumed nationally.
Displacement	25%	25%	Due to the nature of employment uses planned a 25% displacement assumption has been applied to account for the risk of employment displacement locally. Nationally, there will also be some displacement and so a conservative assumption of 25% has been assumed.
Substitution	0%	0%	Assumed no incentives to influence substitution behaviour.
Multiplier	1.25	2.7	Multipliers have been sourced from the HCA Additionality Guide Fourth Edition 2014. A local composite multiplier of 1.25 has been used for Reading based upon an average sub-regional composite multiplier outlined in BEIS additionality guidance. A national composite multiplier of 2.7 has been applied based on a national construction sector average produced by Oxford Economics.

7.7.10 The gross FTE employment impact of the Proposed Development is therefore estimated as the sum of these, 276 FTE jobs.

- 7.7.11 **Net Additional Employment:** The operational phase of the Proposed Development is predicted to support 86 net additional FTE operational jobs in Reading, based on the assumptions in **Table 7.20**. Taking into the account the loss of an estimated net 30 FTE associated with the loss of existing commercial space on the site a total of 56 net additional FTE operations jobs created in Reading.
- 7.7.12 The net operational jobs impact is identified **low sensitivity** due to the Proposed Development being unlikely to lead to labour market pressure. A **medium beneficial** magnitude of change is generated as the change in employment is greater than 50. This results in a **minor beneficial significance**.

Education

- 7.7.13 To inform the assessment on education effects the child yield associated with the Proposed Development has been calculated with reference to an assumed housing mix. One-bedroom dwellings are not expected to generate requirements for school places, which reduces the number of dwellings to which the child yield ratios apply to from 820 dwellings to 377 dwellings.

Table 7.21: Child Yield from the Proposed Development

	1-bed Flat	2-bed Flat	3-bed Flat	Total
Nursery Yield Ratio	0	0.1	0.13	
Primary Child Yield Ratio	0	0.29	0.4	-
Secondary Child Yield Ratio	0	0.05	0.17	-
Housing Mix	54%	27%	19%	100%
Dwellings	443	225	152	820
Nursery Places	0	23	20	43
Primary Places	0	66	61	126
Secondary Places	0	11	26	37
Total	0	77	87	163

- 7.7.14 **Table 7.21** illustrates the increased demand for nursery, primary and secondary school places arising from the Proposed Development. Assuming 30 pupils per form, four-year groups in nursery, seven-year groups in each primary school and five in a secondary school, the Proposed Development generates need for:
- 43 nursery places.
 - 4.2 forms of primary provision.
 - 1.2 forms of secondary provision.
- 7.7.15 Baseline conditions for pre-school provision show the number of nursery children accommodated exceeds capacity. The Proposed Development is expected to generate additional demand for nursery places. Nursery provision is therefore considered to be **of high sensitivity**. The magnitude of change is considered to be **medium adverse** due to the scale of change being important at the local level resulting in a change of **major adverse significance**. This reflects the nature of the Proposed Development and the conversion of the Site from retail to residential uses.
- 7.7.16 Both primary and secondary school provision current meets local needs and has the capacity to adsorb additional demand, hence the sensitivity of school places is considered to be **low**.

Existing provision can absorb the expected number of school children generated from the Proposed Development meaning the magnitude of change is considered to be **medium adverse**, resulting in change of **minor adverse significance**.

Health Facilities

- 7.7.17 Based on the number of new residential units to be developed on the Site of up to 820 units, it has been estimated that the delivery of this new residential development would introduce approximately 1,675 new people to the local area¹¹.
- 7.7.18 The sensitivity of GP surgeries is considered to be **high** given that this chapter has already established that GP surgeries near the Proposed Development are already over-capacity. The introduction of an additional 1,675 new residents would have a **medium adverse** impact on GP provision, creating a change of **major adverse** significance.
- 7.7.19 NHS Dental Statistics for England show there were 24,272 dentists performing NHS activity in England during 2021-22 providing an average of 2,329 people per NHS dentist or 0.43 dentists per 1,000 population¹². Based on the population generated by the scheme, demand for 1 (0.7) dentist would be generated while existing providers are current under /over capacity. The Proposed Development will therefore lead to a **minor / negligible adverse impact**.
- 7.7.20 Based on the proposals for the Site there will be no net loss of public open space within the local authority based on the delivery of the Proposed Development. In addition, the design code for the Proposed Development includes publicly accessible green space and soft landscaping compared to the current site uses which are dominated by hard landscaping.

7.8 Secondary Mitigation and Enhancement

- 7.8.1 Financial contributions are proposed to offset minor adverse in primary and secondary education as well as major adverse effects for health provision.

7.9 Residual Effects

- 7.9.1 The following adverse residual effects are observed following the additional mitigation proposed:
- Moderate adverse – Health provision.
 - Minor adverse – Primary and Secondary education.
- 7.9.2 All other effects remain as reported in **Section 7.7** Potential Effects of the chapter.

7.10 Cumulative effects

- 7.10.1 There are ten cumulative developments set out in **Table 7.22** that form part of the cumulative effects assessment alongside the Proposed Development. All of these sites are within 1km of the site.

¹¹ This is based on the multiplying of the number of new units split by number of bedrooms by the estimated number of people living in a household as per Census 2011 data (DC4405EW). This was calculated at a local authority level.

¹² Population per Dentist based on NHS dentist numbers and the Mid-Year Population estimate for England. Source: Office for National Statistics, 2021.

Table 7.22: Sites in cumulative assessment

Site	Number of new residential units	New commercial floorspace/land use
80 Caversham Road	616 (2-24 storeys)	1650sqm retail 187 sqm community centre 442 health centre
Broad Street Mall	422 (5-20 storeys)	1,501 sqm of ground floor retail
Gas Holder Site, Alexander Turner Close	130 (2-9 storeys)	-
Plot F Station Hill Reading	168	665 sqm of leisure (Class D2) floorspace, 390 sqm of flexible retail and leisure (Class A1-A5/D2)
Plot E Station Hill	370	1,125 sqm of retail floorspace (Class A1-A5)
The Printworks, Cox & Wyman, Cardiff Road	96	-
20 Hosier Street	-	101 bed hotel (3,486 sqm non-residential) 462 sqm restaurant
Clarendon House	43 (6-9 storeys)	-
97a-117 Caversham Road	60	
71-73 Caversham Road	29	
55 Vastern Road	209 (1-11 storeys)	
Wedale Street	429 (4-11 storeys)	184 sqm A1/A3
45 Caversham Road	40 (5 storeys)	
Richfield Driving Range, Richfield Avenue	-	The proposal is for the redevelopment of the site for a new three-storey 8 form entry school for years 11 – 16, including a dedicated SEND unit and a 300 place 6th form. The new school will have a total school capacity of 1500 pupils. The Proposed Development will comprise a part two and part three storey building, totalling 11,733 sqm (GEA). The new school and will employ 156 no. (FTE) members of staff.
Sloane Place, 6-8 Market Place	38	-
138-144 Friar Street	-	163 bed hotel

7.10.2 Cumulatively, the remaining proposals are for up to 2,646 new dwellings that are estimated to generate 4,761 new residents. Combined with the Proposed Development, this would be an additional 6,436 new residents.

- 7.10.3 Using the standards and methodologies set out in this assessment the additional 4,761 new residents are anticipated to require an additional 2 Dentists, 149 new pre-school places, 15 forms of entry at primary school and 3 forms of entry at secondary school once fully delivered. It should be noted that the Richfield Driving Range site has planning permission to build a 1,500-capacity secondary school which would provide enough capacity to accommodate the 3 new forms of entry at secondary school required by the level of housing proposed to be created by the sites included in this cumulative effects assessment.
- 7.10.4 The combined commercial space of the sites identified as part of the cumulative effects assessment is anticipated to generate an additional 1,235 gross jobs¹³.

7.11 Monitoring

- 7.11.1 No monitoring for the scheme has been identified as part of this assessment.

7.12 Summary of Effects

Table 7.23 sets out a summary of the potential effects, additional mitigation and residual effects.

¹³ This includes an estimated 156 jobs created by the proposed development at Richfield Driving Range, Richfield Avenue site.

Table 7.23: Summary of Cumulative Effects

Receptor/Effect	Sensitivity of Receptor	Magnitude of Impact	Nature of Effect	Potential Effect	Additional Mitigation	Residual Effect
Construction						
Jobs	Low	Medium beneficial	Temporary, indirect	Minor beneficial	No mitigation required	Minor beneficial
Operation						
Housing	Low	Medium beneficial	Permanent, long term, direct	Minor beneficial	No mitigation required	Minor beneficial
Nursery Education	High	Medium adverse	Permanent, long term, direct	Major adverse	No mitigation required	Major adverse
Primary Education	Low	Medium adverse	Permanent, long term, direct	Minor adverse	Financial contribution to offset provision – CIL and Section 106 as referenced in Local Plan	Minor adverse
Secondary Education	Low	Medium adverse	Permanent, long term, direct	Minor adverse	Financial contribution to offset provision – CIL and Section 106 as referenced in Local Plan	Minor adverse
Health (GP and Dentists)	High	Medium adverse	Permanent, long term, direct	Major adverse	Financial contribution to offset provision – CIL and Section 106 as referenced in Local Plan	Moderate adverse
Jobs	Low	Medium beneficial	Permanent, long term, indirect	Minor beneficial	No mitigation required	Minor beneficial

8 Noise and Vibration

8.1 Introduction

- 8.1.1 This Chapter of the ES was prepared by Sandy Brown Ltd and presents an assessment of the potential for likely significant effects of the Proposed Development in terms of noise and vibration. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and / or enhance likely beneficial effects. The nature and significance of the likely residual effects are reported.
- 8.1.2 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A.3**.

8.2 Policy Context, Legislation, Guidance and Standards

- 8.2.1 The noise and vibration assessment has been undertaken within the context of relevant planning policies, guidance documents and legislative instruments. A high-level summary of key documents relating to acoustics is provided below.

Legislation Context

Control of Pollution Act 1974

- 8.2.2 Powers are given to Local Planning Authorities (LPAs) under the Control of Pollution Act 1974 (COPA) for the control of noise from construction sites. Sections 60 and 61 of COPA 1974 allow LPAs to serve notices imposing conditions on the way in which construction work is conducted. It is a criminal offence to contravene such a notice without a reasonable excuse, which can be avoided provided the work is carried out under a consent issued under Section 61 of the Act. Such consents may be applied for in advance of construction work being carried out.
- 8.2.3 LPAs can produce Regulations to control noise from plant or machinery under Section 68 of COPA 1974, but the preference is generally to use codes of practice issued under Section 71 to minimise noise. Although breach of a code of practice is not a criminal offence, these may be taken into account in legal proceedings.

The Environmental Noise (England) Regulations 2006 (as amended 2018)

- 8.2.4 The Environmental Noise (England) Regulations 2006 implement the Assessment and Management of Environmental Noise Directive 2002/49/EC (END). The END requires:
- The use of harmonised noise indicators and computational measures so that data can be collected and compared in a standardised way
 - Common protocols for noise mapping
 - The drawing up of noise maps
 - Making information available to the public
 - The drawing up of local action plans
 - Collection of data by the Commission to inform future Community policy.

- 8.2.5 Noise mapping of the UK has been under way for some years, with the majority of urban areas being covered.

Planning Policy Context

National Planning Policy Framework (2021)

- 8.2.6 The National Planning Policy Framework (NPPF) sets out the government planning requirements, and supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers.

- 8.2.7 Paragraph 185 of the NPPF states:

‘Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life;
- b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason...

- 8.2.8 In addition, the following is noted at paragraph 187:

‘Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’

Noise Policy Statement for England (2010)

- 8.2.9 The Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy. The NPSE states that its aims are as follows:

- 8.2.10 “Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvement of health and quality of life.”

- 8.2.11 The NPSE adopts established concepts from toxicology that can be applied to noise impacts. The concept details noise levels, at which the effects of an exposure may be classified into a specific category. The classification categories as detailed within the NPSE are as follows:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

- 8.2.12 The SOAEL does not have a single objective noise level that is applicable to all sources of noise in all situations and therefore, the SOAEL is likely to be different for different sources, different receptors and at different times of the day.
- 8.2.13 The first aim of the NPSE is to avoid significant adverse effects on health and quality of life, taking into account the guiding principles of sustainable development. The second aim considers situations where impacts are established between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur. The third aim seeks to improve health and quality of life, where possible, through the pro-active management of noise, whilst also taking account of the guiding principles of sustainable development.
- 8.2.14 DEFRA have led a study to identify the SOAEL and LOAEL for a limited range of noise sources. The study was understood to have ended in 2012. However, no guidance from this research has been issued at the time of writing (February 2022).

Reading Borough Local Plan (2019)

- 8.2.15 Reading Borough Council gives information on the planning criteria to be achieved with any development regarding any 'noisy plant' which is to be installed within their policy, 'General Policies – Built and Natural Environment'. The following information is provided within the Council's Local Plan:

'EN:17 NOISE GENERATING EQUIPMENT

Where noise generating equipment is proposed, the noise source specific⁶¹ level (plant noise level) should be at least 10 dBA below the existing background level as measured at the nearest noise sensitive receptor.

⁶¹ The noise specific level is the measured noise level, as opposed to the rating level, which is the specific level with correction factors included.'

- 8.2.16 Given the above information, it is understood that to comply with Reading Borough Council's criteria, the proposed plant should not be at least 10 dBA below the background noise level at 1 m away from the nearest noise sensitive receptor.
- 8.2.17 Reading Borough Council Local Plan (Adopted November 2019) does not have any specific criteria for noise ingress.

Guidance

- 8.2.18 The following guidance is relevant to the Proposed Development:

- British Standard BS 8233 Sound insulation and noise reduction for buildings (British Standards Institute, 2014);
- World Health Organisation Guidelines for Community Noise (WHO, 1999);

- ProPG Planning & Noise (Professional Practice Guidance on Planning & Noise), New Residential Development (ANC, IOA, CIEH, 2017);
- The Association of Noise Consultants - Acoustics Ventilation and Overheating, Residential Design Guide (ANC, 2020);
- British Standard BS 4142 + A1 Methods for rating and assessing industrial and commercial sound (British Standards Institute, 2014, 2019);
- British Standard BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings Part 1: Vibration Sources Other Than Blasting (British Standards Institute, 2008);
- The Association of Noise Consultants - Guidelines 'Measurement and assessment of ground-borne noise and vibration (ANC, 2020);
- British Standard BS 5228-1 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise (British Standards Institute, 2009);
- British Standard BS 5228-2 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration (British Standards Institute, 2009);
- Update of Noise Database for Prediction of Noise on Construction and Open Sites (DEFRA, 2005);
- Institute of Acoustics ('IOA') and Institute of Environmental Management and Assessment ('IEMA') 'Guidelines for Environmental Noise Impact Assessment (IOA, IEMA, 2014);
- Calculation of Road Traffic Noise (CRTN), (Department of Transport, 1988);
- Calculation of Railway Noise (CRN), (Department of Transport, 1995)
- Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 LA 111 (Highways England, 2020);
- Extrium Noise and air Quality Strategic Noise Map (Defra, 2019)
- Institute of Acoustic's (IoA) Good Practice Guide on the Control of Noise from Pubs and Clubs (IOA, 2001).

8.3 Consultation

8.3.1 In general, the Scoping Opinion received from RBC did not include any specific comments relating to noise and vibration that need to be addressed within this chapter.

8.3.2 The EHO opinion included the following statement:

'The Council's Environmental Health Officer raises no objections to the scope of the ES at this stage from this perspective. Accordingly, the scope within the Stantec report in respect of Section 8 (Noise and Vibration) (but please separately consider the Network Rail response above) and Section 9 (Air Quality) are agreed from an Environmental Protection perspective.'

8.3.3 The Network Rail comments relating to noise are as follows:

The current level of railway usage may be subject to change at any time without prior notification including increased frequency of trains, night time train running and heavy freight trains. There is also the potential for maintenance works to be carried out on trains, which is

undertaken at night and means leaving the trains' motors running which can lead to increased levels of noise.

- 8.3.4 Regarding potential future changes, it is considered impractical to design to increased levels of noise where changes to the network have not been confirmed to date. The environmental noise survey included monitoring of railway noise over a five day period which would be expected to include a reasonable sample of any freight events. Using this data, and data provided by Defra which uses the CRN method (Department of Transport, 1995), outline sound insulation requirements were developed to control average and night-time maximum events.
- 8.3.5 To date, there are no known significant changes to the train timetable which could be used to evaluate increased levels. A 20% increase in rail events would be required to result in a 1 dB change in noise levels and given the high usage of the railway lines currently, this is considered unlikely.
- 8.3.6 During the RMA/detailed application of each block/building, the timetables for the trains will be reviewed to ensure that corrections are made for changes in railway noise levels. Communication with Network Rail would be required to establish any potential changes in night time servicing or other events that could cause an increase in night time maximum noise events an evaluate. Additional survey work could be done if deemed necessary at the time of detailed application.
- 8.3.7 The internal noise limits established for the development are expected to be conditioned and this would ensure that future changes in noise are accounted for in future assessments.

8.4 Methodology

Study Area

- 8.4.1 The study area is illustrated in **Figure 8.1** (the 'Noise and Vibration Study Area'). Specifically, the scope of the assessment includes the receptors identified in **Table 8.15** (See **Section 8.5**), the Site and the relevant cumulative schemes which are set out within **Appendix A.6**.
- 8.4.2 The study area for demolition and construction noise and vibration effects includes the Site and nearest receptors which extend approximately 200 m from the Site boundary, in accordance with guidance contained in BS 5228-1 (British Standards Institute, 2009). Beyond this distance, noise levels from typical construction activities are unlikely to give rise to significant effects.
- 8.4.3 For the assessment of the suitability of the Site for its intended end-use, the study area was the Site and noise sources which were considered to influence this area.

Baseline Data Collection

- 8.4.4 An environmental noise and vibration survey was conducted between 10th September 2021 and 15th September 2021 to establish the baseline conditions of the Site and at key receptor locations surrounding the Site (see section **Receptors and Receptor Sensitivity: Paragraph 8.4.47** of this ES chapter).
- 8.4.5 It is noted that the dominant noise sources are road traffic and railway noise. At the time of the survey road traffic flows across the country were reported to be around 90-100% of the pre-pandemic levels, which is not a significant enough reduction to affect the noise measurements. On this basis the baseline condition measurements are considered to be representative of the typical conditions at the Site.

- 8.4.6 As part of implementing the Environmental Noise Directive, Defra published strategic maps of noise from major road and rail sources in 2019. These have been used to supplement the environmental survey data for rail noise levels, which will vary at upper storeys due to screening effects from the tracks further from the Site, which run on a viaduct.
- 8.4.7 The receptor locations, as illustrated in **Figure 8.3** are the closest to the Site and are worst-case. Where significant effects are identified at the initial receptor locations, then receptors located at further distances from the Site are included for assessment, i.e. the geographic extent of significant effects is established.
- 8.4.8 The survey results have also been used to assess the suitability of the Site for residential use and set limiting noise emission criteria for sources associated with the Proposed Development, i.e. new building services, plant and systems.
- 8.4.9 There is potential for vibration and vibration induced structure borne noise as the Site is located 24 m from the nearest railway line. Vibration measurements were conducted to establish vibration levels resulting from the passage of trains on the overground lines adjacent to the Site.

Survey Methodologies

- 8.4.10 The noise surveys have been undertaken in line with the guidance contained in BS 7445 (British Standards Institute, 2003) and BS 4142 (British Standards Institute, 2014, 2019).
- 8.4.11 The vibration survey has been undertaken in line with the guidance contained in BS 6472-1 (British Standards Institute, 2008) and BS 7385-2 (British Standards Institute, 1993).

Noise Logging Survey (Unattended)

- 8.4.12 A continuous noise survey was undertaken at two positions to determine the existing ambient and background noise levels across the Site. The long-term unattended noise monitoring location is shown in **Figure 8.2** denoted by the letter 'L'. Measurements were conducted between 10th September and 15th September 2021.
- 8.4.13 The dominant noise source identified during the baseline survey was road traffic, predominately from Forbury Road, and the passage of trains along the railway tracks at the northern perimeter, leading to and from Reading Station.
- 8.4.14 A summary of the long-term environmental noise results is provided within the 'Baseline Conditions' section of this ES Chapter. Full details of the methodology and results of the environmental noise surveys are presented in **Appendix H.3: Environmental Noise Survey Report**.

Noise Logging Survey (Attended)

- 8.4.15 A daytime sample noise survey was undertaken in order to assist in the calibration of the environmental noise model and to account for noise emissions from Forbury Road. The sample measurement locations are indicated in Figure 8.2, denoted by the numbers 1-3.
- 8.4.16 A summary of the sample noise measurements is provided within the 'Baseline Conditions' section of this ES Chapter. Full details of the methodology and results of the environmental noise surveys are presented in **Appendix H.3: Environmental Noise Survey Report**.

Vibration Logging Survey (Attended)

- 8.4.17 Vibration measurements were taken at the Site in one location in order to determine the vibration levels resulting from the passage of trains on the railway tracks running adjacent to

the northern perimeter of the Site. The vibration measurement location is indicated in **Figure 8.2**, denoted by the letter “V”.

Traffic Data

- 8.4.18 In respect to road traffic, a minor reduction from the existing levels of traffic flow is expected to reduce (as identified in the **Transport Assessment**, submitted as part of the outline application) and would not change the road traffic noise levels measured. Therefore, future scenarios have been scoped out of this assessment.

Assessment

- 8.4.19 This section presents the methodology used to assess each type of noise and vibration impact, in terms of the application of relevant standards and guidance, along with the types of data and analyses carried out.
- 8.4.20 As well as the suitability of the Site for use as a residential scheme, the assessment considers the following:
- Construction noise - airborne noise from machinery and the works themselves;
 - Construction vibration - ground-borne vibration from machinery and the works themselves;
 - Completed Proposed Development building services noise;
 - Completed Proposed Development noise; and
 - Completed Proposed Development non-residential Operational Noise Emissions.
- 8.4.21 The noise levels presented in this ES chapter are the maximum predicted at each building (receptor) identified from the modelling of the Proposed Development. The predicted noise levels presented are those calculated at a distance of 1 m from the receptor building façade and also accounts for reflections from the building façade.

Demolition and Construction

Works Noise

- 8.4.22 The demolition and construction programme is anticipated to be undertaken over the course of approximately 7.5 years. The noise and vibration assessment has been undertaken in line with the details of the proposed programme and demolition and construction works as set out in **Chapter 4: Demolition and Construction**.
- 8.4.23 Noise egress has been calculated based on the methodology outlined in BS 5228-1 (British Standards Institute, 2009). Where specific sound power levels have not been provided, reference has been made to the operational noise levels for various items of plant that are included within this standard. The operational plant noise levels have been used to determine a representative equivalent continuous sound level (LAeq) associated with each stage of the construction programme. The construction plant noise assumptions are set out in **Appendix H.4: Construction Plant Assumptions**.
- 8.4.24 A 3D noise model has been created to determine the predicted noise level associated with the demolition and construction works at the surrounding noise sensitive receptors. This has been done using CadnaA v2023 which is an industry standard environmental noise modelling software package.

- 8.4.25 Noise levels associated with the demolition and construction of the Proposed Development have been predicted at each of the noise sensitive receptors and these levels have been compared with the guidelines highlighted in BS 5228-1 (British Standards Institute, 2009), to determine the magnitude of impact. This has been referenced against the sensitivity of each receptor to determine the scale of effect.

Vibration

- 8.4.26 The assessment of demolition and construction vibration effects has considered absolute levels experienced within adjacent buildings in general accordance with BS 5228-2 (British Standards Institute, 2009).
- 8.4.27 Vibration levels have been predicted at each of the nearby sensitive receptors using historical data and the methodology provided in BS 5228-2 (British Standards Institute, 2009).
- 8.4.28 Predictions of vibration levels at the receptors have been made in terms of the Peak Particle Velocity ('PPV') experienced within the working day and during the piling operations at the Site (i.e. the most vibratory activity).

Completed Development

Building Services (Plant) Noise and Commercial Noise

- 8.4.29 Reading Borough Council gives information on the planning criteria to be achieved with any development regarding any 'noisy plant' which is to be installed within their policy, 'General Policies – Built and Natural Environment'. The following information is provided within the Council's Local Plan (Reading Council, 2019):

'EN:17 NOISE GENERATING EQUIPMENT

Where noise generating equipment is proposed, the noise source specific⁶¹ level (plant noise level) should be at least 10 dBA below the existing background level as measured at the nearest noise sensitive receptor.

⁶¹ The noise specific level is the measured noise level, as opposed to the rating level, which is the specific level with correction factors included.'

- 8.4.30 Given the above information, it is understood that to comply with Reading Borough Council's criteria, the proposed plant should be at least 10 dBA below the background noise level at 1 m away from the nearest noise sensitive receptor.

Operational Noise Generated by Non-Residential Spaces

- 8.4.31 The western podium building at the ground floor West Block 2 and West Block 3, as well as the ground floor of Central Block 3, Central Block 4 and East Block 4 is proposed for Class E use.
- 8.4.32 The assessment of amplified noise breakout from the use of internal spaces associated with the Proposed Development makes reference to Institute of Acoustic's (IoA) Good Practice Guide on the Control of Noise from Pubs and Clubs (IOA, 2001), and separate articles published within IoA Acoustics Bulletin Nov/Dec 2003.

Site Suitability (Residential Dwellings)

- 8.4.33 The assessment of the suitability of the Site for residential consists of the following:
- Noise measurements completed on-site;

- Operational Noise Generated by Non-Residential Spaces; and
- Computer modelling of the Proposed Development.
- Computer modelling (CadnaA v2023) has been completed to evaluate the sound pressure levels incident on each of the proposed façades.

Limitations and assumptions

- 8.4.34 The noise levels presented in this ES Chapter are the maximum predicted at each building (receptor) identified from the modelling of the Proposed Development. The predicted noise levels presented are those calculated at a distance of 1 m from the receptor building façade and also accounts for reflections from the building façade.

Baseline Noise Measurements

- 8.4.35 The surveys may have been affected by the government imposed restrictions to control the spread of Covid-19. Nevertheless, in line with the Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments issued by the Institute of Acoustics ('IOA') and Association of Noise Consultants ('ANC'), noise and vibration surveys were completed. It is noted that unusually lower noise levels would represent a worst-case assessment, as most of the noise emission assessments are based on changes to the existing baseline conditions.
- 8.4.36 The environmental noise sources were road and rail traffic, which during the survey were largely unaffected by the restrictions, i.e. traffic flows reported to be approximately 90% (less than 1 dB and a negligible difference) of pre-Covid restrictions. The rail noise data has been supplemented using the Extrium database (Defra, 2019) which uses the CRN method based on data from 2012. On this basis, no corrections have been applied to the data.

Demolition and Construction Works

- 8.4.37 It is assumed that trade contractors will comply with all legislation relevant to the control of noise and vibration from construction works including:
- Control of Pollution Act (UK Public General Acts, 1974) with particular reference to part III;
 - Environmental Protection Act (UK Public General Acts, 1990);
 - The Control of Noise at Work Regulations (Health and Safety Executive, 2005); and
 - The Health and Safety at Work Act (UK Public General Acts, 1974).
- 8.4.38 The eventually selected equipment used during the demolition and construction stage and the precise demolition and construction methodology would be dependent on the main contractor selected for the work. Conservative assumptions have therefore been made with regards to operations and activities, and the associated plant and equipment to be used. As such, the predicted demolition and construction noise and vibration levels represent an upper estimate of noise and vibration emissions from the Site during the works.
- 8.4.39 The emphasis of the demolition and construction assessment focuses on the noisiest phases of work, which are likely to arise from the use of plant, (eg piling rigs during the piling works). Consequently, this presents the worst case and highest levels of noise and vibration.
- 8.4.40 For the purposes of this assessment, predictions have been generally made for the following:
- Demolition and construction plant being located at ground level.

- Piling rigs will be positioned at the perimeters closest to the nearest high noise sensitive receptor; and
- The types of plant and operating on/off times are as set out in Appendix H.4 Construction Plant Assumptions.

Completed Development

Operational Traffic

- 8.4.41 For traffic data, the maximum traffic data (development fully occupied) has been assessed, as this scenario generates the highest vehicle movements, and is therefore the worst case scenario in terms of noise.

Non-Residential Spaces – Amplified Music

- 8.4.42 The outline application proposes a flexible use class (E) for the non-residential elements of the Proposed Development to enable sufficient flexibility to respond to local needs at the time of delivery. To assess noise generated by this aspect of the Proposed Development, assumptions have been made by adopting the 'worst-case' approach of all units operating as gyms. A reasonably high average internal noise level of up to L_{Aeq} 90 dB, associated with amplified music, has been assumed.
- 8.4.43 The facades of the Class E units are assumed to provide a minimum sound insulation of $R'w + C_{tr}$ 35 dB. This is a reasonably high level of facade sound insulation, but not impractical.
- 8.4.44 All spaces can be operational at the same time and during the daytime (07:00 and 23:00). The purpose of the assessments contained herein is to demonstrate that high internal noise levels can be generated within the Proposed Development, without resulting in significant effects.

Site Suitability

- 8.4.45 The Site Suitability assessment will be limited to the High sensitivity uses (i.e. residential) only, on the basis that acceptable conditions will be achieved for less sensitive spaces if high sensitivity uses can be accommodated.

Methodology for Defining Effects

- 8.4.46 The scale and significance of an effect are derived from the magnitude of the impact and the sensitivity of the affected receptor.

Receptors and Receptor Sensitivity

- 8.4.47 **Table 8.1** summarises the sensitivity of various receptors, including use types relevant to the Proposed Development, and other uses for context, which is based on a professional experience and industry standards.

Table 8.1: Receptor Sensitivity

Sensitivity	Description
High	Residential properties
Medium	Schools, nursery, colleges, places of worship.
Low	Retail, industrial and commercial buildings.

- 8.4.48 Although there are other noise sensitive receptors located at greater distance, it is considered that controlling noise egress at the closest properties will result in acceptable noise levels at all other noise sensitive premises.
- 8.4.49 In any instances where the noise impact cannot be mitigated to an acceptable level at the nearest noise sensitive receptors, consideration will be given to the impact on receptors at greater separation distances.

Magnitude of Impact

Demolition and Construction - Works Noise

- 8.4.50 BS 5228 provides practical information on construction noise and vibration reduction measures and promotes a 'Best Practicable Means' approach to control noise and vibration. The calculation method provided in BS 5228 (British Standards Institute, 2009) is based on the number and types of equipment operating, their associated Sound Power Level (SWL), and the distance to receptors, together with the effects of any screening.
- 8.4.51 Magnitude of impact for construction plant noise are based on the 'ABC' methodology set out in BS 5228-1 (British Standards Institute, 2009), which aligns thresholds of significant construction noise with respect to the existing ambient noise levels. These thresholds are presented in **Table 8.2**. These levels are external noise levels measured at the facade of the building.

Table 8.2: Construction Works Noise Magnitude of Impact

Magnitude of Impact	Daytime Construction Noise Level
Very low	Lower than ambient $L_{Aeq,10hr}$ or greater than the ambient L_{Aeq} but less than $L_{Aeq,10hr}$ 65 dB.
Low	Greater than ambient $L_{Aeq,10hr}$ and between $L_{Aeq,10hr}$ 66-70 dB.
Medium	Greater than ambient $L_{Aeq,10hr}$ and between $L_{Aeq,10hr}$ 71-75 dB.
High	Greater than ambient $L_{Aeq,10hr}$ and greater than $L_{Aeq,10hr}$ 75 dB.

- 8.4.52 Demolition and construction activity will generally only take place during weekday daytime hours and Saturday mornings.
- 8.4.53 It is noted that while the 'ABC' method in BS 5228-1 (British Standards Institute, 2009) presents categories in terms of a 12-hour day that the assessments of construction noise herein are completed on a 10-hour day which is typical of most construction sites within most urban Local Authority restrictions.

Construction Traffic Noise

- 8.4.54 Significance criteria for assessing the traffic effects, operational and construction, are presented in **Table 8.3**. The criteria are based on the 'Guidelines for Noise Impact Assessment' (IOA, IEMA, 2014).

Table 8.3: Magnitude of Impact - Road Traffic Noise

Magnitude of Impact	Increase in Noise Level (dBA)	Description
Very low	<1.0	Noise increase is unlikely to be discernible
Low	1.0-2.9	A slight increase in noise levels may be perceived in affected buildings and outdoor recreational areas.
Medium	3.0-4.9	Increase in noise levels is likely to be noticeable in affected buildings and outdoor recreational areas.
High	>5.0	Increase in noise levels is likely to be clearly perceptible and could have a significant effect on the continued use of a building.

Construction Vibration

- 8.4.55 BS 5228-2 (British Standards Institute, 2009) provides guidance on the perception of vibration within occupied buildings. This provides a simple method of assessing annoyance associated with vibration.
- 8.4.56 **Table 8.4** details Peak Particle Velocity ('PPV') levels and their potential effect on humans and provides a semantic scale for description of construction vibration impacts on human receptors.

Table 8.4: Peak Particle Velocity (PPV) Levels – Impact on Humans (Annoyance)

Magnitude of Impact	Peak Particle Vibration Level	Description
Very low	<0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
Low	0.14 – 1.0 mm/s	Vibration might be just perceptible in residential environments.
Medium	1.0 – 10.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
High	>10.0 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

- 8.4.57 Levels of vibration required for cosmetic damage are far higher than those that would result in an unacceptable impact in terms of annoyance and as such are not presented or assessed in this assessment.

Completed Development - Building Services Plant Noise

- 8.4.58 Noise levels from building services plant associated with the Proposed Development will need to be controlled to ensure that they will not have an effect on nearby noise sensitive receptors relative to the background sound level. Criteria for the assessment are set in accordance with BS 4142 (British Standards Institute, 2014, 2019) and 'Guidelines for Noise Impact Assessment' (IOA, IEMA, 2014), as identified in **Table 8.5**.

Table 8.5: Magnitude of Impact – Building Services Plant Noise

Magnitude of Impact	Increase in Noise Level (dBA)	Description
Very low	<1.0	Noise increase is unlikely to be discernible.
Low	1.0-2.9	A slight increase in noise levels may be perceived in affected buildings and outdoor recreational areas.
Medium	3.0-4.9	Increase in noise levels is likely to be noticeable in affected buildings and outdoor recreational areas.
High	>5.0	Increase in noise levels is likely to be clearly perceptible and could have a significant effect on the continued use of a building.

Road Traffic Noise

- 8.4.59 The road traffic impact (on nearby noise sensitive receptors) can be categorised as noise associated with changes in road traffic movements on the roads around the Site, as a result of the Proposed Development.
- 8.4.60 Assessment of road traffic noise has been scoped out of this assessment, as a minor decrease in traffic flows between the existing and Proposed Developments has been predicted which will not result in any change from the existing noise levels.

Noise Associated with Gym Use

- 8.4.61 The magnitude of impact for the assessment of amplified music noise emissions associated with the use of the Class E units are presented in **Table 8.6**. These are based on the IOA guidance on noise from pubs and clubs (IOA, 2001), and separate articles published within IOA Acoustics Bulletin Nov/Dec 2003.

Table 8.6: Magnitude of Impact Rating for Assessing the Effects of Amplified Music

Magnitude of Impact	Increase in Noise Level (dBA)	Description
Very low	L _{Aeq} does not exceed the background L _{A90} level. L _{eq} does not exceed the background L ₉₀ level in any 1/3 octave band between 40 Hz and 160 Hz	Noise barely audible
Low	L _{Aeq} does not exceed the background L _{A90} level	Low frequency noise audible, but noise sources are not identifiable

Magnitude of Impact	Increase in Noise Level (dBA)	Description
Medium	L _{Aeq} does not exceed the background LA ₉₀ level by more than 5 dB	Noise generally audible
High	L _{Aeq} does not exceed the background LA ₉₀ level by more than 10 dB	Noise clearly audible

Defining the Effect

- 8.4.62 **Table 8.1** relates the scale of effects in relation to the sensitivity of the receptor and the magnitude of the impact, based on the 'Guidelines for Noise Impact Assessment' (IOA, IEMA, 2014).

Table 8.1: Scale of Effects

Sensitivity of Receptors	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible

Nature

- 8.4.63 All noise and vibration effects are considered either adverse or neutral. Whilst beneficial noise effects can occur, this assumes an improvement from the baseline environment and in practice is unlikely when a new development is being introduced to the local environment.
- 8.4.64 An 'adverse effect' is considered anything that can cause a change in behaviour, attitude or changes the character of a place in a negative manner.

Geographic Extent of Effect

- 8.4.65 The geographic extent of the effects has been categorised. At a spatial level, 'site' or 'local' effects are those affecting the Site and neighbouring receptors, while effects beyond the vicinity of the Site and its neighbours are at a 'district' level. Effects affecting London are at a 'regional' level, whilst those which affect different parts of the country, are considered being at a 'national' level.

Effect Duration and Direct and Indirect Effects

- 8.4.66 For the purposes of the assessment effects that are generated as a result of the demolition and construction works (i.e. those that last for this set period of time) are classed as 'temporary'. Effects that result from the completed and operational Proposed Development are classed as 'permanent' effects.
- 8.4.67 Noise and vibration effects are generally considered to be direct effects (i.e. resulting without any intervening factors).

Categorising Likely Significant Effects

- 8.4.68 **Table 8.2** categorises the likely scale of effect in context of what would be experienced by the identified sensitive receptors. This is based on the IOA / IEMA guidance and the Planning Practice Guidelines for Noise ('PPG').
- 8.4.69 **Table 8.2** also relates the scale of effect with where adverse effects on health and quality of life can be detected. This follows guidance in the Noise Policy Statement for England ('NPSE'), which introduces the terms Lowest Observed Adverse Effect Level ('LOAEL') and Significant Observed Adverse Effect Level ('SOAEL'). The LOAEL is the level which adverse effects on health and quality of life can be detected, with the SOAEL the level above which significant adverse effects on health and quality of life occur. Significant effects are those that are either Moderate Adverse or Major Adverse, as indicated in **Table 8.2**.

Table 8.2: Classification of Noise Effects Relative to LOAEL and SOAEL

Scale of Effect (Adverse)	Description of Effect	Exceeds SOAEL?	Exceeds LOAEL?	Acceptance
Major	Disruptive, causes a material change in behaviour and/or attitude. Potential for sleep disturbance. Quality of life diminished due to change in character of the area.	Yes	Yes	No
Moderate	Intrusive, noise can be heard and causes small changes in behaviour and/or attitude. Potential for non-awakening sleep disturbance. Affects the character of an area such that there is a perceived change in the quality of life.	Yes	Yes	Yes, for temporary sources, such as construction No, for operational phase
Minor	Non-intrusive, can be heard but does not cause any change in behaviour or attitude. Can slightly affect the character of an area but not such that there is a perceived change in the quality of life.	No	Yes	Yes
Negligible	No discernible effect on the receptor.	No	No	Yes

Site Suitability

- 8.4.70 Results from the noise and vibration baseline surveys have been used to assess the suitability of the Site for residential accommodation.
- 8.4.71 Suitability of internal noise levels are determined based on the recommendations made in BS 8233 (British Standards Institute, 2014), as listed in Table 8.3, and having access to external amenity spaces where noise levels do not exceed $L_{Aeq,16h}$ 55 dB during the daytime.

Table 8.3: Indoor Ambient Noise Level Criteria (BS8233)

	Daytime (07:00-23:00)	Night time (23:00-07:00)
Living room	$L_{Aeq,16h}$ 35 dB	N/A
Bedroom	$L_{Aeq,16h}$ 35 dB	$L_{Aeq,8h}$ 30 dB and L_{AFmax} 45 dB

8.4.72 Suitability of tactile vibration levels from train events are determined based on the recommendations in BS 6472-1 (British Standards Institute, 2008) in relation to human response to vibration, as shown in **Table 8.4**. It is important to note that people exhibit wide variations of vibration tolerance. Specific values are dependent upon social and cultural factors, psychological attitudes and expected degree of intrusion.

Table 8.4: BS 6472-1: 2008 tactile vibration assessment criteria – Vibration Dose Value (VDV)

VDV (m/s ^{1.75}) above which might result in various probabilities of adverse comment within residential buildings.			
Place	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential buildings 16 hr day	0.2 – 0.4	0.4 – 0.8	0.8 – 1.6
Residential building 8 hr night	0.1 – 0.2	0.2 – 0.4	0.4 – 0.8

8.4.73 There is currently no international or British Standard which provides guidance on assessing the impact of ground-borne noise from railways on the occupants of a building. The Association of Noise Consultant's guidelines on 'Measurement and assessment of ground-borne noise and vibration' (ANC, 2020) is generally used as the basis of assessments such as this. This document also provides discussion on the relevant research that has been carried out, and a summary of typically adopted criteria. The most relevant items cited in the document are set out below:

- The American Public Transit Association (APTA) guidelines recommend criteria of between 30 and 40 dB(A) depending on the density and type of residential properties. They do not define where within a building these apply, or the time response that should be used.
- The Federal Transit Administration (FTA) of the US Department of Transportation, recommends limits for maximum pass-by levels of 35 dB(A) for frequent events (more than 70 events per day) and 43 dB(A) for infrequent events.
- London Underground Limited has studied the relationship between ground-borne noise levels and complaint thresholds. This was used to define a complaint threshold of L_{Amax} 40 dB.
- The ANC guidelines also note that Local Authority guidelines for ground-borne noise were published in London and the Southeast, and state a limit of L_{AFmax} 35 dB.

8.4.74 In all the above examples, the time constant is not defined, with the exception of the Local Authority guidelines in London and the Southeast, which is defined as having a fast time weighting.

8.4.75 It should be noted that most of this research relates to residential accommodation and is aimed at providing good sleeping/resting conditions.

8.4.76 The ANC guidance also provides input on the typical difference between L_{AFmax} and L_{ASmax} , stating that the L_{AFmax} will be approximately 1 to 2 dB greater than the L_{ASmax} for rail systems using continuous welded rail and 3 to 4 dB greater for jointed rail.

8.5 Baseline Conditions

- 8.5.1 The noise climate around the Site is mainly dominated by road traffic and rail traffic.
- 8.5.2 **Figure 8.2** illustrates the measurement positions adopted. The position labelled 'L' was a long-term unattended position, with those labelled '1', '2' and '3' being daytime attended survey positions. Position 'V' was the location of the daytime attended train vibration survey.

Unattended Monitoring

- 8.5.3 Daytime and night time representative background and ambient noise levels are presented in **Table 8.5** and **Table 8.6** respectively. Analysis on the representative background noise levels is given in **Appendix H.3**.

Table 8.5: Representative Background Sound Level

Location	Measurement dates	Representative Background Sound Level - $L_{A90,15min}$ dB	
		Daytime (07:00-23:00)	Night time (23:00-07:00)
L	10/09/21 to 14/09/21	48	38

Table 8.6: Average Ambient Sound Level

Location	Measurement dates	Average Ambient Noise Level - L_{Aeq} dB	
		Daytime (07:00-23:00)	Night time (23:00-07:00)
L	10/09/21 to 14/09/21	54	51

Attended Monitoring

- 8.5.4 Daytime attended measurements were completed to supplement the long-term unattended noise survey. The noise levels measured during the survey are presented in **Table 8.7**.

Table 8.7: Noise Levels and Key Noise Sources from Attended Measurements

Position	Start time and date	Sound pressure level (dB)			Noise sources
		$L_{Aeq,15min}$	L_{AFmax}	$L_{A90,15min}$	
1	12.30	71	93	60	Busy road. Max was caused by truck carrying scaffolding
1	13.47	70	84	59	Busy road. Dominated by trucks
1	14.45	70	83	62	Busy road. Dominated by trucks
2	13.01	68	85	63	Road Noise. Max happens when trucks pass by. Cars accelerate from the roundabout.
2	14.07	68	86	63	Road Noise. Max happens when trucks pass by.

Position	Start time and date	Sound pressure level (dB)			Noise sources
		$L_{Aeq,15min}$	L_{AFmax}	$L_{A90,15min}$	
					Cars accelerate from the roundabout.
2	15.07	67	78	63	Road Noise. No trucks. Cars accelerate from the roundabout.
3	13.26	67	79	59	Busy road with cars and trucks. Distant construction.
3	14.26	66	77	57	Busy road with cars and trucks. Distant construction.
3	15.27	67	79	57	Busy road with cars and trucks. Distant construction.

Vibration

- 8.5.5 VDV_s measured at location V are presented in **Table 8.8**. The maximum VDV_s measured for each of the directions are highlighted in red.

Table 8.8: Vibration Dose Values (VDV_s) measured at location V

Event number	Start time (hh:mm)	Duration (mm:ss)	VDV (m/s ^{1.75})		
			X	Y	Z
1	12:03	01:09	0.002	0.001	0.003
2	12:05	00:34	0.002	0.002	0.005
3	12:11	00:31	0.001	0.001	0.003
4	12:20	01:00	0.001	0.001	0.003
5	12:30	00:39	0.001	0.001	0.003
6	12:33	01:17	0.002	0.001	0.004
7	12:38	00:24	0.002	0.002	0.004
8	12:51	00:27	0.002	0.001	0.003
9	13:00	00:53	0.003	0.001	0.001
10	13:03	00:14	0.003	0.003	0.003
11	13:11	01:48	0.004	0.003	0.005
12	13:15	00:23	0.003	0.002	0.003
13	13:20	00:14	0.003	0.002	0.003
14	13:27	00:43	0.003	0.002	0.003
15	13:32	00:42	0.003	0.004	0.006
16	13:38	01:02	0.005	0.001	0.004
17	13:42	00:26	0.002	0.001	0.003
18	13:59	00:17	0.001	0.002	0.003
19	14:03	01:42	0.003	0.001	0.005
20	14:21	00:31	0.002	0.001	0.003
21	14:28	00:19	0.001	0.001	0.002
22	14:38	00:28	0.001	0.001	0.003
23	14:52	00:54	0.002	0.002	0.003

[1] Measurements of RMS acceleration are presented in Appendix H.3.

The Site and Surrounding Area

- 8.5.6 The Site location in relation to its surroundings is shown in **Figure 8.3**. Currently the Site primarily comprises commercial units with associated carpark. On the southern boundary of the Site there is a fast-food restaurant.
- 8.5.7 The nearest major road is Forbury Road (A329), which leads to Kenavon Drive to the east of the roundabout. National rail lines serving Reading Station run across the northern perimeter of the Site and include the Elizabeth Line (Crossrail), Great Western and North Downs lines. The route is also used for freight.
- 8.5.8 The existing receptors assumed for the assessment are listed (with their sensitivity) in **Table 8.9**. These are also shown in **Figure 8.3**. The same receptors have been used for assessing the effects during the construction and operational phases.

Table 8.9: Existing receptors

Receptor	Type	Sensitivity
Thames Quarter	Residential	High
Luscinia View	Residential	High
Kenavon Drive	Residential	High
Abbot's Walk	Residential	High
Reading Gaol (HM Prison)	Commercial	Low
Forbury Road offices	Office	Low
St James Church	Place of Worship	Medium
Forbury Gardens Nursery	Nursery	Medium
Abbot's House offices	Office	Low
McDonalds & Retail units	Retail	Low
Napier Road offices	Office	Low

Future receptors

- 8.5.9 The Proposed Development will introduce residential and commercial uses. The residential units are considered as high sensitivity introduced receptors in terms of Site Suitability, as detailed in **Table 8.10** and shown in **Figure 8.4**. The commercial uses are low sensitivity.
- 8.5.10 The construction programme assumes that Phase 1 (West Blocks 1-4) will be finished and occupied before construction activities associated with Phase 2 (Central Blocks 1-4) are undertaken. Phase 1 and Phase 2 are assumed to be finished and occupied before construction activities are undertaken for Phase 3 (East Blocks 1-4). Consequentially for the purposes for a worst case scenario, Phase 1 and Phase 2 need to be considered as introduced, or baseline, receptors.

Table 8.10: Introduced Receptors

Receptor	Type(s)	Sensitivity
Phase 1 (West blocks 1-4)	Residential, Class E	High (residential) and Low (Class E)
Phase 2 (Central blocks 1-4)	Residential, Class E	High (residential) and Low (Class E)
Phase 3 (East blocks 1-4)	Residential	High (residential) and Low (Class E)

Baseline Evolution

- 8.5.11 In the absence of the Proposed Development, assuming the land uses within the Site are retained, the future noise baseline is expected to remain broadly the same as the existing, due to the negligible change in traffic flows around the Site.

8.6 Mitigation

Construction and demolition

Embedded mitigation measures

- 8.6.1 Effects during construction and demolition will be temporary. It is assumed that trade contractors will comply with all legislation relevant to the control of noise and vibration from construction works. Precise demolition and construction methodology would be dependent on the main contractor. This would be confirmed by submission of a DCEMP, to be agreed in writing with the Local Planning Authority.
- 8.6.2 The predictions of potential demolition, enabling and construction noise and vibration effects have assumed the following best practice construction measures:
- The adoption of a minimum 2.4 m high perimeter hoarding around the Site;
 - Construction plant that is compliant with the sound and vibration levels published within BS 5228 (British Standards Institute, 2009);
 - Stationary construction plant, such as concrete crushers, will be positioned behind screens and positioned away from sensitive receptors;
 - The use of hand-held tools, when used for a prolonged period, will be adequately screened.

Operational

Primary mitigation measures

- 8.6.3 Mitigation in the form of appropriate facade sound insulation to the Class E units (assumed to be of Gym use). For the purposes of this assessment, a sound insulation performance of $R_w + C_{tr}$ 35 dB has been assumed.

8.7 Assessment of Significant Likely Effects

Demolition and Construction Effects

Construction noise – on-site activities

- 8.7.1 The construction phases modelled, and the relevant receptors are summarised below (refer to **Chapter 4: Demolition and Construction** for anticipated construction programme detail):
- Enabling Works & Demolition: January 2023 – March 2025;
 - Phase 1 substructure and superstructure: March 2025 – September 2027;
 - Phase 2 substructure and superstructure: September 2027 – February 2030;
 - Phase 3 substructure and superstructure: February 2030 – July 2032.

The highest unmitigated construction noise levels and magnitude of impact for each stage of demolition and construction at each noise sensitive receptor are highlighted in **Table 8.11** (Demolition), **Table 8.12** (Phase 1), **Table 8.13** (Phase 2) and **Table 8.14** (Phase 3). These levels are based upon localised grouping of construction activities around the Site, and therefore these levels can be considered to be the reasonable worst-case scenario. Images from the modelling are provided in **Figure 8.5** to **Figure 8.11**.

Table 8.11: Predicted Demolition Noise Levels ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Demolition ($L_{Aeq,10h}$ dB)
Thames Quarter	High	61 (Very Low)
Luscinia View	High	50 (Very Low)
Kenavon Drive	High	77 (High)
Abbot's Walk	High	66 (Low)
Reading Gaol (HM Prison)	Low	71 (Medium)
Forbury Road offices	Low	78 (High)
St. James Church	Medium	78 (High)
Forbury Gardens Nursery	Medium	74 (Medium)
Abbot's House offices	Low	64 (Very Low)
McDonalds & Retail units	Low	69 (Low)
Napier Road offices	Low	77 (High)

Table 8.12: Predicted Construction Noise Levels – Phase 1 ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Substructure ($L_{Aeq,10h}$ dB)	Superstructure ($L_{Aeq,10h}$ dB)
Thames Quarter	High	54 (Very Low)	50 (Very Low)
Luscinia View	High	55 (Very Low)	48 (Very Low)
Kenavon Drive	High	62 (Very Low)	57 (Very Low)
Abbot's Walk	High	51 (Very Low)	43 (Very Low)
Reading Gaol (HM Prison)	Low	66 (Very Low)	60 (Very Low)
Forbury Road offices	Low	73 (Medium)	67 (Very Low)
St. James Church	Medium	74 (Medium)	67 (Very Low)
Forbury Gardens Nursery	Medium	68 (Low)	62 (Very Low)
Abbot's House offices	Low	55 (Very Low)	51 (Very Low)
McDonalds & Retail units	Low	60 (Very Low)	55 (Very Low)
Napier Road offices	Low	54 (Very Low)	48 (Very Low)

Table 8.13: Predicted Construction Noise Levels – Phase 2 ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Substructure ($L_{Aeq,10h}$ dB)	Superstructure ($L_{Aeq,10h}$ dB)
Thames Quarter	High	33 (Very Low)	30 (Very Low)
Luscinia View	High	55 (Very Low)	49 (Very Low)

Receptor	Sensitivity	Substructure ($L_{Aeq,10h}$ dB)	Superstructure ($L_{Aeq,10h}$ dB)
Kenavon Drive	High	68 (Very Low)	63 (Very Low)
Abbot's Walk	High	54 (Very Low)	49 (Very Low)
Reading Gaol (HM Prison)	Low	67 (Low)	60 (Very Low)
Forbury Road offices	Low	47 (Very Low)	46 (Very Low)
St. James Church	Medium	67 (Very Low)	61 (Very Low)
Forbury Gardens Nursery	Medium	62 (Very Low)	57 (Very Low)
Abbot's House offices	Low	58 (Very Low)	53 (Very Low)
McDonalds & Retail units	Low	54 (Very Low)	49 (Very Low)
Napier Road offices	Low	52 (Very Low)	48 (Very Low)
Phase 1	High	74 (Medium)	69 (Low)

Table 8.14: Predicted Construction Noise Levels – Phase 3 ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Substructure ($L_{Aeq,10h}$ dB)	Superstructure ($L_{Aeq,10h}$ dB)
Thames Quarter	High	34 (Very Low)	29 (Very Low)
Luscinia View	High	57 (Very Low)	52 (Very Low)
Kenavon Drive	High	73 (Medium)	67 (Very Low)
Abbot's Walk	High	49 (Very Low)	47 (Very Low)
Reading Gaol (HM Prison)	Low	61 (Very Low)	53 (Very Low)
Forbury Road offices	Low	38 (Very Low)	33 (Very Low)
St. James Church	Medium	42 (Very Low)	39 (Very Low)
Forbury Gardens Nursery	Medium	52 (Very Low)	48 (Very Low)
Abbot's House offices	Low	54 (Very Low)	45 (Very Low)
McDonalds & Retail units	Low	63 (Very Low)	56 (Very Low)
Napier Road offices	Low	55 (Very Low)	50 (Very Low)
Phase 1	High	61 (Very Low)	53 (Very Low)
Phase 2	High	73 (Medium)	68 (Low)

8.7.2 The impact of demolition and construction noise activity has been determined based on the magnitude of impact classifications provided in **Table 8.2**, Sensitivity of the Receptors provided in **Table 8.9** and detailed further in **Table 8.10**.

8.7.3 Based on the magnitude of impacts and sensitivity of receptors, the scale of effect on each receptor has been identified within **Table 8.15** (Demolition), **Table 8.16** (Phase 1), **Table 8.17** (Phase 2) and **Table 8.18** (Phase 3).

Table 8.15: Predicted Demolition Noise Likely Effects ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Demolition
Thames Quarter	High	Negligible (Not Significant)
Luscinia View	High	Negligible (Not Significant)
Kenavon Drive	High	Major Adverse (Significant)

Receptor	Sensitivity	Demolition
Abbot's Walk	High	Minor Adverse (Not Significant)
Reading Gaol (HM Prison)	Low	Negligible (Not Significant)
Forbury Road offices	Low	Minor Adverse (Not Significant)
St. James Church	Medium	Moderate Adverse (Significant)
Forbury Gardens Nursery	Medium	Minor Adverse (Not Significant)
Abbot's House offices	Low	Negligible (Not Significant)
McDonalds & Retail units	Low	Negligible (Not Significant)
Napier Road offices	Low	Minor Adverse (Not Significant)

Table 8.16: Predicted Construction Noise Likely Effects – Phase 1 ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Substructure	Superstructure
Thames Quarter	High	Negligible (Not Significant)	Negligible (Not Significant)
Luscinia View	High	Negligible (Not Significant)	Negligible (Not Significant)
Kenavon Drive	High	Negligible (Not Significant)	Negligible (Not Significant)
Abbot's Walk	High	Negligible (Not Significant)	Negligible (Not Significant)
Reading Gaol (HM Prison)	High	Negligible (Not Significant)	Negligible (Not Significant)
Forbury Road offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
St. James Church	Medium	Minor Adverse (Not Significant)	Negligible (Not Significant)
Forbury Gardens Nursery	Medium	Negligible (Not Significant)	Negligible (Not Significant)
Abbot's House offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
McDonalds & Retail units	Low	Negligible (Not Significant)	Negligible (Not Significant)
Napier Road offices	Low	Negligible (Not Significant)	Negligible (Not Significant)

Table 8.17: Predicted Construction Noise Likely Effects – Phase 2 ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Substructure	Superstructure
Thames Quarter	High	Negligible (Not Significant)	Negligible (Not Significant)
Luscinia View	High	Negligible (Not Significant)	Negligible (Not Significant)
Kenavon Drive	High	Negligible (Not Significant)	Negligible (Not Significant)
Abbot's Walk	High	Negligible (Not Significant)	Negligible (Not Significant)

Receptor	Sensitivity	Substructure	Superstructure
Reading Gaol (HM Prison)	High	Minor Adverse (Not Significant)	Negligible (Not Significant)
Forbury Road offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
St. James Church	Medium	Negligible (Not Significant)	Negligible (Not Significant)
Forbury Gardens Nursery	Medium	Negligible (Not Significant)	Negligible (Not Significant)
Abbot's House offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
McDonalds & Retail units	Low	Negligible (Not Significant)	Negligible (Not Significant)
Napier Road offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
Phase 1	High	Moderate Adverse (Significant)	Minor Adverse (Not Significant)

Table 8.18: Predicted Construction Noise Likely Effects – Phase 3 ($L_{Aeq,10h}$ dB)

Receptor	Sensitivity	Substructure	Superstructure
Thames Quarter	High	Negligible (Not Significant)	Negligible (Not Significant)
Luscinia View	High	Negligible (Not Significant)	Negligible (Not Significant)
Kenavon Drive	High	Moderate Adverse (Significant)	Negligible (Not Significant)
Abbot's Walk	High	Negligible (Not Significant)	Negligible (Not Significant)
Reading Gaol (HM Prison)	High	Negligible (Not Significant)	Negligible (Not Significant)
Forbury Road offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
St. James Church	Medium	Negligible (Not Significant)	Negligible (Not Significant)
Forbury Gardens Nursery	Medium	Negligible (Not Significant)	Negligible (Not Significant)
Abbot's House offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
McDonalds & Retail units	Low	Negligible (Not Significant)	Negligible (Not Significant)
Napier Road offices	Low	Negligible (Not Significant)	Negligible (Not Significant)
Phase 1	High	Negligible (Not Significant)	Negligible Adverse (Not Significant)
Phase 2	High	Moderate Adverse (Significant)	Minor Adverse (Not Significant)

8.7.4 The results presented above show that the likely temporary effects during the demolition and construction works will be **Major Adverse** (significant) at the Kenavon Drive residences during the demolition phase only.

8.7.5 Likely temporary effects during the period of demolition and construction works will be **Moderate Adverse** (significant) at the following receptors:

- St. James Church (demolition);
- Kenavon Drive residences (construction of Phase 3);
- Phase 1 (construction of Phase 2); and
- Phase 2 (construction of Phase 3).

8.7.6 Likely temporary effects during the period of demolition and construction works for all other receptors and periods are either **Negligible** (not significant) or **Minor Adverse** (not significant).

8.7.7 The predictions are based on reasonable worst-case assumptions in terms of plant/activity locations relative to the receptors, so there will be extended periods in the demolition works when the noise levels will be inherently lower than those predicted.

Construction Vibration

8.7.8 BS 5228 (British Standards Institute, 2009) indicates that construction activities (particularly piling) generally only generate vibration impacts when they are located less than 20 m from sensitive locations. The magnitude of impact depends on the type of piling, ground conditions, and receptor distance.

8.7.9 Whilst it is therefore not possible to accurately estimate the level of vibration with certainty, it is proposed that limits are placed on the vibration at sensitive buildings (receptors) and therefore vibration levels will need to be monitored during construction at the sensitive locations. The guidance within BS 5228-2 states that vibration PPV levels are tolerable within residential properties when they do not exceed 1.0 mm/s and prior warning of potential vibration inducing works is given to building occupants.

8.7.10 Annex C and D of the guidance within BS 5228-2 provide summaries of case histories of vibration measured during piling operations. The examples presented within BS 5228-2 suggest that the potential vibration levels are unlikely to impact any buildings outside of the Proposed Development Site, and that at reasonable distances from the location of the works the estimated vibration levels would be expected to be substantially lower than the vibration levels stated above due to geometric propagation attenuation. In addition, any effect identified will be temporary.

8.7.11 Considering the receptors identified within the surrounding area, the following assessment is made, taking into account the receptor's distance from the piling locations (typically perimeter of building).

8.7.12 Receptors located between 20 to 100 m of piling activities:

- The Kenavon Drive residences are the only residential receptors within 20 m to 100 m from piling activities;
- The proposed piling positions are expected to be at levels at or below 1 mm/s, which corresponds with a low magnitude of impact.
- The effects on these are assessed to be Minor Adverse (Not Significant).
- The effects at non-residential receptors within this distance range are assessed to be Negligible (not significant).

8.7.13 Receptors that are within 20 m of piling activities:

- The proposed piling positions are expected to be at levels of between 1mm/s - 3mm/s, which correspond to a medium magnitude of impact.
- The effects on receptors located at Phase 1 and Phase 2 during the piling of the subsequent phases upon occupation of the preceding phase are assessed to be **Moderate Adverse** (Significant).

Operational Effects

Building services plant and commercial noise

8.7.14 On the basis of the baseline background noise levels, the total noise from building services plant and commercial noise will be limited (by an appropriately worded planning condition) in line with the noise levels details in at a position 1 m from the existing façades.

8.7.15 Limits have been determined for the closest receptors on the basis that the control of noise emissions from building services plant at these receptors will inherently result in lower noise levels at receptors further away. These are provided in **Table 8.19**.

8.7.16 Representative background noise levels are presented as free-field levels, whereas building

Table 8.19: Building Services Plant Noise Emission Limits

Receptor	Building Services Noise Limits (dB)		Background Noise Level (dB)		Increase in Background Noise Level	Sensitivity	Magnitude of Impact	Scale of Effect and Significance
	Day 0700 - 2300	Night 2300 - 0700	Day 0700 - 2300	Night 2300 - 0700				
Thames Quarter	41	31	48	38	<1.0	High	Very Low	Negligible (Not significant)
Luscinia View	41	31	48	38	<1.0	High	Very Low	Negligible (Not significant)
Kenavon Drive	41	31	48	38	<1.0	High	Very Low	Negligible (Not significant)
Abbot's Walk	41	31	48	38	<1.0	High	Very Low	Negligible (Not significant)
Reading Gaol (HM Prison)	41	31	48	38	<1.0	Low	Very Low	Negligible (Not significant)
Forbury Road offices	41	31	48	38	<1.0	Low	Very Low	Negligible (Not significant)
St. James Church	41	31	48	38	<1.0	Medium	Very Low	Negligible (Not significant)

Receptor	Building Services Noise Limits (dB)		Background Noise Level (dB)		Increase in Background Noise Level	Sensitivity	Magnitude of Impact	Scale of Effect and Significance
	Day 0700 - 2300	Night 2300 - 0700	Day 0700 - 2300	Night 2300 - 0700				
Forbury Gardens Nursery	41	31	48	38	<1.0	Medium	Very Low	Negligible (Not significant)
Abbot's House offices	41	31	48	38	<1.0	Low	Very Low	Negligible (Not significant)
McDonalds & Retail units	41	31	48	38	<1.0	Low	Very Low	Negligible (Not significant)
Napier Road offices	41	31	48	38	<1.0	Low	Very Low	Negligible (Not significant)

8.7.17 The building services plant strategy and the operation of the commercial premises would need to be developed to ensure that the limits detailed in **Table 8.19** are achieved.

8.7.18 It has been assumed that the building services plant would operate in accordance with the manufacturer's instructions and would not result in any noise which is tonal, impulsive or distinctive in nature. Should the noise exhibit any such acoustic features then the relevant 'penalty' / correction should be applied in accordance with BS 4142 (British Standards Institute, 2014, 2019) to ensure that the resultant rating level falls within the limit levels identified in **Table 8.19**.

8.7.19 An important aspect of the BS 4142 assessment method is that sound sources should be considered in the context of the residual noise environment. Therefore, once the details of building services plant are confirmed as part of the detailed design process for the Proposed Development, appropriate design and mitigation measures can be identified in the context of BS 4142, accounting for the proposed noise sources.

8.7.20 As the building services plant would be expected to be designed to achieve the recommended limits shown, in accordance the Reading Local Plan (Reading Council, 2019), it is expected that the magnitude of impact will be Very Low and the effect will be Negligible (not significant).

Amplified noise associated with gym use

8.7.21 The ground level Class E units may include amplified music/sound. As a worst-case approach to maximise flexibility of use, predictions have been based on the assumption that all units will be operating as gyms with high internal noise levels. In practice the cumulative noise emitted from all units will be substantially lower. This approach has been taken to assess the potential effect of amplified noise from these units to the nearby existing noise sensitive receptors.

8.7.22 The assessment has been performed assuming amplified music/sound within all the spaces simultaneously (as a worst-case). In practice, it is considered highly unlikely that this scenario would ever occur. This noise level is assumed to all units during daytime (0700-2300) only.

8.7.23 The following has been assumed:

- mechanical ventilation will be provided to the commercial units, so that the façade will remain closed.
- doors will remain closed, and other measures will be introduced as part of the fit-out to minimise noise transmission via entrances.
- façade transmission will be the main noise transfer path (i.e. via glazing provided as part of the shell and core works).

8.7.24 A glazing sound insulation performance of $R_w + C_{tr}$ 35 dB is assumed to the units. This corresponds to a reasonably high performance glazing specification, though similar performances to those required for the residential dwellings.

8.7.25 A summary of predicted noise level incidents upon the façades of the nearby noise sensitive receptors, due to amplified noise from the units, is provided in **Table 8.20**.

8.7.26 The noise levels presented are the maximum predicted at each building (receptor) identified in **Table 8.9**. **Table 8.20** also presents the receptor sensitivity, the magnitude of impact (on the basis of the baseline background noise levels) and the resultant scale and nature of noise effect.

Table 8.20: Predicted Amplified Music Noise Levels at Receptors

Receptor	Predicted Music Noise Level (LAeq dB)	Daytime Background Noise Level (LA90 dB)	Sensitivity	Magnitude of Impact	Scale and Nature of Effect and Significance
Thames Quarter	16	48	High	Very Low	Negligible (Not significant)
Luscinia View	13	48	High	Very Low	Negligible (Not significant)
Kenavon Drive	35	48	High	Very Low	Negligible (Not significant)
Abbot's Walk	23	48	High	Very Low	Negligible (Not significant)
Reading Gaol (HM Prison)	32	48	Low	Very Low	Negligible (Not significant)
Forbury Road offices	18	48	Low	Very Low	Negligible (Not significant)
St. James Church	32	48	Medium	Very Low	Negligible (Not significant)
Forbury Gardens Nursery	29	48	Medium	Very Low	Negligible (Not significant)
Abbot's House offices	21	48	Low	Very Low	Negligible (Not significant)
McDonalds & Retail units	25	48	Low	Very Low	Negligible (Not significant)
Napier Road offices	21	48	Low	Very Low	Negligible (Not significant)

- 8.7.27 **Figure 8.12** shows the corresponding noise contour plot of predicted noise levels due to amplified sound from ground floor units. The plot is presented at a grid height of 1.5 m above the existing ground level (approximate ear height).

On the basis that amplified music/sound generated from the commercial units will be managed to within reasonable levels for the proposed Class E use (considered L_{Aeq} 90 dB within this assessment) and that measures are implemented to minimise noise transfer via entrances, the significance of effects are predicted to be **Negligible** (not significant) effect at all receptors.

- 8.7.28 The noise incident on the facades of the Proposed Development is taken into account in the Site Suitability assessment.

8.8 Secondary Mitigation and Enhancement

Demolition and Construction Mitigation

- 8.8.1 Good industry standards, guidance and practice procedures (i.e., Considerate Contractors scheme) will be followed in order to minimise noise and vibration effects during demolition and construction. Noise and vibration will be managed to avoid and minimise significant impacts, and mitigation measures will be documented within a detailed Demolition and Construction Environmental Management Plan (DCEMP), which will take into account the relevant key guidance documents and comply with the Outline DCEMP. The DCEMP will be secured by an appropriately worded planning condition. **Paragraphs 8.8.2 to 8.8.9** document the mitigation measures not inherently included within assessments completed.

Mitigation of Demolition and Construction Noise

- 8.8.2 The underlying objective would be for the mitigation measures to be employed to ensure that potential noise impacts at nearby sensitive receptors, as a result of demolition and construction activities, are minimised.
- 8.8.3 The preferred approach for controlling demolition and construction noise is to reduce source levels where possible, but with due regard to practicality. The simplest and most effective method of reducing noise at nearby receptors is to ensure that noisy plant is located as far from receptors as practicable and screened using temporary barriers.
- 8.8.4 Noise experienced by receptors can also be reduced by limiting the daily time that noisy equipment is operated; however, it is acknowledged that sometimes a greater noise level may be acceptable if the duration of the activity, and therefore length of disruption, is reduced.
- 8.8.5 Noise shall be minimised by adopting Best Practicable Means (BPM) as standard working practices across the Site to ensure that noise is reduced whenever practicable. The following provisions are examples of BPM that, where practicable, could be adopted by the appointed Contractor during the demolition and construction programme:
- The production of a construction noise and vibration report that evaluates the construction activities and provides specific BPM to reduce noise and vibration;
 - Limiting high impact activities (e.g. piling) to specific times during the day, e.g. 1 hour on – 1 hour off, or 09:00-12:00 and 14:00-17:00;
 - Plant is to be properly maintained and operated in accordance with manufacturer's recommendations. Electrically powered plant is preferred, where practicable, to mechanically powered alternatives.

- All stationary plant to be located so that the noise effect at all occupied residential and commercial properties is minimised and, if practicable, every item of static plant when in operation is to be sound attenuated using methods based on the guidance and advice given in BS 5228;
 - Trade contractors would at all times apply the principle of BPM as defined in Section 72 of the Control of Pollution Act, (UK Public General Acts, 1974) and carry out all work in such a manner as to reduce any disturbance from noise and vibration to a minimum; and
 - The timing of building operations will be critical in avoiding noise and vibration nuisance to surrounding areas and premises. The contractor would identify particularly sensitive periods in the works so that the potential problems can be minimised and that early and good public relations with the adjacent occupants of buildings are maintained.
- 8.8.6 The assessment of potential construction noise and vibration impacts in this ES Chapter does not take account of the above BPM measures (i.e. the assessment is of unmitigated effects).
- 8.8.7 During the detailed working up of the construction programme and preparation of the detailed DCEMP, the BPM measures to mitigate potential noise impacts on nearby noise sensitive premises will be defined and agreed with the Local Authority. The detailed DCEMP will comply with the framework of mitigation measures detailed within the draft DCEMP, which supports the planning application, via a suitably worded condition attached to any planning permission. The primary method for the control of noise and vibration will be establishing a Section 61 agreement under the COPA.
- 8.8.8 It is expected that a Section 61 agreement under the COPA will contain appropriate noise limits at the nearby properties, with the reports highlighting when it is likely that the construction limits will be exceeded, so that construction activities can be effectively altered to mitigate.
- 8.8.9 In addition, a Section 61 agreement also sets out a dispensation and variation procedure under which consent can be applied for to carry out works which would potentially exceed the agreed noise and vibration limits or must occur at times when such work is otherwise not approved. Such dispensation/variations would be applied for where there are good engineering, safety or practical reasons for undertaking the works at these times. The selected contractor should adopt measures, including site supervision arrangements, to reduce noise to a minimum in accordance with BPM, as defined in Section 72 of the COPA.

Mitigation of Construction Vibration

- 8.8.10 Adverse effects are only likely to occur if piling activities are taking place in close proximity to sensitive receptors (i.e. assuming the worst case, less than 20 m distance). In reality, high vibration generating activities are unlikely to occur so close to sensitive receptors as detailed planning methodology (i.e. Piling Method Statement) and solutions will seek to further reduce the potential for adverse impacts, and if they do, they would be of short-term duration and appropriately monitored.
- 8.8.11 Furthermore, as detailed previously, the examples presented within BS 5228-2 (British Standards Institute, 2009) suggest that the potential vibration levels are unlikely to impact any buildings outside of the Proposed Development Site, and that at reasonable distances from the location of the works the estimated vibration levels would be expected to be substantially lower than the vibration levels stated above due to geometric propagation attenuation.
- 8.8.12 Given that there is potential for predicted impacts to be significant under the worst-case scenario, mitigation measures will be put in place to ensure that vibration effects are minimised as far as practicable through the use of an appropriate piling technique, design and methodology.

- 8.8.13 To reduce potential vibration impacts due to piling, the contractor shall use a piling technique that is least likely to cause adverse vibration impacts (e.g. auger piling), to ensure that the likely effect of vibration is reduced or avoided at nearby receptors.
- 8.8.14 A Piling Method Statement will also be provided and agreed prior to the commencement of these works. Vibration limits will be set in accordance with BS5228-2 to minimise the risk of complaints or building damage. These limits will be controlled through implementation of the DCEMP and vibration monitoring. The statement will also include vibration and noise monitoring and action levels.
- 8.8.15 It is considered that, with the appropriate and successful implementation of the mitigation proposed, the likely adverse effects predicted would reduce (for example, this assumes that no piling will occur within 5m of a high sensitivity receptor, and that should the piling methodology be able to prevent piling occurring within a 10-15 m radius of the receptor, it is considered that the likely effects can be reduced further). However, until the final piling strategy and detailed construction planning are identified, for the purpose of this assessment, it is concluded a worst-case effects of **Moderate Adverse** (significant). However, this effect would be temporary and last for less than 4% of the entire length of the construction programme.

Operational

Building service plant noise

- 8.8.16 Building services plant will be designed to achieve the recommended limits set out in **Table 8.19** (in accordance with BS 4142 (British Standards Institute, 2014, 2019)). As such, it is expected that the magnitude of impact will be Very Low and the effect will be **Negligible** (not significant). Typical measures to be considered to ensure that the building services noise criteria are achieved include low-noise equipment, in-duct attenuators and acoustic enclosures. This will be secured by an appropriately worded planning condition.

Likely effectiveness of additional mitigation measures

- 8.8.17 Through implementation of mitigation measures representing BPM, it is conservatively assumed that construction noise effects can be reduced by 5 dB.
- 8.8.18 It is important to note that these effects will only be experienced temporarily whilst the peak construction activities are ongoing and whereby the works will ensure that the mitigation measures described above is in place.
- 8.8.19 It is considered that, with the appropriate and successful implementation of the mitigation proposed, the likely adverse effects of construction vibration predicted would reduce (for example, this assumes that no piling will occur within 5 m of a high sensitivity receptor, and that should the piling methodology be able to prevent piling occurring within a 10-15 m radius of the receptor, it is considered that the likely effects can be reduced further). However, until the final piling strategy and detailed construction planning are identified the effectiveness of the mitigation has been assumed to be negligible.

8.9 Residual Effects

- 8.9.1 A summary of the residual effects resulting from the Proposed Development after effective implementation of the embedded and additional mitigation measures where required is provided in **Table 8.21** and **Table 8.22**.

Table 8.21: Summary of Residual Effects - Noise

Phase	Receptor affected	Description of Residual Effect	Residual Effect
Demolition and construction	Kenavon Drive	Demolition	Temporary Moderate Adverse Effect
	St. James Church	Demolition	Temporary Minor Adverse Effect
	Kenavon Drive	Construction of Phase 3	Temporary Minor Adverse Effect
	Phase 1	Construction of Phase 2	Temporary Minor Adverse Effect
	Phase 2	Construction of Phase 3	Temporary Minor Adverse Effect

Table 8.22 Summary of Residual Effects - Vibration

Phase	Receptor affected	Description of Residual Effect	Residual Effect
Demolition and construction	Phase 1	Construction vibration	Temporary Moderate Adverse Effect
	Phase 2	Construction vibration	Temporary Moderate Adverse Effect

8.10 Cumulative Assessment

- 8.10.1 All approved schemes are at least 350 m from the Proposed Development and would not influence the results given the distance propagation effects and the shielding provided by intermittent buildings.

8.11 Summary

- 8.11.1 The baseline was appraised during September 2021 through a combination of long-term unattended noise monitoring and sample measurements taken around the Site. Survey data has been supplemented by noise data from the Defra Extrium noise database (Defra, 2019).
- 8.11.2 The existing conditions are unlikely to evolve significantly from those surveys, given that the dominant noise sources are road traffic and railway events and no significant changes to these networks are envisaged.
- 8.11.3 The noise and vibration assessments have been based primarily on principles and guidance included in British Standards and relevant Industry Guidance. All assessments have been based on determining whether the Significant Observed Adverse Effect Level (SOAEL) is expected to be exceeded, i.e. where significant effects occur.
- 8.11.4 Significant residual temporary effects are expected during the demolition and construction phases of the Proposed Development. All permanent operational effects are expected to be negligible (not significant).
- 8.11.5 The significant temporary residual demolition and construction effects are limited to receptors closest to the Site and in duration i.e. during only demolition activity (noise) or where piling takes place within 20m (vibration).
- 8.11.6 The significant residual temporary demolition and construction noise effects have been assessed to occur at the Kenavon Drive residences, St James Church, Kenavon Drive, Phase

1, and Phase 2. The mitigation measures include the contractor adopting Best Practicable Means (BPM), which will be outlined within a Demolition and Construction Environmental Management Plan (DCEMP).

- 8.11.7 The significant residual temporary demolition and construction vibration effects have been assessed to occur at Phase 1 and Phase 2. The mitigation measures include the contractor adopting BPM, as detailed in their DCEMP, with the activity also evaluated within a Piling Method Statement.
- 8.11.8 The DCEMP will be secured by an appropriately worded planning condition.
- 8.11.9 The Site Suitability assessment indicates that appropriate conditions can be achieved for residential dwellings, though it would be necessary to rely on façade sound insulation. This is typical for most residential developments within urban areas.

Appropriately worded planning conditions relating to building services plant noise emissions, amplified music emissions and indoor ambient noise levels within dwellings are required.

8.12 References

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- WHO, 1999. Guidelines for Community Noise, s.l.: s.n.

9 Air Quality

9.1 Introduction

- 9.1.1 This Chapter presents the findings of the assessment of likely significant effects arising from the Proposed Development with respect to air quality. The purpose of this Chapter is to describe and evaluate the likely air quality impacts during both construction and operation and classify the effects of the Proposed Development considering relevant national, regional, and local regulations and guidance.
- 9.1.2 This Chapter of the ES has been prepared by Stantec. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A.3**.
- 9.1.3 This Chapter is supported by the following technical appendices:
- Appendix I.1. IAQM Dust Guidance (2016) Approach
 - Appendix I.2. EPUK/IAQM Guidance (2017) Screening Criteria
 - Appendix I.3. Road Traffic Emissions Air Quality Model Inputs and Results Processing
 - Appendix I.4. Road Traffic Emissions Air Quality Model Verification
 - Appendix I.5. Site Suitability Modelling Results
 - Appendix I.6. Figures

9.2 Policy Context, Legislation, Guidance and Standards

Air Quality Regulations

- 9.2.1 The Air Quality (England) Regulations 2000 (AQR) defined National Air Quality Objectives (NAQOs, a combination of concentration-based thresholds, averaging periods and compliance dates) for a limited range of pollutants. Subsequent amendments were made to the AQR in 2001 and 2002 to incorporate 'limit values' and 'target values' for a wider range of pollutants as defined in European Union (EU) Directives.
- 9.2.2 These amendments were consolidated by the Air Quality Standards Regulations 2010 (AQSR) (with subsequent amendments most notably in 2016 and for the devolved administrations), which transposed the EU's Directive on ambient air quality and cleaner air for Europe (2008/50/EC).
- 9.2.3 Following the Transition Period after the UK's departure from the EU in January 2020, the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (and subsequent amendments for the devolved administrations) have amended the AQ Standards Regulations 2010 to reflect the fact that the UK has left the EU. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 amended the Particulate Matter (PM_{2.5}) limit value in the AQSR to 20 microgrammes per cubic meter (µg/m³).
- 9.2.4 The relevant NAQOs and limit values for this assessment are shown in **Table 9.1**.

Table 9.1: Relevant Air Quality Objectives / limit values

Pollutant	Time Period	Objectives	Source
Nitrogen Dioxide (NO ₂)	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year	NAQO and AQSR limit value
	Annual mean	40 µg/m ³	NAQO and AQSR limit value
PM ₁₀	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year	NAQO and AQSR limit value
	Annual mean	40 µg/m ³	NAQO and AQSR limit value
PM _{2.5}	Annual mean	20 µg/m ³	NAQO and AQSR limit value

9.2.5 The NAQOs for NO₂ and PM₁₀ were to have been achieved by 2005 and 2004 respectively, but also continue to apply in all future years thereafter.

9.2.6 The 2019 Clean Air Strategy includes a commitment to set a “new, ambitious, long-term target to reduce people’s exposure to PM_{2.5}” which the Environment Act 2021 committed the Secretary of State to setting. Two PM_{2.5} targets were published in The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 and are set out below:

- An annual mean concentration target for PM_{2.5} levels in England to be 10 µg/m³ or below by 2040; and
- A population exposure reduction target for a reduction in PM_{2.5} population exposure of 35% compared to 2019 to be achieved by 2040.

9.2.7 The Government has published an Environmental Improvement Plan 2023 (DEFRA, 2023) which sets out the following interim PM_{2.5} targets to be met by the end of January 2028:

- The highest annual mean concentration in the most recent full calendar year must not exceed 12 µg/m³ of PM_{2.5}; and
- Compared to 2018, the reduction in population exposure to PM_{2.5} in the most recent full calendar year must be 22% or greater.

9.2.8 The Plan also details how these targets will be met including reducing emissions at home, driving effective local action through local authorities, maintaining, and improving the regulatory framework for industrial emissions, supporting farmers to reduce their impact on ammonia emissions and reducing emissions from cars and other forms of transport.

National Air Quality Plan for NO₂ in the UK

9.2.9 The national Air Quality Plan for NO₂ (DEFRA, 2018) sets out how the Government plans to deliver reductions in NO₂ throughout the UK, with a focus on reducing concentrations to below the EU limit values throughout the UK within the ‘shortest possible time’.

9.2.10 The Plan requires all local authorities in England which DEFRA identified as having exceedances of the limit values in their areas past 2020 (including Reading Borough Council

(RBC)) to develop local plans to improve air quality and identify measures to deliver reduced emissions, with the aim of meeting the limit values within their area within "the shortest time possible". Potential measures include changing road layouts, encouraging public and private ultra-low emission vehicle (ULEV) uptake, the use of retrofitting technologies and new fuels and encouraging public transport. In cases where these measures are not sufficient to bring about the required change within 'the shortest time possible' then local authorities may consider implementing access restrictions on more polluting vehicles (e.g., Clean Air Zones (CAZs)).

Air Quality Management

The Air Quality Strategy

- 9.2.11 Part IV of the Environment Act 1995 required the Secretary of State to prepare and publish a 'strategy' regarding air quality.
- 9.2.12 The Air Quality Strategy (2007) establishes the policy framework for ambient air quality management and assessment in the UK (DEFRA, 2007). The primary objective of the Air Quality Strategy is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Air Quality Strategy sets out the NAQOs and Government policy on achieving these.
- 9.2.13 The Clean Air Strategy (2019) aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy aims to create a stronger and more coherent framework for action to tackle air pollution (DEFRA, 2019).

Local Air Quality Management

- 9.2.14 Part IV of the Environment Act 1995 introduced a system of Local Air Quality Management (LAQM) which requires local authorities to regularly and systematically review and assess air quality within their boundary and appraise development and transport plans against these assessments.
- 9.2.15 Where a NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the NAQOs within its AQMA. An AQMA was declared in Reading in 2019 for exceedances of the annual mean NO₂ NAQO, and an AQAP was subsequently adopted in 2009.
- 9.2.16 The Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22)), issued by the Department for Environment, Food and Rural Affairs (DEFRA) for local authorities, provides advice on where the NAQOs apply (DEFRA, 2022). These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year) as summarised in **Table 9.2**.

Table 9.2: Relevant Public Exposure

Averaging Period	NAQOs should apply at:	NAQOs don't apply at:
Annual mean	All locations where members of the public might be regularly exposed For example: Building façades of residential properties, schools, hospitals, care homes etc	Façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residences

Averaging Period	NAQOs should apply at:	NAQOs don't apply at:
		Kerbside sites Any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean NAQO would apply, together with hotels and gardens of residences	Kerbside sites Any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean NAQOs apply as well as: Kerbside sites Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside locations where the public would not be expected to have regular access
15-minute mean	All locations where members of the public might reasonably be regularly exposed for a period of 15 minutes or longer.	Locations where members of the public are unlikely to be regularly exposed for 15 minutes or longer.

Planning Policy

National Planning Policy

9.2.17 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities & Local Government (MHCLG), 2021). The following paragraphs are considered relevant from an air quality perspective:

- Paragraph 104 on considering the availability of sustainable transport in the early stages of plan-making and development proposals.
- Paragraph 105 on identifying appropriate locations to allow sustainable development.
- Paragraph 174 on conserving and enhancing the natural environment by preventing unacceptable levels of air pollution and improving existing air quality.
- Paragraph 185 on ensuring that new development accounts for likely effects of pollution on health, living conditions and the natural environment, both at the site and within the wider area.
- Paragraph 186 on complying with NAQOs, identifying opportunities to improve air quality and mitigating any air quality impacts, as well as ensuring that new development within an AQMA is consistent with the local AQAP.

- Paragraph 187 on applying the agent of change principle when the operation or an existing development could have a significant adverse effect on nearby new development.

National Planning Practice Guidance

9.2.18 The Planning Practice Guidance (PPG) on Air Quality (MHCLG, 2019) provides guidance on how planning can take account of the impact of new development on air quality. The following paragraphs are considered relevant to this assessment:

- Paragraph 005, Reference 32-005-20191101 (revision date 01.11.2019) provides guidance on how considerations regarding air quality can be relevant to the development management process.
- Paragraph 006, Reference 32-006-20191101 (revision date 01.11.2019) identifies what specific air quality issues need to be considered in determining a planning application.
- Paragraph 007, Reference 32-007-20191101 (revision date 01.11.2019) provides guidance on how detailed an assessment needs to be.
- Paragraph 008, Reference 32-008-20140306 (revision date 01.11.2019), of the PPG provides guidance and examples on how an impact on air quality can be mitigated.

Local Planning Policy

Reading Borough Local Plan

9.2.19 The Reading Borough Local Plan was adopted by RBC in November 2019 (RBC, 2019). The Plan sets out RBC's development strategy, and planning policies and proposals, to guide land use and planning decisions within the Borough up until 2036. The Local Plan includes the following policies in relation to air quality:

9.2.20 CC8: Safeguarding Amenity:

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

[...]

- *Dust and fumes*
- *Smell [...]"*

9.2.21 CC9: Securing Infrastructure:

"Proposals for development will not be permitted unless infrastructure, services, resources, amenities or other assets lost or impacted upon as a result of the development or made necessary by the development will be provided through direct provision or financial contributions at the appropriate time[...]"

[...] Other measures, as follows, should also be considered where a specific need is identified and justified:[...]"

- *Measures to tackle poor air quality or for on-going air quality monitoring; and [...]"*

9.2.22 EN15: Air Quality:

“Development should have regard to the need to improve air quality and reduce the effects of poor air quality.

iii. Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:

- *Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;*
- *Whether the development is within, or accessed via, an Air Quality Management Area; and*
- *Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health or the environment would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.*

ii. Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant detrimental effects that cannot be mitigated, the application should be refused.

iii. Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring.”

9.2.23 CR6: Living in Central Reading

“Proposals for residential development within the central area will be assessed against the following criteria: [...]

[...]ii) Proposals for new residential development within the central area will be required to demonstrate how the issue of potential noise disturbance from neighbouring land uses and other sources, and air quality implications of residential development, have been considered and if necessary, mitigated. New residential development should not be located next to existing town centre uses where those uses would give rise to unacceptable levels of noise and disturbance to the occupiers of the new scheme, unless this can be mitigated.[...]”

Reading Transport Strategy 2036

9.2.24 The Reading Transport Strategy 2036 (RBC, 2020) is a statutory document that sets the plan for developing the town’s transport network to 2036 and beyond. It includes the guiding policies and principles, alongside schemes and initiatives to be delivered, to enable a step-change in sustainable travel choices in Reading. The Draft Transport Strategy includes the following policies in relation to air quality:

9.2.25 Policy RTS2: The Environment and Climate Change, 2.2:

“We will ensure transport schemes deliver improved air quality, reduced emissions and biodiversity net gains.”

9.2.26 Policy RTS13: Healthy Streets, 13.1:

“We will encourage the creation of healthy streets in Reading, to improve air quality, reduce congestion and help make our communities healthier, greener and more attractive places to live, work, learn and play.”

9.2.27 Policy RTS14: Walking and Cycling, 14.4:

“We will integrate the LCWIP [Local Cycling and Walking Infrastructure Plan] into cross-departmental strategies to maximise the benefits of walking and cycling, including improved health and wellbeing, air quality, reduced emissions and to create a more attractive local environment.”

RBC Air Quality Action Plan 2009

- 9.2.28 RBC has declared an AQMA which covers Reading Town Centre, areas along the major radial road routes into Reading and along the railway lines where they pass-through built-up areas. The AQMA was declared due to exceedances of the annual mean NO₂ objective. As such, the Council prepared an Air Quality Action Plan (AQAP) in January 2009 which seeks to improve air quality within the AQMA via a series of policies and measures (RBC, 2009).

Assessment Guidance

DEFRA ‘Local Air Quality Management Technical Guidance (LAQM.TG(22))’

- 9.2.29 DEFRA’s LAQM.TG(22) was published for use by local authorities in their LAQM review and assessment work (DEFRA, 2022). The document provides key guidance on aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

EPUK / IAQM ‘Land-Use Planning & Development Control: Planning for Air Quality’

- 9.2.30 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance to help ensure that air quality is properly accounted for in the development control process (EPUK / IAQM, 2017). It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

IAQM ‘Guidance on the Assessment of Dust from Demolition and Construction’

- 9.2.31 Guidance on the assessment of dust from demolition and construction has been published by the IAQM (IAQM, 2016). The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.

9.3 Consultation

- 9.3.1 Consultation with the Environmental Health Department at RBC was conducted via email in March 2023 to agree the proposed methodology of the air quality assessment. It was agreed to scope out detailed modelling of operational road traffic emissions on existing sensitive receptors in the local area as there is expected to be a net reduction in traffic associated with the Proposed Development in comparison to the current use at the Site. In addition, it was agreed that air quality impacts arising from the nearby railway lines and energy centres could be scoped out of the assessment, as well as air quality impacts upon ecological receptors. Detailed modelling of exhaust emissions associated with the proposed basement car park was agreed to be scoped into the assessment, however this will be undertaken at detailed design stage.
- 9.3.2 A Scoping Report was also submitted to RBC in February 2023 summarising the likely significant effects on local air quality as a result of the Proposed Development, as well as the anticipated methodology. A Scoping Opinion was received from RBC on 18th April 2023 which confirmed that the air quality assessment methodology was agreeable and that Air Quality should be scoped into the EIA.

9.4 Methodology

- 9.4.1 The assessment methodology detailed in the following sections has been applied to ascertain the potential impacts of emissions to air in order to identify their significance and compliance with policy and regulatory requirements (outlined in **Section 9.2** of this report), and whether or not additional mitigation is required.

Study Area

- 9.4.2 The study area adopted for this assessment is as follows:
- for the construction phase assessment, the study area (based on IAQM guidance, **Appendix I.1**) is defined as up to 350 m from the site or 50 m from the route of construction vehicles (up to 500 m from the Site entrance) as shown in **Figures 9.1** and **9.2**;
 - for the operational phase assessment, the study area (based on EPUK / IAQM guidance) is defined as all roads within 250 m of the Site and other roads predicted to exceed the screening criteria outlined in **Appendix I.2**.

Baseline Data Collection

- 9.4.3 Any exceedances of the limit values along roads within the study area have been identified using the 2020 NO₂ Projections Data published by DEFRA (DEFRA, 2020a). Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by RBC and their LAQM reports to identify potential AQMAs. Background concentrations for the study area have been defined using the national pollution maps published by DEFRA which cover the whole country on a 1x1 km grid (DEFRA, 2020b).

Assessment

Assessment of Construction Dust Impacts

- 9.4.4 During demolition and construction, dust from on-site activities and off-site trackout by construction vehicles has the potential to impact on sensitive human and ecological receptors within the study area. The main potential impacts are loss of amenity (as a result of dust soiling), deterioration of human health (as a result of increased concentrations of PM₁₀) and harm to sensitive ecological receptors (as a result of dust soiling).
- 9.4.5 The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source(s).
- 9.4.6 Separation distance is also an important factor. Large dust particles (greater than 30 µm) can be potentially responsible for most dust annoyance and will largely deposit within 100 m of sources. Intermediate particles (10-30 µm) can travel 200-500 m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10 µm), which are the predominant fraction that can be potentially responsible for human health impacts, largely remain airborne. However, the impact on the short-term concentrations of PM₁₀ occurs over a shorter distance due to the rapid decrease in concentrations with distance from the source due to dispersion.
- 9.4.7 The assessment of the risk of potential construction dust impacts has been undertaken with reference to relevant guidance (IAQM, 2016).

Screening Assessment

- 9.4.8 The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the activities associated with the construction phase of the scheme; defined as the study area. No further assessment is required if there are no receptors within the study area.
- 9.4.9 The IAQM guidance outlines that an assessment is only required in cases where:
- A 'human receptor' is located within:
 - 350 m of the boundary of the Site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s).
 - An 'ecological receptor' is located within:
 - 50 m of the boundary of the Site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s).
- 9.4.10 Using the criteria above, the potential for impacts from construction dust on sensitive ecological receptors has been screened out of this assessment, with further justification provided in **Section 9.7**.

Further Assessment

- 9.4.11 The risk of dust impacts associated with the Proposed Development has been determined (following the IAQM guidance (IAQM, 2016)) based on the dust emission class (or magnitude) for each activity arising from four activities in the absence of mitigation (demolition, earthworks, construction and trackout), the sensitivity of nearby receptors and the overall sensitivity of the area. The dust emission class, receptor sensitivity and the overall sensitivity of the area are determined using the criteria outlined in **Table I.1.1** to **Table I.1.5** of **Appendix I.1** based on the IAQM guidance), indicative thresholds and professional judgement. The risk of dust impacts arising is a product of the relationship between the dust emission magnitude and the area sensitivity and is based on the criteria outlined in **Table I.1.6** (based on the IAQM guidance). The risk of impact is then used to determine the mitigation requirements.
- 9.4.12 The IAQM guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.
- 9.4.13 With appropriate mitigation in place, the IAQM guidance indicates that the residual effect as a result of dust emissions associated with the demolition and construction can be classified as being 'not significant'.

Assessment of Road Traffic Emission Impacts

Screening Assessment

Impacts of Emissions from Road Traffic Associated with the Proposed Development on Existing Sensitive Human Receptors

- 9.4.14 The potential for significant impacts on existing sensitive receptors within the study area as a result of emissions from traffic generated by both the construction and operational phases of the Proposed Development has been determined using the screening criteria outlined in the EPUK / IAQM guidance (see [Appendix I.2](#)). The screening criteria includes consideration of the volume and composition of traffic generated by the Proposed Development and existing local air quality conditions (i.e., the presence of any declared AQMAs)).
- 9.4.15 Information on the Proposed Development's trip generation has been provided by the project's transport consultants (Stantec). Based on the predicted trip generation, the impact of construction and operational road traffic emissions on human receptors has been scoped out of this assessment, with further justification set out in sections 9.7.

Impacts of Emissions from Road Traffic Associated with the Proposed Development on Existing Sensitive Ecological Receptors

- 9.4.16 The potential for impacts from road traffic emissions on existing sensitive ecological receptors has been scoped out of this assessment as there are no ecological receptors in close proximity to the Site which may be susceptible to air quality changes. The closest designated ecological site to the Proposed Development is Highwood Local Nature Reserve and Ancient Woodland, which is located over 2.5 km from the Site boundary. As such, the impact of road traffic emissions on existing sensitive ecological receptors has not been considered further in this Chapter.

Emissions from the Proposed Basement Car Park

- 9.4.17 The potential for significant impacts on both existing and proposed sensitive receptors within the study area as a result of exhaust emissions associated with the Site's proposed basement car park has been qualitatively assessed using the EPUK / IAQM screening criteria outlined in [Appendix I.2](#).

Site Suitability

- 9.4.18 An initial qualitative assessment to determine whether there is a potential for exceedances of the relevant NAQOs / limit values at sensitive locations within the Proposed Development has been undertaken, taking into account local monitoring, estimated background concentrations, the layout of the Proposed Development and the proximity of worst-case sensitive locations within the Proposed Development to nearby sources of emissions (i.e. the local road network).

Detailed Assessment

- 9.4.19 Concentrations of pollutants (NO₂, PM₁₀ and PM_{2.5}) have been predicted for a range of worst-case locations of relevant human receptor exposure within the Proposed Development to allow comparison with the NAQOs.
- 9.4.20 Emissions from road vehicles and their resultant impact at receptor locations have been predicted using the Atmospheric Dispersion Modelling System (ADMS) Roads dispersion model (v5.0.1.3). The model requires the user to provide various input data, including traffic flows in Annual Average Daily Traffic (AADT) format, vehicle composition (i.e. the proportion of Heavy Duty Vehicles (HDVs)), road characteristics (including road width, gradient and street canyon dimensions, where applicable), and average vehicle speed. AADT flows and the proportions of HDVs for roads within the study area have been provided by the project's transport consultants (Stantec). Traffic data used in this assessment are summarised in [Appendix I.3](#).
- 9.4.21 The following traffic scenarios have been modelled:
- 2019 'existing' baseline (for model verification); and

- 2026 future year scenario with the fully built-out Proposed Development in the first year of occupation including traffic growth up to the year 2026.
- 9.4.22 The model also requires meteorological data and has been run using 2019 meteorological data from the Farnborough meteorological station, which are considered suitable for this area. **Appendix I.3** provides further details on the model inputs.
- 9.4.23 Traffic emissions have been calculated using the Emission Factor Toolkit (EFT) v11 (DEFRA, 2021), which utilises nitrogen oxides (NO_x) emission factors taken from the European Environment Agency (EEA) COPERT 5.3 emission tool. The traffic data were entered into the EFT to provide emission rates for each of the road links entered into the model. Road vehicle emissions are primarily associated with the exhaust emissions but also include particles generated from abrasion (of tyres, brakes and road). The EFT allows users to calculate road vehicle pollutant emission rates for NO_x, PM₁₀ and PM_{2.5} (exhaust and brake, tyre and road wear) for a specified year, road type, vehicle speed and vehicle fleet composition.
- 9.4.24 The EFT provides pollutant emission rates for 2018 through to 2050 for England (not London), and 2018 to 2030 for Wales, Scotland, Northern Ireland, and London and takes into consideration bespoke vehicle fleet information as well as the following information available from the National Atmospheric Emissions Inventory (NAEI, 2018):
- fleet composition data for motorways, urban and rural roads in the UK (excluding London);
 - fleet composition based on European emission standards from pre-Euro I to Euro6/VI (including Euro 6 subcategories);
 - scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting; and
 - technology conversions in the national fleet.
- 9.4.25 As a result of this, the road vehicle exhaust emissions of NO_x are projected to decrease year-on-year due to technological advances and improvements to the fleet mix i.e., penetration of Euro VI HDVs. Whilst there has been uncertainty over NO_x emissions from vehicle exhausts (particularly from Euro 5 and 6 LDVs) it is important to note the EFT is not based on the Euro emission standards.
- 9.4.26 Generally, concentrations of air pollutants in the UK are anticipated to decrease in the coming years; as such, in most cases, the earlier the year that is assessed, the more worst-case the assessment is. The earliest year that the Proposed Development could potentially be occupied by is 2026. Therefore, in order to take account of uncertainties relating to future year vehicle emissions and background pollutant concentrations to provide a conservative assessment, the assessment has been carried out utilising 2026 emission factors and background concentrations combined with traffic data from 2026 (which includes full development flows). This is considered a conservative assumption of emissions in the future.

Air Quality Impacts Significance Criteria

- 9.4.27 The relevant NAQOs are set out in **Table 9.1**. The predicted pollutant concentrations in the future year (2026) at each identified sensitive receptor have been compared to the relevant NAQOs and any exceedances identified.
- 9.4.28 Analysis of long-term monitoring data suggests that if the annual mean NO₂ concentration is less than 60 µg/m³ then the 1-hour mean NO₂ NAQO is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the one-hour mean objective is likely to be achieved (DEFRA, 2022). Analysis of long-term monitoring data also suggests that if the annual mean PM₁₀ concentration is less than 32 µg/m³ then the 24-hour mean PM₁₀ NAQO is unlikely to be

exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the 24-hour mean NAQO is likely to be achieved.

- 9.4.29 There is no official guidance in the UK on how to assess the significance of the air quality impacts of existing air quality on a new development. The assessment of proposed sensitive receptors within the Site has therefore been limited to predicting pollutant concentrations at worst-case receptors within the Site and comparing these predicted concentrations to the relevant NAQOs, with the overall significance being based on whether the NAQOs for each pollutant are exceeded or not.

Limitations

- 9.4.30 There are many components that contribute to the uncertainty in predicted concentrations. The models used in this assessment are dependent upon the traffic data that have been inputted which will have inherent uncertainties associated with them. There is then additional uncertainty as the model is required to simplify real-world conditions into a series of algorithms. A summary of the assumptions and limitations used in this assessment is set out below:

- There has been an acknowledged disparity between national road transport emissions projections and measured annual mean concentrations of nitrogen oxides (NO_x) and NO₂ for many years. Recent monitoring has shown that reductions in concentrations are now being measured in many parts of the country (Air Quality Consultants, 2022), however, there is still some uncertainty regarding the rate at which emissions will reduce in the future and therefore some consideration must be given to the accuracy of any projection and to appropriately respond to this.
- The future year modelling has been based on 2026 (earliest anticipated occupation of the Proposed Development) emission factors and background concentrations for the operational phase. This is considered to provide an appropriately conservative assessment taking into account the uncertainties regarding future vehicle emission factors. The model has been verified against monitoring data from 2019, the latest representative set of monitoring data available.
- The default fleet projections in DEFRA's EFT v11.0 and 2018-based background maps are based on fleet growth assumptions which were current before the Covid-19 outbreak in the UK. As a result, default outputs from these tools do not reflect short or longer-term impacts on emissions in 2020 and 2021 and potentially beyond resulting from behavioural change during lockdowns.
- It has been assumed that meteorological conditions recorded at Farnborough in 2019 are representative of those at Site in 2026, the earliest anticipated first year of occupation.
- It has been assumed that the baseline traffic data derived from the Department for Transport website and traffic surveys undertaken for previous transport assessments for local roads in 2019 and 2026 is representative of the Proposed Development in operation.

9.5 Baseline Conditions

Sensitive Receptor Locations

- 9.5.1 Relevant sensitive human receptor locations are places where members of the public might be expected to be regularly present over the averaging period of the NAQOs. The NO₂, PM₁₀ and PM_{2.5} annual mean, 24-hour mean PM₁₀ and 1-hour mean NO₂ NAQO sensitive locations comprise proposed residences and commercial spaces. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, traffic lights and roundabouts where traffic may become congested, where there is a combined effect of several

road links and routes along which substantial volumes of traffic generated by the Proposed Development will travel.

- 9.5.2 Based on these criteria, 14 proposed sensitive human receptors within the Site itself have been identified as worst-case receptors for the operational phase assessment. These locations have been modelled at a height of 1.5 m, 4.5 m, and 7.5 m, and are described in **Appendix I.3** and shown in **Figure 9.3, Appendix I.6**.
- 9.5.3 Concentrations have also been predicted at two of RBC's passive diffusion tube monitoring sites (see **Table I.4.1, Appendix I.4**) in order to verify the modelled results. **Appendix I.4** provides further details on the verification method.
- 9.5.4 For the construction dust assessment, all sensitive receptor locations have been considered within 350 m of the Site, and within 50 m of the likely routes to be taken by construction vehicles (up to 500 m from the Site entrance) as shown in **Figures 9.1 and 9.2**.

The Site

Predicted Background Concentrations at the Site

- 9.5.5 Estimated background concentrations for the Site have been obtained from the latest 2018-based national maps provided by DEFRA (DEFRA, 2020b). The Site falls into two grid squares: X 471500 Y 173500 and X 472500 Y 173500.
- 9.5.6 The predicted DEFRA background concentrations at the Site are provided in **Table 9.3** for 2019, the latest year for which representative monitoring data is available, 2025, the year construction is due to commence, and 2026, the earliest anticipated year for first occupation.

Table 9.3: Estimated Annual Mean Background Concentrations

Year	Location	Annual Mean ($\mu\text{g}/\text{m}^3$)		
		NO ₂	PM ₁₀	PM _{2.5}
2019	471_173	34.4	18.8	13.5
	472_173	23.8	17.2	12.0
2025	471_173	30.4	17.0	11.9
	472_173	20.2	15.9	10.9
2026	471_173	30.0	16.9	11.8
	472_173	19.9	15.8	10.9
NAQOs		40	40	20

Note: Projections in the 2018 reference year background maps and associated tools are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these tools do not reflect short- or longer-term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

- 9.5.7 The background concentrations are all below the relevant NAQOs in both 2019 and the future years.

The Surrounding Area

Ambient Air Quality

Limit Values

- 9.5.8 A review of the DEFRA Pollution Climate Mapping (DEFRA, 2020a) indicated that the A329 Caversham Road, located approximately 820 m to the west of the Site, was predicted to exceed the annual mean NO₂ NAQO in 2019. However, the study area does not contain any predicted exceedances of a NAQO beyond 2022.

LAQM

- 9.5.9 RBC has investigated air quality within its area as part of its responsibilities under the LAQM regime. An AQMA was declared in Reading in 2019 for exceedances of the annual mean NO₂ NAQO. The AQMA covers the town centre, areas along all the major radial roads into Reading (including J11 of the M4) and along railway lines where they pass through built-up areas. The majority of the Site is located within the AQMA, as shown in **Figure 9.4**.

Local Monitoring Data

NO₂

- 9.5.10 RBC undertakes automatic monitoring of NO₂ concentrations at four locations in the Borough, two of which are located within 1.5 km of the Site. RBC also undertakes monitoring using NO₂ passive diffusion tubes at 21 monitoring locations within 1 km of the Site. Monitoring data for the nearby monitoring sites are described in **Table 9.4** and **Table 9.5** and their corresponding locations are shown in **Figure 9.5**, **Appendix I.6**.

Table 9.4: Measured Annual Mean NO₂ Concentrations 2015 – 2019

Site ID	Site Type	Within AQMA	Approximate Distance to Site (m)	Annual Mean (µg/m³)				
				2015	2016	2017	2018	2019
Automatic Monitoring Stations								
RD1 – Caversham Road	Roadside	Y	1,080	38	39	37	40	35
Reading AURN ^a	Urban Background	Y	1,270	22	34	29	26	22
Passive Diffusion Tubes								
King Oak Flats	Roadside	Y	420	33	33	31	32	28
181 Kings Road ^a	Roadside	Y	460	-	-	-	-	35
Wycliffe Baptist Church	Roadside	Y	470	-	49	40	37	39
Sidmouth Street – Trinity Hall	Roadside	Y	470	-	-	-	37	34
Friar St (Nandos)	Kerbside	Y	560	47	52	50	42	41
Station Hill (Near Taxi Station)	Roadside	Y	600	-	47	49	33	35
21A Friars Walk, Friars Street	Roadside	Y	630	-	-	-	-	39
276 Kings Road	Roadside	Y	640	33	32	32	30	26
Sainsburys 52-55 Friar Street	Roadside	Y	680	-	-	-	-	40
Station Hill (Near Bus stop WN)	Roadside	Y	690	-	50	47	35	38
31a Vastern Rd	Roadside	Y	690	36	37	38	33	28
68 George Street	Roadside	Y	730	34	33	31	33	27
40 George Street	Roadside	Y	780	42	44	47	45	38
Sackville Street	Roadside	Y	820	40	37	37	38	32
241 Gosbrook Road	Roadside	Y	830	35	35	34	35	31
Malcolm Place	Roadside	Y	840	42	41	43	39	52
44 Crown Street	Roadside	Y	850	36	37	35	34	29
Red Cow	Roadside	Y	860	38	38	35	38	31

Site ID	Site Type	Within AQMA	Approximate Distance to Site (m)	Annual Mean (µg/m³)				
				2015	2016	2017	2018	2019
*108 Caversham Rd	Roadside	Y	860	41	41	40	42	35
33 Caversham Rd	Roadside	Y	880	48	43	45	44	35
*131 Caversham Rd	Roadside	Y	890	40	36	36	35	32
NAQO				40				

Exceedances of the NAQO are highlighted bold.

2015 – 2019 data taken from the RBC 2020 Air Quality Annual Status Report (RBC, 2020)

^a Low data capture in 2019

*Monitoring location used for model verification purposes.

- 9.5.11 There have been measured exceedances of the annual mean NO₂ NAQO between 2015 – 2019 at 12 monitoring locations within 1 km of the Site. However, the closest passive diffusion tube to the Site, King Oak Flats, has consistently achieved the annual mean NO₂ NAQO in the latest five years. Furthermore, at the majority of monitoring locations described in **Table 9.4**, there is a general decreasing trend in measured concentrations over time, which reflects the national trend (Air Quality Consultants, 2022).

Table 9.5: Measured Exceedances of the Hourly Mean NO₂ NAQO 2015 – 2019

Site ID	Number of Hours > 200 µg/m³				
	2015	2016	2017	2018	2019
RD1 – Caversham Road	1	0	0	7	0
Reading AURN ^a	0	4	0	0	0
NAQO	18 (hours > 200 µg/m³)				

2015 – 2019 data taken from the RBC 2020 Air Quality Annual Status Report (RBC, 2020)

^a Low data capture in 2019

- 9.5.12 **Table 9.5** shows that there have been no exceedances of the 1-hour mean NO₂ NAQO at either automatic monitoring station located in the vicinity of the Site, between 2015 and 2019.

PM₁₀

- 9.5.13 RBC undertakes monitoring of PM₁₀ at all four automatic monitoring stations in the Borough. Recent PM₁₀ monitoring data for the two closest automatic monitoring stations to the Site are shown in **Table 9.6** and **Table 9.7** below.

Table 9.6: Measured Annual Mean PM₁₀ Concentrations 2015 – 2019.

Site ID	Annual Mean PM ₁₀ (µg/m³)				
	2015	2016	2017	2018	2019
RD1 – Caversham Road	28	20	23	24	24
Reading AURN ^a	12	13	12	13	13
NAQO	40 µg/m³				

2015 – 2019 data taken from the RBC 2020 Air Quality Annual Status Report (RBC, 2020)

^aLow data capture in 2019

Table 9.7: Measured Exceedances of the 24-hour Mean PM₁₀ NAQO 2015 – 2019.

Site ID	PM ₁₀ Number of Days > 50 µg/m ³				
	2015	2016	2017	2018	2019
RD1 – Caversham Road	8	5	7	3	11
Reading AURN ^a	0	3	3	1	0
NAQO	35 (days > 50 µg/m³)				

2015 – 2019 data taken from the RBC 2020 Air Quality Annual Status Report (RBC, 2020)

^a Low data capture in 2019

- 9.5.14 **Table 9.6** and **Table 9.7** indicate that there have been no exceedances of either the annual mean or 24-hour mean PM₁₀ NAQOs at the closest PM₁₀ monitoring stations to the Site between 2015 and 2019.

PM_{2.5}

- 9.5.15 RBC also undertakes monitoring of PM_{2.5} at one automatic monitoring station in the Borough – Reading Automatic Urban and Rural Network (AURN). The Reading AURN monitoring station is located in an urban background location approximately 1.2 km southeast of the Site. Recent PM_{2.5} monitoring data for Reading AURN are shown in **Table 9.8** below.

Table 9.8: Measured Exceedances of the Annual Mean PM_{2.5} NAQO 2015 – 2019.

Site ID	Annual Mean PM _{2.5} (µg/m ³)				
	2015	2016	2017	2018	2019
Reading AURN ^a	7	9	10	7	8
NAQO	40 µg/m³				

2015 – 2019 data taken from the RBC 2020 Air Quality Annual Status Report (RBC, 2020)

^a Low data capture in 2019

- 9.5.16 Measured PM_{2.5} concentrations do not exceed the relevant NAQOs for the duration of the 2015 – 2019 monitoring period.

Predicted Background Concentrations in the Study Area

- 9.5.17 In addition to the background concentrations at the Site presented in **Table 9.3**, estimated background concentrations for the wider study area have been obtained from the latest 2018-based national maps provided by DEFRA (DEFRA, 2020b).
- 9.5.18 The DEFRA background concentrations in the wider study area are provided in **Table 9.9** for 2019, the baseline year, and 2026, the earliest anticipated year of first occupation.
- 9.5.19 The background concentrations are all below the relevant NAQOs and limit value in both the 'existing' and future year.

Table 9.9: Estimated Annual Mean Background Concentrations in the Study Area

Year	Location (x_y)	Annual Mean (µg/m ³)			Representative Human Receptors and Monitoring Locations
		NO ₂	PM ₁₀	PM _{2.5}	
2019	471_172	21.6	17.8	12.5	Monitoring locations at Red Cow and 44 Crown Street
	471_173	34.4	18.8	13.5	Monitoring locations at Malcolm Place, 33 Caversham Road, Station Hill and Friar Street
	471_174	22.7	17.6	12.6	Monitoring locations RD1, 108 Caversham Road, 131 Caversham Road, 31a Vastern Road, 40

Year	Location (x_y)	Annual Mean ($\mu\text{g}/\text{m}^3$)			Representative Human Receptors and Monitoring Locations
		NO ₂	PM ₁₀	PM _{2.5}	
					George Street, 68 George Street and 241 Gosbrook Road
	472_173	23.8	17.2	12.0	Proposed receptors P01 – P14 and monitoring locations at 181 Kings Road, 276 Kings Road, King Oaks Flats, Sidmouth Street – Trinity Hall and Wycliffe Baptist Church.
	473_173	21.3	17.1	11.9	The Reading AURN automatic monitoring station
2026	471_172	17.5	16.5	11.5	Monitoring locations at Red Cow and 44 Crown Street
	471_173	30.0	16.9	11.8	Monitoring locations at Malcolm Place, 33 Caversham Road, Station Hill and Friar Street
	471_174	19.1	16.3	11.5	Monitoring locations RD1, 108 Caversham Road, 131 Caversham Road, 31a Vastern Road, 40 George Street, 68 George Street and 241 Gosbrook Road
	472_173	19.9	15.8	10.9	Proposed receptors P01 – P14 and monitoring locations at 181 Kings Road, 276 Kings Road, King Oaks Flats, Sidmouth Street – Trinity Hall and Wycliffe Baptist Church.
	473_173	17.5	15.9	10.9	The Reading AURN automatic monitoring station
NAQOs/Limit		40	40	20	-

Note: Projections in the 2018 reference year background maps and associated tools are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these tools do not reflect short- or longer-term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

Railway Emissions

- 9.5.20 The Site is located immediately south of railway lines serving Reading railway station. Although the NO₂ background concentrations in the area are above 25 $\mu\text{g}/\text{m}^3$, the nearby railway lines are electrified and are not included on the list of lines with a heavy traffic of diesel passenger trains. As such, any air quality impacts are unlikely to be considered significant in line with LAQM.TG (22) (DEFRA, 2022).

Baseline Evolution

- 9.5.21 Baseline concentrations of NO₂, PM₁₀ and PM_{2.5} are predicted to decrease between 2019 and 2026, the earliest possible year for first occupation. Vehicle emission factors and background concentrations are expected to improve over this period due to technological advances and national and international regulatory regimes, despite general population growth leading to traffic increases on the road network.

9.6 Primary and Tertiary Mitigation

- 9.6.1 The primary and tertiary mitigation which has been evaluated as part of the assessment is outlined below. Any secondary mitigation measures deemed to be required following the assessment of significant effects are outlined in **Section 9.8**.

Primary

- 9.6.2 The energy strategy for the Proposed Development is all-electric, with no proposed combustion sources. As such, no local air quality impacts are anticipated and the impacts of emissions from

the plant are considered to be not significant. The use of an all-electric energy strategy is a primary mitigation measure.

- 9.6.3 In addition, electric vehicle charging facilities will be provided at both the residential and commercial elements of the Site in line with Building Regulations and RBC requirements. A minimum of 10% of total car parking spaces will be allocated electric vehicle charging points, resulting in a minimum of 20 electric vehicle charging spaces.

Tertiary

Construction

- 9.6.4 In accordance with Part 4 of the IAQM construction dust guidance (IAQM, 2016), all Non-Road Mobile Machinery (NRMM) will need to adhere to the NRMM emission standards for NO₂ and PM₁₀ outlined in the European Directive 2016/1628. This is considered an integral part of the Proposed Development and will be implemented through a Demolition and Construction Environmental Management Plan (DCEMP) secured by a suitably worded planning condition on any permission.
- 9.6.5 In addition, the following standard mitigation measures from the IAQM guidance (IAQM, 2016) are recommended for inclusion in a DCEMP, taking into account the outcomes of the construction dust risk assessment (presented in [Table 9.11](#)).

Table 9.10: Construction Phase Mitigation Measures

Category	Mitigation Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary.
	Display the head or regional office contact information.
Management	Develop and implement a Dust Management Plan (DMP).
	Record all dust and air quality complaints, identify causes and take measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- of off-site, and the action taken to resolve the situation in the log book.
	Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
Monitoring	Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked.
	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the local authority. Where possible, commence baseline monitoring at least three months before work on a phase commences.

Category	Mitigation Measure
Preparing and maintaining the site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust productions and the site is active for an extensive period.
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
	Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery and sustainable travel	Ensure all vehicles switch off engines when stationary – no idling vehicles.
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
	Impose and signpost a maximum speed limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car sharing).
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management	Avoid bonfires and burning of waste materials.
Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
	Ensure effective water suppression is used during demolition operations.
	Avoid explosive blasting, using appropriate manual or mechanical alternatives.
	Bag and remove any biological debris or damp down such material before demolition.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
	Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
	Only remove the cover in small areas during work and not all at once.
Construction	Avoid scabbling (roughening of concrete surfaces) if possible.
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Category	Mitigation Measure
	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
	For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	Use water assisted dust sweepers on the site access and local roads.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving the site are covered to prevent escape of materials.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site log book.
	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowzers and regularly cleaned.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
	Access gates to be located at least 10 m from receptors where possible.

Operation

- 9.6.6 Sustainable travel to and from the Site will be encouraged through a Framework Travel Plan submitted in support of the Outline Planning Application. This plan seeks to minimise vehicle movement to the Site and facilitate active sustainable models of transport. The plan is considered tertiary mitigation but will include several key primary mitigation measures which are outlined in the Transport Assessment. The measures identified in the Plan are not exhaustive and it is envisaged that the additional measures may be identified as the design of the Proposed Development develops in later stages.

9.7 Assessment of Significant Likely Effects

Demolition and Construction Dust Impacts

Screening Assessment

- 9.7.1 There are a number of existing sensitive human receptors (including residential properties, a school and a nursery) located within 350 m of the Site boundary and within 50 m of the likely routes that will be used by demolition and construction vehicles. As such, further assessment of the risk of dust soiling and PM₁₀ emissions at human receptor locations is required.
- 9.7.2 There are no sensitive ecological receptors located within 50 m of the Site boundary or within 50 m of the likely routes that will be used by demolition and construction vehicles. The closest designated ecological site to the Site is located over 2.5 km from the Site boundary. As such, the potential for impacts on ecological receptors as a result of dust soiling can be screened out as being 'not significant'.

Further Assessment

Dust Emission Magnitude

- 9.7.3 The dust emissions magnitude of demolition, earthworks and construction activities and as a result of trackout have been determined in **Table 9.** below based the criteria shown in **Table I.1.1, Appendix I.1.**

Table 9.11: Dust Emissions Magnitudes

Activity	Magnitude	Justification
Demolition	Large	The Site currently includes the existing Forbury Retail Park and associated car parking. Demolition activities are not expected to occur more than 10 m above ground; however, the demolition of the retail park and car park has the potential to exceed 50,000 m ³ of material and may utilise on-site crushing. Therefore, the dust emission magnitude of demolition activities is judged to be 'large' as a worst-case scenario.
Earthworks	Large	Proposed earthworks activities comprise clearance of vegetation, soil preparation and landscaping across an area greater than 10,000 m ² . The soil at the Site is largely classified as loamy and clay soils (Cranfield University, 2023) which are considered to be moderately dusty, particularly during periods of dry weather. Based on this, the dust emission magnitude of earthworks activities is judged to be 'large'.
Construction	Large	The total building volume to be constructed is expected to be greater than 100,000 m ³ . Construction materials will comprise a mixture of masonry material including those with a high potential for dust release, such as concrete, as well as those with a lower dust potential such as metals and timber. Based on this, the dust emission magnitude of construction activities is judged to be 'large'.
Trackout	Large	The number of HDVs that will exit the Site is currently unknown but will vary depending upon the processes occurring at any one time. Due to the nature of the Site, there could be an unpaved road length greater than 100 m in length comprising moderately dusty surface material. Based on this, the dust emission magnitude of trackout is judged to be 'large' as a precautionary measure and worst-case scenario.

Area Sensitivity

- 9.7.4 The area sensitivity to dust soiling and human health impacts has been determined based on the criteria shown in **Appendix I.1.** The IAQM demolition and construction band criteria used to determine the sensitivity of the local area is shown in **Figures 9.1 and 9.2, Appendix I.6.**
- 9.7.5 Residential properties are classed as 'high sensitivity' receptors to human health impacts as well as dust soiling, based on the IAQM guidance (IAQM, 2016) (**Appendix I.1**). There are between 10 and 100 residential properties located within 20 m of the Site boundary; as such, the sensitivity of the area surrounding the Site to human health impacts and dust soiling is judged to be **'high'**.
- 9.7.6 The IAQM guidance states that trackout may occur for distances of up to 500 m from large sites. The demolition and construction traffic routing is currently unknown, therefore it has been assumed that vehicles would travel along all major roads exiting the Site. There are more than 100 high sensitivity receptors, including residential properties and car parking spaces, located

within 20 m of roads extending up to 500 m of the Site. As such, the sensitivity to dust soiling of the area surrounding roads along which material may be tracked is judged to be 'high'.

- 9.7.7 The IAQM also defines residential properties as being 'high sensitivity' receptors to human health impacts (see **Table I.1.2, Appendix I.1**). PM₁₀ concentrations at existing residential properties within the study area are anticipated to be similar to those predicted by DEFRA at the Site (see **Table 9.3**) in 2025, the year construction is proposed to commence (i.e. 15.9 – 17.0 µg/m³). Based on the maximum predicted 2025 PM₁₀ concentration in the vicinity of the Site, and the number of proposed sensitive receptors that may be situated within 20 m of the site boundary and roads used for trackout, the sensitivity to human health impacts of the areas surrounding the Site and the area surrounding roads along which material may be tracked are judged to be 'medium'.

Risk of Impacts

- 9.7.8 The risk of construction dust impacts, without mitigation, have been defined based on the criterion shown in **Table I.1.6, Appendix I.1** and are presented in **Table 9.12**.

Table 9.12: Risk of Construction Dust Impacts without Mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk	High Risk
Human Health	High Risk	Medium Risk	Medium Risk	Medium Risk

- 9.7.9 The tertiary mitigation measures presented in **Table 9.10** have been identified using the risk of construction dust impacts above.

Construction Road Traffic Emission Impacts

Screening Assessment

- 9.7.10 At present, detailed information regarding the construction methodology for the Proposed Development, specific activities and traffic movements is not available. However, a Dust Management Plan (DMP) will outline measures to control and minimise the risk of adverse effects from construction activities. The DCEMP will be submitted to RBC for their approval. The DCEMP will consider Heavy Goods Vehicles (HGV) and other construction traffic movements, including details of routing and times of movements. HGV access will be prevented or minimised, where possible, on traffic sensitive roads, residential streets, congested roads, or unsuitable junctions.
- 9.7.11 Vehicle movements associated with access, demolition and construction will vary throughout the construction programme, with short periods of peak HGV movements associated with demolition and the delivery of materials during the construction phase. However, when the HGV movements are averaged over a full year period (-AADT), these will be significantly lower than peak movements.
- 9.7.12 Moreover, vehicle movements associated with construction are typically significantly lower than the number of vehicle movements associated with operation of the Proposed Development, which has been considered in section 0. As the Site currently exists as a retail park, there is expected to be a net reduction in trips to the Site during the construction phase when compared to the existing use. This decrease in traffic is expected to give rise to a beneficial impact on local air quality in terms of road traffic emissions.

- 9.7.13 Together with the implementation of the DCEMP, the impacts of construction vehicle movements on human health receptors in the local area are considered to be temporary and not significant and have therefore been scoped out of this assessment.

Operational Road Traffic Emission Impacts

Screening Assessment

- 9.7.14 The Proposed Development will be a low-car development with a residential basement car park comprising a maximum of 200 spaces. The projected traffic generation associated with the Proposed Development has been provided by the project's Transport Consultants (Stantec) and is discussed below.
- 9.7.15 Given that the Proposed Development involves the demolition of the existing Forbury Retail Park, the trip generation associated with Kings Meadow View is expected to be lower than that associated with the current Site use. At this stage, the predicted two-way decrease in 24-hour AADT is 140 AADT during the operational phase. This decrease in road traffic exceeds the EPUK/IAQM criteria of 100 LDVs and/or 25 HDVs AADT trips for developments located within an AQMA (see **Appendix I.2**), however this reduction is expected to give rise to a beneficial impact on local air quality.
- 9.7.16 As such, the potential for adverse impacts from operational road traffic emissions generated by the Proposed Development on existing sensitive receptors within the study area can be screened out and considered 'not significant'. No additional mitigation is required.

Emissions from the Proposed Basement Car Park

- 9.7.17 As outlined in the EPUK/IAQM guidance, a ventilation extract for the car park must be situated within 20 m of a relevant receptor for a detailed air quality assessment of the exhaust emissions to be required, and the car park must see more than 100 vehicle movements per day (in and out).
- 9.7.18 The total vehicular movements associated with the basement car park at the Site is approximately 1,219 AADT, thereby exceeding the EPUK/IAQM criteria outlined above. However, as the ventilation strategy for the proposed basement car park is currently unknown, further assessment cannot be undertaken at this stage and has been scoped out of this Chapter. Should mechanical ventilation be proposed within the car park, it is recommended that an assessment of exhaust emissions associated with the basement car park is undertaken at the detailed design stage, and that this is controlled via a suitably worded planning condition. Following detailed assessment, appropriate mitigation should be recommended to offset any air quality impacts arising from the exhaust emissions. Should a natural ventilation strategy be adopted for the basement car park, further assessment will not be required.

Site Suitability

Screening Assessment

- 9.7.19 Based on the busy road network, the predicted trip generation associated with the Proposed Development and high sensitivity of the proposed receptors at the Site, a detailed assessment of site suitability in relation to road traffic emissions has been undertaken in the following section.

Further Assessment

- 9.7.20 Predicted concentrations have been modelled at 14 proposed sensitive human receptors within the Proposed Development, as presented in **Table I.5.1**, **Appendix I.5**. Annual mean NO₂

concentrations have also been predicted across a 300 m x 300 m Cartesian centred on the Site at a height of 1.5 m in the year 2026, as presented in **Figure 9.6**.

- 9.7.21 The predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations are well below the relevant NAQO / limit value at all proposed sensitive receptor locations and heights in the 2026 scenario. Furthermore, predicted annual mean NO₂ concentrations are below 60 µg/m³ at all proposed sensitive receptor locations, indicating that exceedances of the 1-hour mean NO₂ NAQO are unlikely. The predicted annual mean PM₁₀ concentrations are also below 32 µg/m³ at all proposed sensitive receptor locations, suggesting exceedances of the 24-hour mean PM₁₀ NAQO are unlikely.
- 9.7.22 Therefore, the air quality conditions at the Site are considered suitable for the proposed end uses and the impact of existing air quality on future users of the Proposed Development is considered to be 'not significant'.

9.8 Secondary Mitigation and Enhancement

Construction Phase

- 9.8.1 No additional mitigation for the construction phase is required.

Operational Phase

- 9.8.2 The impacts of road traffic emissions associated with the Proposed Development on local air quality are considered to be 'not significant' and therefore no further mitigation is considered to be required. The impacts of existing air quality on future users of the Proposed Development are considered 'not significant' and therefore no mitigation is considered to be required.
- 9.8.3 Notwithstanding this, a Travel Plan will be prepared for the Proposed Development, although the effect of this plan cannot be quantified at this stage.

9.9 Residual Effects

Construction Phase

- 9.9.1 As no secondary mitigation or enhancement is required for the construction phase, the residual effects remain the same as those reported in **Section 9.7** and are considered to be Not Significant.

Operational Phase

- 9.9.2 As no secondary mitigation or enhancement is required for the operational phase, the residual effects remain the same as those reported in **Section 9.7** and are considered to be Not Significant.

9.10 Cumulative Assessment

Construction Phase

- 9.10.1 There is the potential for the Proposed Development to be in construction at the same time as other consented developments in the local area. However, demolition and construction work would have to be taking place concurrently in proximity to a receptor for cumulative effects to occur, which is considered unlikely. In addition, all consented development will require robust dust management procedures and construction vehicle routing strategies to prevent significant effects and it is considered that these will be adequate to prevent the risk of significant in-combination effects associated with construction dust and construction traffic. As such, no

cumulative construction phase impacts are predicted, and the overall cumulative effect is considered 'Not Significant'.

Operational Phase

- 9.10.2 As the Proposed Development is expected to lead to a decrease in road traffic emissions in comparison to the Site's existing use, any in-combination impacts arising from committed development in the local area will be less than those assessed in-isolation through individual planning applications. As such, there are not anticipated to be any additive adverse air quality impacts on existing sensitive receptors in the local area as a result of the Proposed Development and the overall cumulative effect is considered 'Not Significant'.
- 9.10.3 For the assessment of the suitability of the Site for the proposed end-uses, the impact of nearby committed developments in the study area has been inherently assessed via the inclusion of traffic growth within the future baseline traffic data, albeit this does not explicitly identify individual developments. As a result, the cumulative effects of the Proposed Development are the same as those reported in **Section 9.10** are considered 'Not Significant'.

9.11 Monitoring

- 9.11.1 The assessment has demonstrated that residual effects from the Proposed Development on air quality are considered Not Significant, therefore no monitoring is required.

9.12 Summary

- 9.12.1 The air quality impacts associated with the proposed redevelopment of land at Forbury Retail Park have been assessed. The Site is located within the administrative boundary of Reading Borough Council (RBC).
- 9.12.2 RBC has declared one AQMA in its administrative area for exceedances of the annual mean NO₂ NAQO. The AQMA covers Reading town centre, areas along all the major radial roads into Reading (including J11 of the M4) and along railway lines where they pass through built-up areas. The Site is partially located within the AQMA.
- 9.12.3 The construction activities associated with the Proposed Development have the potential to create dust. During construction, it is recommended that a package of mitigation measures is put in place in accordance with the IAQM guidance to minimise the risk of elevated PM₁₀ concentrations and dust soiling in the surrounding area. With mitigation in place the construction impacts are judged as being 'not significant'.
- 9.12.4 The road traffic generated by the Proposed Development is estimated to be below that currently produced by the Site and is therefore below the relevant EPUK / IAQM screening criteria.
- 9.12.5 Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted for a number of worst-case locations representing future receptor locations within the Site during the Proposed Development's operational phase. Predicted concentrations are well below the relevant NAQOs at all proposed receptor locations. The operational effects of the Proposed Development are therefore judged to be not significant. No secondary mitigation or enhancement is considered necessary.
- 9.12.6 There are not predicted to be any significant air quality effects as a result of the Proposed Development, and the Proposed Development is considered to be in accordance with the requirements of the NPPF, and relevant local and national guidance regarding air quality.

9.13 References

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10 Built Heritage

10.1 Introduction

- 10.1.1 This Built Heritage chapter provides an assessment of the likely significant effects of the Proposed Development on heritage (the historic environment) assets (hereafter ‘receptors’). The chapter describes the significance (or ‘value’) of any heritage receptors that may be affected by the Proposed Development, including any contribution to significance made by their setting. Montagu Evans has prepared this chapter in accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A.3**.
- 10.1.2 The assessment as a whole is informed by visual tools, including a zone of theoretical visibility (ZTV), non-verified massing studies and accurate visual representations (‘AVRs’), which are contained in **Appendix M.2** and **M.3** of the TVIA Chapter.

10.2 Policy Context, Legislation, Guidance and Standards

- 10.2.1 The following section sets out the planning policy context for the Site and for the context of the assessment process.

National Legislation and Policy

Planning (Listed Buildings and Conservation Areas) Act 1990

- 10.2.2 The Site does not comprise any statutorily listed buildings and nor is it located in a conservation area. There are statutorily listed buildings which have been identified in the study area which may experience a change to their heritage value as a result of the Proposed Development changing their setting. The relevant statutory provision is Section 66(1) of the 1990 PLBCA Act which states:

“In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural and historical interest which it possesses.”

National Policy

- 10.2.3 The development plan is supported by the planning policies set out in the NPPF. The relevant provisions are set out at **Table 10.2**.

Table 10.1: National Planning Policy Relevant to Built Heritage

National Policy	Key Provisions
National Planning Policy Framework (NPPF) 2021	Chapter 16 (Conserving and enhancing the historic environment): Paragraph 194 Paragraph 195 Paragraph 197 Paragraph 199-202 Paragraph 203 Paragraph 206

Local Policy

Reading Borough Local Plan (2019)

- 10.2.4 Section 38(6) of the Planning and Compulsory Purchase Act 2004 stipulates that where in making any determination under the Planning Acts, regard is to be had to the development plan, and the determination must be made in accordance with that plan unless material considerations indicate otherwise. The statutory development plan and the policies relevant to the assessment of heritage matters are set out at **Table 10.1** below.

Table 10.2: Development Plan Policy Relevant to Built Heritage

Development Plan Policy	Key Provisions
Reading Local Plan (2019)	Policy CC6: Accessibility and the Intensity of Development Policy CC7: Design and the Public Realm Policy EN1 Protection and Enhancement of the Historic Environment Policy EN2: Areas of Archaeological Significance Policy EN4 Locally Important Heritage Assets Policy EN5 Protection of Significant Views with Heritage Interest Policy EN6 New Development in a Historic Context Policy CR13: East Side Major Opportunity Area Policy CR13b: Forbury Retail Park

Policy Guidance

- 10.2.5 In addition to legislation and policy, the assessment will take into consideration relevant planning guidance and any material considerations, including:
- National Planning Practice Guidance (online);
 - Historic England, Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment (2015)
 - Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2017);
 - Historic England Advice Note 4: Tall Buildings (2022);
 - IEMA, ClfA and IHBC (2021) Principles for Cultural Heritage Impact Assessment
 - Market Place/London Street Conservation Area Appraisal (2007)
 - Reading Borough Council, Eldon Square Conservation Area Appraisal (2015);
 - Reading Borough Council Proposals Map (Adopted 2019);

- City Centre Framework SPD (2008);
- The Reading Prison Framework (2015);
- Significant Views with Heritage Interest assessment (2018).

Policy Discussion

- 10.2.6 The Site is located within an area of evolving change and major regeneration. This planning context is an important material consideration to the decision maker. The development plan identifies the Site as being within the East Side Major Opportunity Area, Forbury Retail Park (Policy CR13). Reading Local Plan (2019) defines one of the main visions for this area as follows:

“One of the main purposes of the designation of this area as the East Side is the creation of a more urban feel to what is currently a low-density area of buildings which do not relate well to the streets and spaces. Therefore, development should be of a more urban form, for example perimeter blocks.”

- 10.2.7 For the specific area in which the Site is located, Forbury Retail Park, the development plan outlines the following criteria:

“CR13b, Forbury Retail Park: *The site would be the focus of the new residential community, and, alongside residential, additional retail, leisure and community uses at a scale to serve the Kenavon Drive area would be appropriate. It should include a new area of open space and enhance the frontage to the canal, including a buffer zone to the top of the canal bank to reflect its wildlife significance. Implementing this policy may involve complete redevelopment or using new additional development to improve the existing urban form of the area. Some parts of the site are likely to be implemented in the long term.”*

- 10.2.8 RBC Local Plan Policy EN1 states that:

“All proposals will be expected to protect and where possible enhance the significance of heritage assets and their settings, the historic character and local distinctiveness of the area in which they are located. Proposals should seek to avoid harm in the first instance. Any harm to or loss of a heritage asset should require clear and convincing justification, usually in the form of public benefits.”

- 10.2.9 Policy EN4 of Reading’s Local Plan, in reference to non-designated heritage asset, states that:

“Development proposals that affect locally important heritage assets will demonstrate that development conserves architectural, archaeological or historical significance which may include the appearance, character and setting of the asset.”

- 10.2.10 The extant development plan policies are consistent with the NPPF.

- 10.2.11 Section 66(1) of the *Planning (Listed Buildings and Conservation Areas) Act 1990* requires that for development which affects a listed building or its setting the decision maker shall have ‘special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.’ The effect of that provision is that the desirability of preserving the setting of a listed building must be treated as a matter of ‘considerable importance and weight’,¹⁴ with such a duty presenting a ‘strong presumption’

¹⁴ *Barnwell v East Northamptonshire District Council* [2014] EWCA Civ 137

against a grant of planning permission where harm to a designated heritage asset is identified.¹⁵

10.2.12 Setting is not an asset in its own right. 'Its importance lies in what it contributes to the significance of the heritage asset or to the ability to appreciate that significance.'¹⁶ The *Setting of Heritage Assets* (hereafter 'GPA3') provides 'advice on understanding setting and how it may contribute to the significance of heritage assets.'¹⁷ It recommends a staged approach to proportionate decision taking.

10.2.13 If, having carried out stages one and two, a proposed development is held to cause harm to the significance of a designated heritage asset, the NPPF stipulates it be categorised as either 'less than substantial' or 'substantial'.¹⁸ The NPPF does not define 'substantial', and national guidance simply states it is a 'high test'.¹⁹ Lord Justice Lindblom, in the Court of Appeal, stated: 'what amounts to "substantial harm" or "less than substantial harm" in a particular case will always depend on the circumstances', based on 'matters of fact and planning judgment'.²⁰

10.2.14 A separate Court of Appeal judgement confirmed that where a development would affect a listed building or its setting in different ways, some positive and some negative, the decision maker may conclude that although each of the effects has an impact, taken together there is no overall adverse effect on the listed building.²¹ This approach was upheld by Lord Justice Lindblom who stated that the NPPF policies 'do not preclude a balancing exercise as part of the decision-making process.'²² Where public benefits - including heritage benefits - outweigh the identified harm, then permission may be granted subject to a proportionate assessment being undertaken.

10.3 Consultation

10.3.1 The assessment scope is based on the Scoping Report submitted to the Council on the 24th February 2023 (ref. 230243) and subsequent response from Reading Borough Council (RBC). **Table 10.3** summarises the consultation comments received from RBC and where the comments have been addressed within the assessment.

Table 10.3: Summary of Consultation

Consultation (Who and Date)	Summary of issues raised during consultation	How it has been dealt within this chapter	Where it has been addressed within the chapter (if applicable)
Scoping Opinion received from Reading Borough Council dated 18 th April 2023	The Gardens Trust highlighted that the EIA should assess the effects of the Proposed Development on the physical and visual setting	The effects of the Proposed Development on the	The effect of the Proposed

¹⁵ *South Lakeland District Council v Secretary of State for the Environment and Another* [1992] 2 AC 141

¹⁶ Historic England, *The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning Note 3*, 2nd edn (Swindon: Historic England, 2017) p4

¹⁷ Ibid. p1

¹⁸ MHCLG, *National Planning Policy Framework*, rev. edn (London: HMSO, 2021)

¹⁹ DLUHC and MHCLG, *National Planning Policy Guidance: Historic Environment* <<https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment>> [3 May 2023]

²⁰ *Bramshill v SSHCLG* [2021] EWCA Civ 320

²¹ *Palmer v Herefordshire Council & ANOR* [2016] EWCA Civ 1061

²² *Bramshill v SSHCLG* [2021] EWCA Civ 320

Consultation (Who and Date)	Summary of issues raised during consultation	How it has been dealt within this chapter	Where it has been addressed within the chapter (if applicable)
	of the Forbury Park RPG and the listed structures within it. RBC identified a number of heritage assets which had not been included on the Heritage Asset Plan submitted as part of Appendix 4 of the Scoping Report. This included the following listed buildings: • Reading Station • 13 and 15 Station Road • 148, 149 and 150 Friar Street • 154 Friar Street • 24-28 Broad Street • Walls to the west of 44 Watlington Street • Gas Works Social Club, Gas Works Road It was advised that a re-review of the boundary of the scoped area should be undertaken in light of the updated site location plan.	Forbury Gardens RPG and its listed structures have been considered within the heritage assessment section of this chapter. considered from Paragraph 10.7.45 of this ES chapter. The additional receptors identified in the Scoping Opinion received from Reading Borough Council have been included on the heritage asset plan at Appendix J.1 of this report. Consideration of these additional receptors have been considered either at pre-baseline, baseline or assessment stage of this Built Heritage Chapter. The Site boundary on the heritage asset plan at Appendix J.1 of this ES chapter has been updated.	Development on the Forbury Gardens RPG has been considered at Paragraph 10.7.45 of this ES chapter. The consideration of the additional receptors identified in the Scoping Opinion received from Reading Borough Council, have been considered at Paragraph 10.5.33 of this Built Heritage Chapter.
Pre application meeting with RBC dated 8th May 2022	Important design considerations were addressed and agreed, notably separation distances were discussed. The new case officer raised questions over the separation distances below 18m.	A detailed assessment of the Site and the Proposed Development in relation to siting, layout and height parameters is provided at the assessment section of this chapter.	N/A
Design Review Panel (DRP) held with Design South East (DSE) dated July 2021.	Concerns over the number of single aspect units and variation of massing.	A detailed assessment of the Site and the Proposed Development in relation to siting, layout and height parameters is provided at the assessment section	N/A

Consultation (Who and Date)	Summary of issues raised during consultation	How it has been dealt within this chapter	Where it has been addressed within the chapter (if applicable)
		of this chapter. As a result, all north facing single aspect units were designed out and increased variation was introduced in relation to the heights of the individual residential blocks to break up the overall massing of the Proposed Development.	

10.4 Methodology

Study Area

- 10.4.1 The study area for the Built Heritage Chapter comprises all heritage receptors (designated and non-designated) up to 500m from the Site (see Appendix J.1 of the Built Heritage Chapter).
- 10.4.2 Site observations, a manual desk-based review of OS maps, characterisation studies and relevant heritage receptors were used to determine the study area. It has been informed by building locations and heights, topography and townscape features, and an understanding of the scale of the Proposed Development.
- 10.4.3 A Zone of Theoretical Visibility (ZTV) has been produced to outline the potential areas where the Proposed Development may be visible, up to a 2km distance from the Site (see Appendix J.2 of the Built Heritage Chapter). The ZTV was run on a Digital Surface Model (DSM) using National LIDAR Programme data, 1m resolution grid, 2019. It is a tool for a high-level understanding of the extent of visibility, which was further interrogated through review of individual viewpoints using field surveys and digital software.

Baseline Data Collection

- 10.4.4 The location of the built heritage receptors identified in this assessment are shown at **Appendix J.1**. The ZTV with an overlay of the heritage receptors identified in the 500m study area is provided at **Appendix J.2**.

Assessment

Heritage

- 10.4.5 The term 'heritage receptor' is used within this assessment to describe a designated or non-designated heritage asset, as defined by the National Planning Policy Framework (2021) (the NPPF). The assessment does not consider below-ground archaeological receptors, including scheduled monuments, unless the archaeological feature has been scoped into the assessment. This occurs in some cases where the understanding of an archaeological feature with no upstanding remains is affected by perceptions of its setting.

Heritage Value

- 10.4.6 Planning policy requires an applicant to describe the significance of any heritage receptors affected by a Proposed Development, including any contribution made by their setting. 'Significance' (for heritage policy) is defined in the NPPF Annex 2 as:

"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."

- 10.4.7 The term 'heritage value' is interchangeable in this assessment with 'heritage significance' and has been adopted to avoid conflation between 'EIA significance'. Heritage value is assessed against the criteria contained in **Table 10.4**; the categories allow some flexibility in their practical application to the facts of any case. The typical examples for each category are indicative, mindful that the buildings/sites/areas cover a wide spectrum of character, history, features, and group relationships. The reader is referred to the qualitative assessment which outlines the particular nature of the value.

- 10.4.8 Paragraph 194 of the NPPF states that the "level of detail [to describe the significance of heritage assets] should be proportionate to the assets' importance". Great weight has been given to the conservation of all designated heritage receptors, although a gradation of value is appropriate. This is reinforced by the 2018 DCMS Principles for Selection of Listed Buildings which states "listed buildings are graded to reflect their relative special architectural and historic interest":

"Grade I buildings are of exceptional special interest;

Grade II buildings are particularly important buildings of more than special interest;*

Grade II buildings are of special interest, warranting every effort to preserve them. "

- 10.4.9 The value of heritage receptors may be expressed with reference to their historical or architectural value identified in the 1990 PLBCA Act, or the other values set out in the NPPF: archaeological, architectural, artistic or historic. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its value.

- 10.4.10 Where a proposal may affect the surroundings in which the heritage receptor is experienced, a qualitative assessment is made of whether, how and to what degree setting contributes to the value of heritage receptors. The assessment is informed by the check-list approach contained in Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2017) (hereafter 'GPA3'). Setting is defined in the NPPF as:

"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."

- 10.4.11 The heritage baseline articulates the contribution made by relevant aspects of setting towards value. Again, the level of detail is proportionate to the receptors' importance and no more than is sufficient to understand the potential impact of the proposal to their value; however, each heritage receptor's susceptibility to change derives from the particular nature of its heritage value, the existing character of its setting and the type of development proposed. The baseline assessment therefore describes what is sensitive about each heritage receptor and its setting without providing a sensitivity rating, which follows later in the assessment stage.

Table 10.4: Heritage Value Criteria

Heritage Value		
Value	Typical Criteria	Typical Examples
Very High	Building/site/area of international heritage value	World Heritage Sites, grade I statutorily listed buildings and registered parks and gardens, and some scheduled monuments, grade II* statutorily listed buildings and registered parks and gardens.
High	Building/site/area of national heritage value	Some scheduled monuments, Grade II* and II registered parks and gardens, grade II* and II statutorily listed buildings and conservation areas
Medium	Building/site/area of lower national or particular local heritage value	Some grade II registered parks and gardens, grade II statutorily listed buildings and conservation areas.
Low	Building/site/area of local heritage value	Locally listed buildings (or equivalent non-designated heritage assets).
Very Low	Building/site/area of low local heritage value	Receptors not formally identified, but which may have a degree of value meriting consideration in planning decisions

Heritage Sensitivity

10.4.12 The first stage in assessing the impact of the Proposed Development upon the heritage value of a receptor is to identify its sensitivity to change. Sensitivity is identified by calibrating the baseline value of the receptor with its susceptibility to change, defined as the ability of the heritage receptor to accommodate the type and/or nature of development without change to its value (see **Table 10.5**). In relation to heritage setting, paragraph 17 of GPA3 provides guidance on the relationship between heritage value and the potential impact of development upon that value by virtue of changes to its setting:

“All heritage assets have significance, some of which have particular significance and are designated. The contribution made by their setting to their significance also varies. Although many settings may be enhanced by development, not all settings have the same capacity to accommodate change without harm to the significance of the heritage asset or the ability to appreciate it. This capacity may vary between designated assets of the same grade or of the same type or according to the nature of the change. It can also depend on the location of the asset: an elevated or overlooked location; a riverbank, coastal or island location; or a location within an extensive tract of flat land may increase the sensitivity of the setting (ie the capacity of the setting to accommodate change without harm to the heritage asset’s significance) or of views of the asset. This requires the implications of development affecting the setting of heritage assets to be considered on a case-by-case basis. “

10.4.13 Cases of direct changes to the fabric of heritage receptors may be more likely to be susceptible to change, although this may be moderated according to the facts of the case. The qualitative text should clearly articulate where any deviation is made from this judgement.

Table 10.5: Susceptibility of Heritage Receptor to Change Criteria

Heritage Susceptibility to Change Criteria	
High	The setting of the receptor or receptor itself has a low ability to accommodate the type of change without change to its value.
Medium	The setting of the receptor or receptor itself has a moderate ability to accommodate the type of change without change to its value.
Low	The setting of the receptor or receptor itself has a high ability to accommodate the type of change without change to its value.

10.4.14 The value of the receptor and its susceptibility are calibrated using the matrix at **Table 10.6**. Sensitivity is recorded in a verbal scale (high, medium or low), supported by a clear narrative linked to evidence from the baseline study and an assessment of susceptibility.

Table 10.6: Heritage Sensitivity (Nature of Receptor Likely to be Affected)

Heritage Sensitivity			
Receptor Value	Susceptibility of Receptor to Change		
	Low	Medium	High
Very Low	Low	Low	Low/Medium
Low	Low	Low/Medium	Medium
Medium	Low/Medium	Medium	Medium/High
High	Medium	Medium/High	High
Very High	Medium/High	High	High

Heritage Magnitude

10.4.15 The magnitude of change to the receptors' heritage value is then considered. In relation to setting impacts, although the change arising from the Proposed Development may be large in physical scale or geographical extent, there may nonetheless be little or no impact on heritage value, and vice versa. The heritage impacts of the Proposed Development have been considered in relation to the degree of change caused to those parts of the receptor and/or its setting which contribute to its heritage value.

10.4.16 The judgement of magnitude considers the size or scale, geographical extent or duration and reversibility of the impact and whether the Proposed Development:

- Conforms with the pattern, scale, mass, grain and historic features of the receptor;
- Creates a loss or restoration of key features of the receptor;
- Contributes to the identified receptor character; and

- Accords with national, regional and local planning policy and guidelines.

10.4.17 The magnitude of impact is a qualitative judgement supported by the narrative text within the assessment. The professional judgement is quantified using criteria at **Table 10.7**.

Table 10.7: Magnitude of Impact to Heritage Receptor Criteria

Heritage Magnitude of Impact	
High	Major change to the value of the receptor. Loss of or major alteration to key elements/features/characteristics that contribute to value. The duration of this impact may be permanent and non-reversible.
Medium	Moderate change to the value of the receptor. Alteration to one or more key elements/features/characteristics that contribute to value. The duration of this impact may be semi-permanent and partially reversible.
Low	Minor change to the value of the receptor. Minor alteration to one or more elements/features/characteristics that contribute to value. The duration of this impact may be temporary and reversible.
Very Low	Negligible change to the value of the receptor. Very minor alteration to one or more key elements/features/characteristics of the baseline. The duration of this impact may be temporary and reversible.
Nil	No change to the value of the receptor.

Likely Effects

10.4.18 Likely effects are determined by combining the judgements of sensitivity and the magnitude of impact (Table 10.8). It is generally considered that moderate to major effects are 'significant' in the context of the EIA Regulations. Criteria defining the scale of effect is provided at **Table 10.8**.

Table 10.8: Likely Effect on Heritage Receptor Matrix

Heritage Likely Effect on Receptor			
Magnitude	Sensitivity		
	Low	Medium	High
Nil	None	None	None
Very Low	Negligible	Negligible	Negligible/Minor
Low	Minor	Minor/Moderate	Moderate
Medium	Minor/Moderate	Moderate	Moderate/Major
High	Moderate	Moderate/Major	Major

10.4.19 The scale of effect requires a qualitative discussion to describe and elucidate this judgement to the reader. This is necessary because heritage assessment is not a strict quantitative process and some of these considerations will depend on expert judgements. Accordingly, there is an emphasis on qualitative text throughout the assessment to describe the receptors and the judgements in regard to the significance of the identified effects.

Table 10.9: Heritage Scale of an Effect

Heritage Scale of an Effect	
Major	The change resulting from the impact of the Proposed Development upon the heritage value of the receptor would give rise to a very significant effect.
Moderate	The change resulting from the impact of the Proposed Development upon the heritage value of the receptor would give rise to a significant effect.
Minor	The change resulting from the impact of the Proposed Development upon the heritage value of the receptor would give rise to an effect, but this would not be significant.
Negligible	The change resulting from the impact of the Proposed Development upon the heritage value of the receptor would give rise to a barely discernible effect. This would not be significant.
None	The change resulting from the impact of the Proposed Development upon the heritage value of the receptor would have no effect.

10.4.20 Professional judgement is also required to determine the nature of the likely effects. For example, there will be cases where a high magnitude of impact produces a major scale of effect, on the basis that the component is prominent or noticeable, but notwithstanding that the quality of effect is beneficial as a consequence of design quality or other benefits. This approach arises most often as a consequence of major developments in areas positively identified for transformational change. Often, such impacts will have varied effects such that a hard and fast categorisation is finely balanced as between beneficial or harmful. In many instances, therefore, the final identification of impact and effect will turn on discursive analysis. Criteria defining the nature of effect is provided at **Table 10.10**.

Table 10.10: Heritage Nature of an Effect

Heritage Nature of an Effect	
Beneficial	An enhancement to a receptor
Neutral	An effect that on balance, is neither beneficial nor adverse to a receptor, and therefore preserves the receptor.
Adverse	A harmful impact to a receptor

Cumulative Effects

10.4.21 The cumulative schemes for inclusion in this Volume were agreed with RBC during the scoping process. A plan of the cumulative schemes is provided in **Appendix A.7**. The approach to assessing cumulative impacts on heritage assets is in line with Planning Note GPA3.

10.5 Baseline Conditions

Historic Development

10.5.1 This section provides a description of the historical development of the Site and that of the surrounding area. The section and the heritage baseline within **Section 10.5** has been informed by secondary sources, including:

- The National Heritage List for England maintained by Historic England;
- Reading Borough Council, Eldon Square Conservation Area Appraisal (2015);
- Reading Borough Council, Market Place/London Street Conservation Area Appraisal (2021);
- Reading Borough Council, Register of Locally Listed Buildings;
- The Historic Environment Record ('HER');
- Bridget Cherry and Nikolas Pevsner, The Buildings of England: Berkshire (2010);
- David Nash Ford, Royal Berkshire History: Reading, Biscuits, Bulbs & Beer; and
- Allan Brodie, Jane Croom and James O Davies, English Prisons: An Architectural History (2002).

Historical development of Reading

10.5.2 This section is informed by the historic maps and images at **Appendix J.3** of this report:

- 1610 John Speed's Map of Reading;
- 1900 OS Map (source: Promap);
- 1933 OS Map (source: Promap);
- 1973 OS Map (source: Promap);
- 1979 OS Map (source: Promap);
- Aerial photograph of Reading from the west, 1947 (source: Historic England);
- Aerial photograph of Broad Street Mall and the Inner Distribution Road, from the north, 1971 (source: Historic England);
- Aerial photograph of the Site during clearance, 1967 (source: Historic England); and
- Goads Insurance Plan of Reading, 1895 (source: British Library).

10.5.3 By the 11th century, Reading was an established urban settlement at a strategic crossing over the River Kennet and north-south, east-west crossroads. The church now known as the Church of St Mary (Reading Minster) would have been at the centre of this original settlement, however, after the founding of Reading Abbey by Henry I in 1121, the urban centre of the settlement moved away from St Mary's and Castle Street towards the Abbey in the north-east.

10.5.4 As one of the largest monasteries in England, Reading became a place of pilgrimage and a new market was established by the Abbey from the 13th century. The town grew in prosperity

due to its successful silk, wool and leather trades. John Speed's 1610 map of Reading at (Appendix J.3) shows Reading as a small settlement to the north of the river Kennet, bound to the north by Gutter Lane, now known as Friar Street, and Reading Abbey to the east. The 17th century map illustrates ribbon development extending beyond the medieval core, following Castle Street to the west and Shomakers Row, now known as London Street, to the south. The irregular street pattern of this medieval core is still discernible around Broad Street.

- 10.5.5 Despite early prosperity, Reading remained within its medieval boundaries until the end of the 18th century as a result of decline in its textile industry and the aftermath of the Civil War. In the 19th century Reading began to prosper again as a market town, as a result of improved trade and transport links, and flourishing industries.
- 10.5.6 By the end of the 18th century, several turnpikes converged at Reading, making it a popular stopping place and Thames River crossing, particularly between London in the east and Bristol or Bath in the west. Consequently, there were a great number of coaching inns in the town. An example of this survives at the Grade II listed George Hotel, 2-4 King Street.
- 10.5.7 In the 19th century, Reading was connected to other cities by canal and rail. By 1810 the 87-mile Kennet and Avon Canal was completed, providing a waterway from the Bristol Channel to Reading, where the River Kennet joins the River Thames towards London.
- 10.5.8 In 1841 the Great Western Railway superseded the canal system, connecting Reading to London by rail. Reading was made further accessible by South Eastern Railway and South Western Railway, in 1849 and 1856 respectively.
- 10.5.9 Reading expanded rapidly in the 19th century, spreading out from the medieval core to the west, south and east. Between 1850 and 1900, the population of Reading increased from 21,450 to 72,000. This expansion can be traced in the linear street pattern of Victorian and Edwardian suburbs, particularly along Oxford Road in West Reading and London Road in East Reading, and New Town.
- 10.5.10 In the 18th century, malting and brewing were prominent industries. Simond's Brewery was founded in 1785 and later came to occupy a large riverside site with brewery buildings designed by Sir John Soane. The brewery complex was demolished and the Oracle shopping centre constructed on the Site, opening in 1999.
- 10.5.11 Owing to its geographical position in the Chilterns, brick making was a historically prominent industry in Reading with medieval origins. This industry grew in the 18th and 19th centuries with the popularity of brick as a building material. Expansion and prosperity at this time led to the redevelopment or refacing of most of the 16th and 17th century timber framed buildings which populated medieval Reading, and by the mid-19th century the predominant building material in Reading was brick.
- 10.5.12 The Edwardian terraces lining Elgar Road are constructed with bricks manufactured at the Katesgrove Kiln formerly to the immediate south of this street and provide an example of the quality of bricks being produced in Reading at the turn of the 19th century. Throughout Reading there are examples of the distinctive red brick produced from the Reading Beds, often used in decorative and elaborate brickwork.
- 10.5.13 Further prosperous industries developed in Reading at this time, including bulb growing and biscuit manufacturing. Reading was known for a period as "Biscuit Town", with the largest employer in Reading being Huntley and Palmers, founded at a small bakery in 1822. Huntley and Palmer occupied a large site to the north of Kings Street, where they would become the world's largest biscuit manufacturer. Only one building remains of this large manufacturing complex at the junction of Kings Road and Gas Works Road.
- 10.5.14 In the 20th century, Reading continued to expand, absorbing radial settlements including Caversham to the north by 1911 and becoming a large urban settlement.

10.5.15 After the Second World War, Reading experienced significant change in its built environment and infrastructure. In the post-war period, a high demand for housing exacerbated by the London overspill resulted in rampant residential and civic development in the centre and outskirts of Reading. Housing shortages led to the building of council housing and estates in the 1950s, to the west of the Site, the Southcote suburb is an example of this expansion.

10.5.16 The dual carriage Inner Distribution Road was built as a radical solution to vehicular congestion in the town centre. Several central Reading neighbourhoods were cleared during the construction of the ring road system and West Reading, including the 19th century Castle Hill residential, which was effectively annexed.

10.5.17 In order to make way for the laying of the ring road and the creation of a new civic centre, there was extensive demolition throughout the 1960s and 1970s on and around the Site. The aerial photograph at in **Appendix J.3**, taken in 1947, shows the extent of historic fabric cleared in the St Mary's Butts area during this post-war redevelopment.

10.5.18 The Magistrates Court and Police Station were built on Castle Street in 1968 and 1976 respectively, and in 1971 the Broad Street Mall indoor shopping centre opened (not shown on the 1973 map), along with the office blocks Quadrant House and Fountain House.

Historical Development of the Site

10.5.19 This section is informed by the OS maps in **Appendix J.4** of this report:

- A map of Reading during the Civil War. Source: Reading Museum;
- OS map of 1899. Source: Promap;
- OS map of 1912-1913. Source: Promap;
- OS map of 1938. Source: Promap; and
- OS map of 1980-1991.

10.5.20 Indicated by the OS map of 1879, during the late 19th century, the Site comprised an empty parcel of land, situated between Forbury Road to the south and the railway line to the north. To the west of the Site, was a goods shed and warehouse, likely associated with the workings of the adjacent railway line.

10.5.21 Following the southern boundary of the Site, on a lateral axis, is a 'plummary ditch'. This survives as a remnant of Reading's historic waterways, which are indicated on John Speed's map of 1610. Plummary Ditch was the largest of all of Reading's water ditches. It started in Kings Meadow and flowed eastwards, eventually joining the River Kennet near Blake's lock. During the Civil War and the Siege of Reading in 1643, a series of ditches to the north of Reading were filled with the waters of the River Thames to prevent Parliamentary forces infiltrating the town.

10.5.22 By the turn of the century, the railway line infrastructure had expanded, covering the majority of the Site. On the eastern and western boundaries of the Site, there is minimal built form, some indicated as good sheds. The large urban footprints of unidentified built form to the west indicates they are of industrial use, associated either with the railway or with the adjacent biscuit factory.

10.5.23 To the south, the Site is bordered by the Plummary Wall, which is now Grade II listed. It was built in the late 19th century and incorporates the medieval Plummary Dwarf wall. It is located in the middle of Forbury Road.

10.5.24 There had been very little change to the Site by the time of the 1912-13 OS map. The Site still comprised only of the infrastructure associated with the railway line. This continued until the late 1930s.

10.5.25 Towards the end of the 20th century, the Site comprised a car park, likely associated with Queens House to the adjacent west, which was constructed in the early 1970s as offices for the Metal Box Company.

10.5.26 Details on Reading Borough Council's website indicate that a planning application was submitted on the 27th of July 1994, (planning application ref: 940008) for "5727 sq m of non-food retail warehousing with associated parking and landscaping."

10.5.27 The retail park has been in use since the mid-1990s and comprises a number of retail and leisure outlets.

Baseline Evolution

10.5.28 The EIA Regulations require that the likely evolution of the baseline is considered. This is an assessment in the event that the Proposed Development were not to come forward. In other words, the likely effect on the receptors if the cumulative developments and any relevant policy designations were to come forward without the Proposed Development.

10.5.29 Given that so much of the likely evolution of the baseline for receptors will depend upon the particulars of the design for development coming forward to meet the policy aspirations for the area, a separate assessment of the evolution of the baseline for the receptors identified in this assessment is not provided.

Baseline: Built Heritage

10.5.30 This section identifies the value of heritage receptors in the baseline that may be affected by the Proposed Development.

10.5.31 The location of the built heritage receptors identified in this assessment are shown at **Appendix J.1**. The ZTV with an overlay of the heritage receptors identified in the 500m study area is provided at **Appendix J.2**.

10.5.32 The built heritage baseline is summarised at **Table 10.11**, including receptors scoped in and out of the full assessment. The ZTV was used to identify at the baseline stage if there were any heritage receptors which could be scoped out from further assessment because there would be no intervisibility with the Proposed Development, or where there would be no change to their setting or heritage value by any other means, including historical associations.

10.5.33 The Scoping Opinion received from Reading Borough Council on the 18th of April 2023, identified that the following receptors had not been included within the original study radius:

- Reading Station
- 13 & 15 Station Road
- 148, 149 & 150 Friar Street
- 154 Friar Street
- 24-28 Broad Street
- Walls to the west of 44 Watlington Street

■ Gas Works Social Club, Gas Works Road

10.5.34 The receptors identified by the Scoping Opinion are identified on the map at **Appendix J.1** of this ES chapter. For the following receptors: 13 and 15 Station Road, 148-150 Friar Street, 154 Friar Street and 24-28 Broad Street, the ZTV overlay with the HA plan at **Appendix J.2** illustrates that there is not likely to be any intervisibility with the Proposed Development, or this would form a peripheral feature of the wider townscape. This is reinforced by the consistent scale of development within this town centre location, which has established a sense of visual enclosure. These receptors have thus been scoped out at pre baseline stage.

10.5.35 For the walls to the west of 44 Watlington Street, a baseline description has been provided within Group 9: Watlington Receptors. Given the limited intervisibility with the Site over distance, the receptor has been scoped out of the assessment stage.

10.5.36 For the Gas Works Social Club, a baseline description has been provided within Group 10. Given the limited intervisibility with the Site due to interposing development in the foreground, the receptor has been scoped out of the assessment stage.

10.5.37 For Reading Station, a baseline description of heritage value and assessment of impact by the Proposed Development has been provided in the relevant sections below.

10.5.38 A qualitative assessment of the heritage value of the remaining receptors is provided below, including the contribution made by setting.

Table 10.11 Summary of Built Heritage Baseline

Map Ref.	Name	Grade (if applicable)	Heritage Value	Full Assessment Required?
Designated Heritage Receptors				
Listed Buildings				
1	Reading Abbey Ruins	I	Very High	Yes
2	Abbey Gate	I	Very High	Yes
3	Church of St Laurence	I	Very High	Yes
4	Archway connecting Forbury Gardens to Abbey Ruins, including retaining walls flanking path to Abbey Ruins	II*	Very High	Yes
7	Watlington House	II*	Very High	No
9	Reading Gaol	II	High	Yes
10	Church of St James's	II	High	Yes
11	St James's Presbytery and St James Former School Buildings	II	High	Yes
12	Shelter at North-East Corner of Forbury Gardens	II	High	Yes
13	Wall between Forbury Road and Abbott's Walk to West of St James's Church	II	High	Yes
14	The Plummary Wall	II	High	Yes
15	10 and 11 and 12, Abbot's Walk	II	High	Yes
16	Anglican Cross	II	High	Yes
17	Maiwand Memorial	II	High	Yes
18	Kings Meadow Swimming Pool	II	High	Yes
19	Assize Courts	II	High	Yes

Map Ref.	Name	Grade (if applicable)	Heritage Value	Full Assessment Required?
20	Shire Hall	II	High	Yes
21	Abbey Mill Ruins	II	High	No
22	Wall and Gatepiers of St Laurence's Graveyard	II	High	Yes
23	Tracey Fragments to south of	II	High	Yes
24	Engine House	II	High	Yes
25	St Laurence's Church and Churchyard, and Twelve Tombs in St Laurence's Churchyard	II	High	Yes
26	Municipal Buildings	II	High	Yes
27	The Screens House	II	High	Yes
28	47-48 Kenavon Drive	II	High	Yes
29	Former School of Art	II	High	Yes
30	The Pump and Turbine House	II	High	Yes
31	Small Town Hall	II	High	Yes
35	Reading Museum	II	High	Yes
42	Wesley Methodist Church	II	High	Yes
57	Church of St John the Evangelist	II	High	Yes
73	Walls at 44 Watlington Street (Watlington House)	II	High	No
74	Main Building of Reading Central Station	II	High	Yes
Conservation Areas				
A	Market Place and London Street	N/A	High	Yes
B	Eldon Square	N/A	High	Yes
Registered Park and Garden				
82	Forbury Gardens	II	High	Yes
Scheduled Monuments				
80	Reading Abbey: a Cluniac and Benedictine monastery and Civil War earthwork.	N/A	Very High	Yes
81	High Bridge	N/A	Very High	No
Non-Designated Heritage Receptors				
75	Kings Road Garden, Kings Road	N/A	Low	No
76	Huntley and Palmers Social Club, Kings Road	N/A	Low	No
79	Former Gas Works Social Club	N/A	Low	No

Designated Heritage Receptors

Listed Buildings

10.5.39 The following receptors have been grouped on the basis of their proximity to one another and thus shared setting relationship.

Group 1: Reading Abbey Receptors

10.5.40 This group comprises the following receptors:

- Reading Abbey Ruins – Grade I
- Abbey Gate – Grade I
- Reading Abbey – Scheduled Monument

10.5.41 Reading Abbey was first scheduled on 19th April 1915 and amended 29th January 1993. It is also a Grade I listed structure, designated on 22 March 1957. The Abbey Complex as a designated scheduled monument covers a considerable geographical area, including Forbury Gardens to the west and Reading Gaol to the east. At the nearest point, and in scheduled monument terms, the abbey is located approximately 30m to the south of the Site. However, much of this comprises below ground, archaeological remnants and in terms of above ground remnants, Reading Abbey is located approximately 85m to the south of the Site.

10.5.42 Monasticism formed an important facet of religious and secular life in Great Britain and settlements of religious communities, including monasteries which were built to house monks and priests.

10.5.43 The Abbey was founded by Henry I in 1121 as part of the Cluniac order, which by the mid-13th century had transferred obedience to the Benedictine order. By the mid-14th century, it had become one of the ten richest abbeys in Britain. Following the Dissolution in 1539, most of the church and abbey buildings were demolished.

10.5.44 The Reading Abbey Gate was listed in its own right in March 1957 as a fragmentary remain of the abbey. It is located further away from the Site, approximately 170m to the southwest.

10.5.45 The Abbey Gate dates to between the 12th to 14th century and was originally the inner gateway of Reading Abbey, also comprising a porter's lodge on the ground floor. The gateway marked the division between the area of the abbey open to the public and the section accessible only to monks. Following the dissolution in 1538, the last abbot of Reading was hung outside the Abbey Gate.

10.5.46 The gateway was entirely remodelled by Sir George Gilbert Scott in 1861 following a partially collapse in a storm. It is now constructed of flint and bath stone ashlar. In 1900 a series of 12 heads sculpted by Andrew Ohlson were added to the gateway.

Survival

10.5.47 The ruined abbey buildings survive well, as stated by the Historic England Listing Entry. They stand to almost their original height and comprise the south transept and chapter house, separated by a once roofed passage over which the treasury was located.

10.5.48 Further south, towards the River Kennet, stands the west wall of the parlour and warming room with the dormitory above. The south wall of the refectory also survives, to a height in excess of 2.5m.

10.5.49 The surviving elements have been robbed of their original facing stone, so it is only the core of which survives. From the elements that survive, it is clear that the Abbey with its apse and apsidal transept Chapels were in the mainstream of Norman architecture.

Heritage Value

10.5.50 Reading Abbey derives historic and architectural interest as an excellent example of a medieval monastic complex, and as one of the ten richest abbeys in Britain. It is telling of the influence of monasticism as an important facet of religious and secular life in Great Britain during the medieval period. Architecturally, the surviving remnants stand as well-preserved examples of Norman religious architecture. Historically, the remnants of Reading Abbey survive as a reminder of the historic event of the dissolution of the monasteries in the mid-16th century.

10.5.51 Reading Abbey Gate stems historic and architectural interest as the inner gate of the abbey, which is telling of the everyday practices of monastic life. Additional historic interest is also derived from the gate as the location of the hanging of the last abbot of Reading, which has wider symbolic association with the historic event of the Dissolution of the Monasteries.

10.5.52 The buildings derive group value with other surviving elements of the abbey, which are listed in their own right, including the Abbey Gate and the former Hospitium, which together comprise the complex of Reading Abbey.

10.5.53 Heritage value: Very High

Contribution of setting to heritage value

10.5.54 A number of listed structures and buildings associated with the Abbey are located within its immediate setting. To the west of the abbey, in the churchyard of St Lawrence, is the former hospitium associated with Reading Abbey and directly west is the former Abbey Gate. The presence of these associated structures positively contributes to the heritage value of the abbey, through a more detailed understanding of its original form.

10.5.55 A number of other buildings dating to the medieval period have been identified in the immediate environs of the abbey complex. To the south of the main abbey complex and spanning Holy Brook, is a single 13th century arch which survives as a remnant of the former mill and to the north of the mill are the remains of a medieval bakehouse. These remnants positively contribute to a better understanding of medieval Reading.

10.5.56 Other, later buildings of architectural note include the listed courts, directly adjacent to the Abbey Gate. Forbury Gardens, a Grade II RPG also forms an attractive, open setting for the Abbey complex, and also contains some of its surviving remnants, as well as the GII* archway wall which incorporates fragments from the Abbey.

10.5.57 Reading Gaol forms a prominent urban form to the direct east of the abbey ruins. Dating to the mid-19th century, it is of architectural interest in its own right but bears no historical or functional relationship to the abbey.

10.5.58 From within the Abbey, the upper elements of taller buildings which comprise Reading town centre are perceptible, eroding the historic character of the abbey and its immediate setting. From directly in front of Reading Abbey Gate, modern development aligning the Forbury Road is perceptible through gaps in the treeline on the northern boundary of Forbury Gardens.

10.5.59 At the nearest point, the Site is located approximately 30m to the south of Reading Abbey (as defined as a scheduled monument), however much of this comprises below ground remnants. In terms of above ground-built form, the Site is located approximately 85m to the south. The abbey is physically separated from the Site by the ring-road, which forms a noisy, urban

feature within the immediate setting of the Abbey. Its noisy and urban presence is considered to erode the prevailing historic character of the abbey's surroundings.

- 10.5.60 The current buildings on Site are considered to form a detracting feature within the setting of Reading Abbey, by virtue of its poor architectural quality, utilitarian appearance and large area of surface level parking.

Reading Gaol – Grade II

History

- 10.5.61 Reading Gaol is a Grade II listed building located approximately 50m to the south of the Site, at the nearest point. The prison was built in 1842-44 by George Gilbert Scott and William Bonython Moffatt, according to advanced principles of organisation.
- 10.5.62 The current building replaced an earlier prison, which had become overcrowded and was in a deteriorating condition. This reflected the status of many English prisons at the beginning of the 19th century.
- 10.5.63 There was no uniform system of discipline or management in English prisons in the early 19th century, and thus, new approaches to penal administration were required. The British government looked at the USA as an exemplar example of prison management, where two systems of discipline had developed. Both sought to prevent communication between prisoners; one by total silence and the other by complete separation. The silent system emerged as dominant in the USA but it was the separate system that became the major influence on European and British design during the mid-19th century. The design and architecture of Reading Gaol, reflects this system of prison management. It was decided that each prisoner would sleep and work alone in a large cell which contained all necessary facilities.
- 10.5.64 Gilbert Scott and Bonython Moffatt won the design competition, which was based on the then recently-completed new model prison at Pentonville, London.
- 10.5.65 The gaol was closed in 2013 and the building is redundant at the time of writing.

Architecture

- 10.5.66 The Historic England Listing Entry describes the architectural style of the prison as 'Tudor-Gothic', the inspiration for the prison having said to be Warwick Castle. The materials comprise red brick with Bath stone dressings, most of which have been replaced in concrete. The most architecturally interesting wing is considered to be D (north), by virtue of its projecting frontispiece at the northern end which is fully crenelated and features tall ridged and corbelled chimney stacks, diapered brickwork and mullion-and-transom windows. The refurbishment of the 1970s significantly changed the appearance of the building, in particular the original two light cell windows being replaced with single square openings.
- 10.5.67 During the World Wars, the prison temporarily closed. It served as an internment centre from 1916-1919 and during the interwar period, was used by various government departments. In the latter part of WWII it was used as a military prison by the Canadian Army, before reopening in 1946.

Plan Form

- 10.5.68 The plan form reflected the new system of separation, in which it was decided that each prisoner would keep and work alone in a large cell which contained all necessary facilities. Cells would be constructed to prevent communication between prisoners and separation would be extended to the chapel and airing yards.

- 10.5.69 The plan of Reading Gaol and Pentonville are similar in the arrangement of cellular blocks, with open galleries in between. See Appendix J.5 for a plan of Reading Gaol, showing the individual cellular arrangement (source: Berkshire Records Office).
- 10.5.70 The prison originally stood within a square enclosure of approximately three acres, terminated by a surrounding high boundary wall with corner towers and a gatehouse complex on the north side to provide accommodation for resident staff. Against the north wall and alongside the gatehouse was a block containing women's cells.
- 10.5.71 All of this was demolished as part of the 1970s refurbishment works. This has left only the cruciform main building. This contains four wings, the historic uses of which are detailed in the Historic England listing entry. As part of the later 20th century works, a series of new buildings were constructed within the old prison yards, comprising red brick structures of one and two storeys, these are not considered to be of architectural interest and are excluded from the listing.
- 10.5.72 As a result of the prison still until recently, the interiors have been much altered, with many of the original features having been removed. The original cells mostly survive, but in most cases have been extended, by removing the internal wall between each pair.

Significance

- 10.5.73 The heritage value of the Gaol lies in its historical and architectural interest as a Victorian county gaol designed by George Gilbert Scott (1811-1878) and William Boynton Moffatt (1812-1887) in 1844. It has an impressive, fortress-like quality.
- 10.5.74 It is most significant for its internal plan form, which represents a pioneering English example of a radial-plan prison built for the newly-introduced 'separate system' of constant surveillance and solitary confinement. This reflects the influence of the USA model of a separate system prison, which was influential throughout Europe and Britain in the mid 19th century.
- 10.5.75 The Gaol also derives heritage value from its most well-known inmate, Oscar Wilde (1854-1900), who wrote 'The Ballad of Reading Gaol' based on his time there.
- 10.5.76 Heritage value: High

Contribution of setting to heritage value

- 10.5.77 Due to its function, the setting of the listed building is restricted to its immediate boundary which are enclosed by tall boundary walls. The walls make it difficult to appreciate its architectural character from the surrounding area. The building has an inward-looking and private character and there is little external expression. Setting therefore makes no contribution to the special interest of the listed building.
- 10.5.78 Its wider setting comprises the urban environs of Reading town centre, including the main ring road with modern development to the north, as well as a series of retail and industrial parks to the east, including Forbury Retail Park and Bakers Yard. The utilitarian character and poor architectural quality of these buildings form detracting features within the wider setting of the prison, which bears no historic or functional relationship to its surroundings.
- 10.5.79 The historic prison, is set well back from the wall and does not have a prominent expression; hence, whilst it is concluded the Site is in its setting, it is considered that the Site does not contribute anything material to the ability to appreciate its heritage value.

Group 2: Church of St James and St James's Presbytery and St James Former School Buildings – Grade II

- 10.5.80 The Church of St James's comprises three Grade II listed buildings: the Church of St James's, St James's Presbytery and St James's Roman Catholic School. The Church is the primary building in the complex, which is located approximately 50m south of the Site, at the nearest point.
- 10.5.81 The Church and Presbytery were built in 1837-40 to the design of A. W. N. Pugin (1812-1852). It was Pugin's first church design.
- 10.5.82 The buildings have a Norman style that was untypical of Pugin's usual work. He was probably influenced by the proximity of the ruins of Reading Abbey. The neighbouring school was built in 1876 in a plain Gothic style and is listed for its group value.
- 10.5.83 The heritage value of the listed buildings lies in their group value as a collection of ecclesiastical buildings with associated educational use. The association with Pugin is important to the buildings' historical interest. The architectural interest of the buildings lies in the unusual character and quality of the Norman revival.
- 10.5.84 Heritage value: High

Contribution of setting to heritage value

- 10.5.85 The setting of St James's includes the ruins of Reading Abbey which are contained within Forbury Gardens. This setting makes a positive contribution to the heritage value of the listed buildings because it provides a historic context in which the buildings are appreciated. Furthermore, the architectural style of the Church was inspired by the Abbey.
- 10.5.86 The Church addresses the Abbey Gardens to the west. Reading Gaol (Grade II) is located to the south east of the listed buildings. It is a contemporary building but does not contribute to the heritage value of the Church complex.
- 10.5.87 The setting also includes features which detract from the special interest of the listed buildings, for example Forbury Road to the north, a major four-lane carriageway, and office development in the area. The road exposes the Church and its courtyard to the later development and environmental influences (noise, pollution etc.). That said, Forbury Road and the roundabout do provide an opportunity to appreciate the Norman character of the building, particularly the north elevation and curved east end of the building. This is incidental, however.
- 10.5.88 The Site forms a detracting feature within the receptors setting, to the immediate northeast. Its poor architectural quality and utilitarian character bear no relationship to the historic character of the cluster of church buildings. The Site thus does not materially contribute to the special interest of the listed building.

The Plummery Wall – Grade II

- 10.5.89 The plummery wall dates to the mid 19th century and likely incorporates the medieval plummery wall. The origins for the name plummery derive from the Latin for lead, 'plumbum'. Lead for the 12th century Abbey was likely melted and prepared in this area of the wall. The wall was extensively remodelled in the mid 19th century.
- 10.5.90 It is constructed of mixed flint and random rubble, as well as brick with low mid-19th century railings.

10.5.91 It derives historic and architectural interest as containing remnants of the earlier 12th century Reading Abbey and thus has group value with the other surviving elements of the abbey in this part of Reading.

10.5.92 Heritage value: High

Contribution of setting to heritage value

10.5.93 The historic setting of the receptor has been entirely eroded by the construction of the ring road in 1989 and subsequently, most of the remains of the wall are buried in its central reservation. The wall in some areas is directly adjoined to the modern railings which align the centre of the central reservation. As such, the setting is not considered to contribute to an understanding of the receptor's significance.

10.5.94 The Site is located approximately 20m to the north of the structure, at the nearest point. The current buildings on Site and associated hard standing form detracting elements within the receptors immediate setting.

10 and 11 and 12, Abbot's Walk – Grade II

10.5.95 Numbers 10, 11 and 12 Abbot's Walk are located approximately 450m to the northeast of the Site, at the nearest point. The receptors comprise a terrace of three houses dating to c.1840.

10.5.96 Number 10 is constructed of silver-grey brick, 11 and 12 are constructed of Bath Stone. The houses are typical of the Neo-Classical style, articulated by the symmetrically placed sash windows, those on 11 and 12 are round headed. The intricate ironwork of the balconies further reinforce the architectural interest of the terrace.

10.5.97 The houses derive historic and architectural interest as a well-preserved example of early 19th century terrace in the Neo-classical architectural style. And historic interest for articulating this period of residential development within Reading.

10.5.98 Heritage value: High

Contribution of setting to heritage value

10.5.99 The immediate setting of the terrace comprises the narrow, historic street of Abbot's Walk and the green open expanse of the Grade II RPG of Forbury Gardens directly opposite. The proximity of the Abbey Ruins, Reading Gaol and Church of St James forms a cluster of attractive historic landmarks which contribute positively to the setting of the listed terrace. The wider setting comprises the larger, urban environs of Reading town centre, as well as the ring road which has partially eroded the historic character of the building's immediate setting.

10.5.100 On the opposing side of the ring road, the modern office development is perceptible through gaps in the mature trees bordering the boundary of Forbury Park. This makes one aware of the wider presence of Reading town centre.

10.5.101 The current building on Site is not visible from Abbot's Walk, but forms a detracting feature in the wider setting of the receptors, by virtue of its poor architectural quality and vacant car park.

Group 3: Forbury Gardens Receptors

10.5.102 This group comprises the following receptors:

- Archway connecting Forbury Gardens to Abbey Ruins – Grade II*
- Shelter at North-east corner of Forbury Gardens – Grade II

- Wall between Forbury Road and Abbott's Walk to West of St James's Church – Grade II
- Anglican Cross within Forbury Gardens – Grade II
- Maiwand Memorial within Forbury Gardens – Grade II
- Forbury Gardens RPG – Grade II

- 10.5.103 Forbury Gardens is located approximately 70m to the southwest of the Site. It is a Grade II registered park and garden (listed on the 22 July 1987), containing isolated Grade II listed structures of the Maiwand Memorial, the Anglian Cross, the shelter at the north east corner of the gardens and the walkway to the east and plummery wall to the north.
- 10.5.104 The origins of the RPG date to the medieval times, in which the gardens were a rough patch of open ground, where horses grazed and pilgrims waited for services at Reading Abbey, it was known as 'the Forbury' during this time. It became a town park in 1856, and incorporated many of the relics and remnants of the nearby abbey. The park is largely enclosed by a low brick and flint wall, in some places punctuated by tall piers to give a castellated effect.
- 10.5.105 The archway connecting Forbury Gardens to the Abbey Ruins is Grade II* listed in its own right and comprises a mid 19th century archway containing fragments of the 12th century Reading Abbey. Its Grade II* designation is a result of its inclusion of remnants of the medieval abbey.
- 10.5.106 The shelter to the north east of the RPG was built c.1855 as a park shelter, re-using numerous fragments from the 12th century abbey, a fairly common phenomena of the Victorian era. It is constructed of some brick and flint but predominantly salvaged Caen stone and limestone ashlar.
- 10.5.107 The wall between Forbury Road and Abbott's Walk to the west of St James' Church, on the Forbury Road dates to c.1855. It is constructed of flint with bath stone ashlar piers. The wall comprises fragments of 12th century carving and architectural decoration from Reading Abbey.
- 10.5.108 The Anglican Cross within Forbury Gardens was erected in 1909 to Henry I of England, who erected Reading Abbey in 1121.
- 10.5.109 The Maiwand Memorial was erected in 1886 and produced by sculptor George Simmons. The sculpture comprises an enraged lion, constructed of cast iron. The monument commemorated the Berkshire Regiment who fought at Girisk, Maiwand and Kandahar during the Afghan campaign of 1879-80.
- 10.5.110 The principal value of the garden lies in its historic arrangement as former pleasure gardens. The key views within the gardens are afforded from the short pathways and from the memorials and bandstand.
- 10.5.111 The gardens have group value with Reading Abbey, as well as number of the structures in the park which comprise remnant of the original abbey fabric or have associations with Reading Abbey.
- 10.5.112 Heritage value: Very High to High

Contribution of setting to heritage value

- 10.5.113 The immediate setting of Forbury Gardens comprises to the west, the green open space of St Laurence's Church cemetery and to the south and southwest the historic landmarks of Reading Abbey Ruins. To the east is the church of St James's. The immediate surroundings

of the RPG comprise a historic cluster of Reading's medieval abbey complex, which positively contributes to an understanding for the historic placement of the RPG in this location.

10.5.114 Whilst mature trees are a feature of the park, the lack of vegetation density around the park's borders allow for views outwards, providing visibility of larger scale, modern developments, including the presence of tall buildings.

10.5.115 As a result of this, the RPG is very much experienced within the wider urban environs of Reading town centre which comprises a variation of architectural styles, forms and eras. This includes the large urban footprints of the Oracle Shopping Centre and Broad Street Mall.

10.5.116 From the north eastern area of the park, the current building on Site is glimpsed at in views looking northwards, across the Forbury Road. The current building on Site and associated forecourt forms a detracting element within the receptor's immediate setting, by virtue of its poor architectural quality and utilitarian character.

Kings Meadow Swimming Pool– Grade II

10.5.117 Kings Meadow Swimming Pool, (now commonly known as the Thames Lido), is located approximately 880m to the north of the Site. It comprises a women's outdoor swimming pool of 1902, with later minor 20th century alterations. Designed and built by John Bowen, Borough Engineer & Surveyor.

10.5.118 It first opened to the public in 1902, as the Ladies Swimming Bath, with the intent of giving female bathers privacy.

10.5.119 The original ironwork was produced by Allen & Kidgell at their Caversham Bridge Engineering Works, but this was later replaced with 20th century corrugated iron. The exterior comprises red and white brick with ashlar dressings and plain tile roof. The interior features the main swimming pool, surrounded by a covered loggia with a timber roof canopy supported on cast-iron columns.

10.5.120 It derives historic and architectural interest as an extremely rare and fine example of a complete Edwardian Lido. It is believed to be the oldest surviving outdoor municipal pool of the early Edwardian era. With no windows onto the pool itself, its architectural features are telling of social conventions at the time, with the emphasis on privacy and separate baths for men and women.

10.5.121 Heritage value: High

Contribution of setting to heritage value

10.5.122 The immediate setting of the receptor comprises the open fields of Kings Meadow and the Thames Path and River Thames to the north. The proximity to the River Thames is telling of the historic water supply for the lido, which was originally fed through from the Thames until it was converted to mains water supply in the 1950s.

10.5.123 The recreational, green setting of Kings Meadow is further telling of the lido's function as a public bath, located in an area of amenity, outside and away from the town centre.

10.5.124 The Thames Lido is visually and physically separated from the town centre, by the railway line, yet the presence of modern, tall building development on Napier Road to the immediate south, reinforces the proximity of the town centre. This includes the residential development of the Thames Quarter which includes a 23 storey tower, on the boundary of Kings Meadow.

10.5.125 The Site is located to the south of the lido, separated from it by green expanse of Kings Meadow and the adjacent railway line. Given the extent of separation distance, there is no

visual relationship between the Site and the receptor. The current building on Site forms a detracting feature in the wider setting of the receptors, by virtue of its poor architectural quality and vacant car park.

Group 4: Assize Courts and Shire Hall– Grade II

10.5.126 Assize Court and Shire Hall are located approximately 600m to the southwest of the of the Site.

10.5.127 Assize Court was built in 1861, the listing entry states by J B Clacy. The court is of the Baroque revival style, constructed in channelled Bath stone ashlar. The Forbury façade and entrance hall were retained when architects Broadway and Maylan added a new courtroom extension in 1989-1997 for the Crown Court. Assize Court still functions as Reading Crown Court today.

10.5.128 Following the formation of Berkshire County Council in 1889, meetings had formerly taken place in the Assize Courts, but owing to continuing increases in the responsibility of the council, leaders chose to procure a new purpose-built Shire Hall for council officers and their departments.

10.5.129 Shire Hall was subsequently built in 1904-1911 by architects Warwick and Hall, in the Queen Anne style, constructed of red brick with Portland channelled ground floor and window surrounds. Today it has been converted into a luxury hotel, 'The Forbury'.

10.5.130 The buildings thus derive historic interest as symbolising the growing metropolitan identity and status of Reading and the wider county of Berkshire, facilitating the need for purpose-built municipal buildings. Both building have architectural interest as well-preserved mid-19th and early 20th century civic buildings in the Baroque Revival and Queen Anne style.

10.5.131 Heritage value: High

Contribution of setting to heritage value

10.5.132 The two buildings are located on The Forbury, a narrow historic street which runs adjacent to the border of Forbury Gardens RPG. Assize Court is slightly set back from the street, its plot boundaries well defined by cast iron railings. The immediate forecourt and approach to the building emphasises its civic status as Reading Crown Court. The green open expanse of Forbury Gardens and the adjacent Reading Abbey Gate establish an attractive pastoral and historic setting for the two buildings.

10.5.133 Further west along The Forbury is a modern building complex with a central area of public realm. The modern glazed structure contrasts with the intricate detailing of the exterior facades of the court buildings. It also marks the two buildings proximity to the urban centre of Reading.

10.5.134 Within the receptors wider setting is the urban environs of Reading town centre which is characterised by a range of architectural styles and eras. Two modern shopping centres, the Oracle and Broad Street Mall have broken up the historic streetscape, as well as an emerging tall building context to the southwest of the town centre.

10.5.135 The current building on Site cannot be seen from the immediate setting of the receptor, however, by virtue of its poor-quality architecture and associated vacant forecourt, it forms a detracting feature within the buildings wider setting.

Abbey Mill Ruins

10.5.136 Abbey Mill Ruins are located approximately 260m to the southwest of the Site.

10.5.137 The receptor comprises the late 12th century to early 13th century ruins of a former medieval watermill originally belonging to Reading Abbey. The mill was built straddling the Holy Brook which marked the southern boundary of the monastic enclosure. The mill ceased work in the 1950s and was then demolished leaving only a medieval arch over the Holy Brook.

10.5.138 The receptor possesses historic and architectural interest as the only surviving remnant of the former medieval Abbey Mill. Architectural interest in their survival as elements of medieval, industrial architecture and historic as evidence of early Medieval industry in Reading. The receptor derives group value with other surviving elements of the abbey, which are listed in their own right, including the Abbey Gate and the former Hospitium, which together comprise the complex of Reading Abbey.

10.5.139 Heritage Value: High

Contribution of setting to heritage value

10.5.140 The only element of the receptor's setting that positively contributes to an understanding of its significance is its location on the Holy Brook, which was a water supply created by the monks of Reading Abbey, to this and other mills owned by them.

10.5.141 The receptor is otherwise surrounded by modern, large scale development which align both sides of the Holy Brook and are a characteristic of Reading town centre. These elements do not positively contribute to an understanding of the receptors significance and the receptor is very much experienced in an urban setting. The large scale development on both sides of the Holy Brook create a sense of enclosure and heavily filter views outwards, as such there is no visibility with the current building on Site.

Group 5: Church of St Laurence Receptors

10.5.142 This group comprises the following receptors:

- Church of St Laurence – Grade I
- Wall and Gatepiers of St Laurence's Graveyard – Grade II
- Tracery Fragments in the churchyard of Church of St Laurence– Grade II
- St Laurence's Church and Churchyard, and Twelve Tombs in St Laurence's Churchyard – Grade II

10.5.143 St Laurence's Church and Churchyard are located approximately 300m to the southwest of the Site. The structure of the building dates from between the Norman period and 15th century, with heavy 19th century restoration.

10.5.144 The church was formerly the chapel ante portas of the Abbey, forming one of three parish churches built to serve the medieval eastern parish of Reading. It has a flint construction with ashlar quoins. The church has a long, narrow north aisle, which embraces the three-stage tower, built in 1458. The tower is an important landmark in views north through the Market Place.

10.5.145 The interior houses a font dating from 1522 and a memorial to 16th century mathematician John Blagrave.

10.5.146 The church possesses considerable historic and architectural interest for the age of its fabric, and its historic associations with the history and development of Reading.

- 10.5.147 St Laurence's Church and Churchyard and Twelve Tombs was added to the statutory list in 1978, and comprises twelve tombs located within the churchyard of St Laurence's Church, dating from the 18th and 19th centuries.
- 10.5.148 The receptors possess historic and architectural interest as good examples of tombs which are closely associated with the historic church.
- 10.5.149 The walls and gatepiers of St Laurence's Graveyard were added to the statutory list in 1975 and are built in red brick with a central break to the front. The retaining wall adjoins the Magistrates Court, and the Gatepiers are inscribed 'Rebuilt AD 1791'.
- 10.5.150 The wall and gatepiers possess historic and architectural interest as a good example of 18th century boundary treatments, which form part of the ensemble of historic built form at St Laurence's Church.
- 10.5.151 The fragments possess historic and architectural interest as part of an early window structure on the Site which forms part of an earlier phase of development in the locality.
- 10.5.152 Heritage value: Very High to High

Contribution of setting to heritage value

- 10.5.153 This group of receptors is focussed on St Laurence's Church, which forms the centrepiece of the historic town centre north of The Forbury/ Friar Street. The open space of Town Square creates an area from which to appreciate the ensemble of the historic Church and civic buildings together. St Laurence's and the group as a whole, are perceptible in axial views when approaching from the north and south.
- 10.5.154 The early 12th century church looks down the Market Place and overlooks Town Hall Square. Originally the outer gate of Reading Abbey was attached to its south flank. This group of receptors is appreciated within the 'town hall complex' of Victoria Hall, Concert Hall, Town Hall and Museum, Library and Art Gallery; which together articulate the civic identity of Reading from the medieval period onwards. This positively contributes to an understanding of the groups heritage interest, by placing them within Reading's wider historic context.
- 10.5.155 To the rear, the buildings face onto St Laurence's churchyard, which comprises attractive planting and mature trees.
- 10.5.156 The church is however very much experienced in the urban environs of Reading town centre, particularly from views within Town Square. The church is viewed alongside modern development, as well as other architecture of various styles and eras.
- 10.5.157 Given the tight knit urban grain of the area, and the extent of mature vegetation in St Laurence's Churchyard, the receptors have a highly enclosed immediate setting and thus there is limited intervisibility with the current building on Site.

Group 6: Municipal Buildings and Small Town Hall – Grade II

- 10.5.158 The Municipal Buildings and Small Town Hall are located approximately 900m to the northeast of the Site.
- 10.5.159 The Municipal Buildings were constructed on the site of the earlier 12th century hospitium, the exterior dates to 1486 but may incorporate some of the earlier building (founded 1196). The hospitium was used as a dormitory for pilgrims of Reading Abbey. Much of the remainder of the original hospitium was located where Reading own Hall now stands.

- 10.5.160 Reading Abbey school, founded in 1125, moved into the hospitium in 1486 as the Royal Grammar School of King Henry VII. It is constructed of flint with Bath Stone quoins, dressings and random blocks. The historic tiled roof now comprises large skylights and dormers.
- 10.5.161 In 1785 the old town hall in the upper storey of the Abbey Hospitium was demolished and a new one was built, now known as Small Town Hall. The interior was rebuilt in an Italianate style in 1864 to accommodate the Father Willis Organ. In 1875 a new building designed by Alfred Waterhouse with bricks from the Reading firm of Colliers was completed. Waterhouse wrapped his new building around the earlier town hall and carefully placed the clock tower for views from Friar Street and Market Place
- 10.5.162 The Municipal Buildings derive historic and architectural interest as one of the oldest surviving remnants of Reading, particularly owing to its composition of an earlier 12th century hospitium that was associated with Reading Abbey. The well-preserved exterior retains historic and architectural interest as a late 15th century school house which was subsequently used as the town hall.
- 10.5.163 The Small Town Hall derives historic and architectural interest as a well-preserved civic building of the late 18th century. Its interior is of architectural interest owing to surviving decoration by Reading Borough Surveyor, W.H.Woodman.
- 10.5.164 Together, the buildings have group value as a collection of late 15th and late 18th century buildings which articulate the historic evolution of Reading's civic centre.
- 10.5.165 Heritage value: High

Contribution of setting to heritage value

- 10.5.166 The buildings are located within the Market Place/London Street Conservation Area, within the centre of Reading. The buildings face on to town hall square, a paved area around the statue of Queen Victoria. This open space, based on the medieval market place and forecourt of a former gateway to the Abbey, comprises a number of historic buildings included the Grade I listed St Laurence's church and the Grade II* Town Council Chamber and the Grade II Museum and Former School of Art. This provides a historic setting for the buildings and positively contributes to an understanding of their placement within the wider historic development of Reading.
- 10.5.167 St Laurence's Church and the adjacent Town Hall complex are the key buildings of this character area. The early 12th century church looks down the Market Place and overlooks Town Hall Square. Originally the outer gate of Reading Abbey was attached to its south flank.
- 10.5.168 This group of receptors form a 'town hall complex' along with Victoria Hall, Concert Hall, Town Hall and Museum, Library and Art Gallery; which together articulate the civic identity of Reading from the medieval period onwards.
- 10.5.169 To the rear, the buildings face onto St Laurence's churchyard, which comprises attractive planting and mature trees. The immediate setting of the receptors is considered to positively contribute to an understanding of their heritage value by virtue of the articulation of the historic phase of development of this part of Reading.
- 10.5.170 Given the tight knit urban grain of the area, and the extent of mature vegetation in St Laurence's Churchyard, the receptors have a highly enclosed immediate setting and thus there is not intervisibility with the Site.

Group 7: Reading Museum and the Former School of Art – Grade II

- 10.5.171 Reading Museum lies approximately 350m to the southwest of the Site. The receptor comprises the former School of Art building, the original Museum building, and the Concert

Hall, all of which are Grade II listed. In our assessment we have grouped these buildings together owing to their proximity and shared setting.

- 10.5.172 This group of listed buildings along Blagrove Street reflects the expansion of Reading in the 18th and 19th centuries. Constructed between 1879 and 1894 these buildings sit alongside the former Town Council Chamber. The Concert Hall was designed by Thomas Lainson and reflects the Town Council Chamber's French Gothic styling. The Art Gallery and Museum were later designed by a local architect, W.R Howell, to fill the corner between the concert hall and the School of Art. The Museum is of an asymmetric design in Gothic style closely echoing the style of the concert hall.
- 10.5.173 From 1986 the buildings, including the former Town Council Chamber, were collectively refurbished and now house a new concert hall and new galleries for the museum and art gallery.
- 10.5.174 This group of buildings reflect the Town Council Chamber's French Gothic styling and are constructed using local materials such as dark blue brick with dark red brick and terracotta dressings. A terracotta band wraps around the buildings above the ground floor, the carved reliefs depicting the history of Reading.
- 10.5.175 Reading Museum, the Former School of Art and the Concert Hall has medium heritage value in respect of its architectural detailing and connection with the Grade II* listed Town Council Chamber.
- 10.5.176 Along with the Town Council Chamber, these buildings are experienced within a highly urbanised setting comprising architecturally traditional buildings and new modern developments.
- 10.5.177 Heritage value: High

Contribution of setting to heritage value

- 10.5.178 Valpy street is the primary element of setting and the only street in which this building can be experienced. The enclosed nature of the street contributes to heritage value.
- 10.5.179 The siting of this building at the junction of Valpy Street and Blagrove Street offers the building townscape status at this locally prominent corner, the street layout and urban grain at this junction therefore offers some contribution to the heritage value of the listed building. There will also be longer distance views both north and south along Blagrove Street and looking west from Valpy street which contribute to local legibility.
- 10.5.180 Given the extent of separation distance, the enclosed nature of Valpy Street and the mature vegetation within Forbury Gardens, there is no visibility with the current building on Site and it is not considered to contribute to its heritage value.

Group 8: Blakes Lock Sewage Pumping Station Receptors

- 10.5.181 This group comprises the following receptors:
- The Engine House – Grade II
 - The Screens House – Grade II
 - 47-48 Kenavon Drive – Grade II
 - The Pump and Turbine House – Grade II

- 10.5.182 Blake's Lock is located approximately 350m south east of the Site along the River Kennet. There are four listed buildings at Blake's Lock which comprise the 19th century infrastructure associated with the former Sewerage Pumping Station on the north side of the lock. The historic buildings have been converted into a museum and restaurant and now represent a destination along the river in which the public can enjoy the riverside area.
- 10.5.183 There has been a lock at this point along the River Kennet since at least the 13th century. The early flash lock was replaced in 1802 with a timber-constructed pound lock to improve navigation along the waterway. By this time, Rennie's Kennet and Avon Canal was also in operation.
- 10.5.184 The 19th century lock has been modernised and repaired and none of its fabric is listed.
- 10.5.185 In c.1870 a Sewerage Pumping Station was developed on the north side of the lock. The engine house, pump and turbine house and screens house are Grade II listed. The buildings have a free Gothic architectural style and they are legible as a historic group. They are single storey buildings (the Pump House slightly taller) in red brick with grey brick decoration and dressings. The windows have cast iron frames and the roofs comprise red tiles.
- 10.5.186 There is a narrow access yard from the southwest which has the original paving. It creates a small courtyard around which the buildings are arranged and appreciated together.
- 10.5.187 Nos. 48 and 49 Kenavon Drive are a pair of houses which are also Grade II listed. They date to 1873 and the detailing is similar to the Victorian buildings which comprise the Sewage Pumping Station. The similarities in date and style suggests that they may have been built as accommodation for workers at the sewerage plant. The list entry description states that they are "listed for their stylistic and functional association with the sewage Pumping Station buildings".
- 10.5.188 The heritage value of the listed buildings at Blake's Lock is derived from their historical and architectural interest as a Victorian sewage works. The group of buildings is evidence of the way waste was handled, and their survival as a group is also important to their special interest because it helps to understand the processes involved in the works. The architectural detailing of the buildings is also of interest.
- 10.5.189 Heritage value: High

Contribution of setting to heritage value

- 10.5.190 The setting of the listed buildings at Blake's Lock comprises the River Kennet which makes an important contribution to the special interest of the listed buildings. The river was part of the industrial process at the sewage works.
- 10.5.191 The wider setting includes later development which has changed the historic character of the area, first from open land (King's Mead) to industrial uses (Huntley and Palmers factory), and now there is a mix of large retail units and modern residential blocks of flats. To the east along the River Kennet, the listed buildings are experienced in the context of the later residential development along the riverbank which visible in views out and across from the group of listed buildings. The later elements of the setting do not contribute to the special interest of the listed buildings.
- 10.5.192 Given the extent of separation distance and interposing development, there is no visibility between the current building on Site and this group of receptors and thus it is not considered to contribute to the heritage value of the receptors.

Group 9: Watlington Street Receptors

- 10.5.193 This group comprises the following receptors:

- Watlington House – Grade II*
- Walls at 44 Watlington Street – Grade II
- Wesley Methodist Church - Grade II
- Church of St John the Evangelist – Grade II

10.5.194 This group of receptors are located approximately 450m to the south of the Site, at the nearest point.

10.5.195 Watlington House was listed Grade II* on 22nd March 1957. It is understood to have been constructed in two parts, the western part in 1688 Samuel and Anne Watlington; Samuel Watlington was Mayor of Reading in 1695 and in 1711. The eastern part is later, possible 1763.

10.5.196 From 1794 the house became the residence of Captain Edward Purvis, until 1877 when it was used as the Kendrick Girls School. In 1927 the school moved to the corner of Sidmouth Street and London Road. The building is currently in office use, being the home of the Mills Archive since 2003.

10.5.197 The principal eastern elevation to Watlington Street is Georgian in appearance. The red brick building is two storeys with clay tiled hipped roof and brick chimney stack. The building is three bays wide, with large sash windows framing a central door at ground floor level. The first floor has two further large sash windows flanking a central slender sash window of six-over-six. Two dormer windows at roof level complete the symmetrical composition, with a modillion eaves cornice on the underside of the eaves.

10.5.198 To the south is a single storey service wing. The ancillary building is of complimentary red brick, with Original mullion and transom windows on ground floor of north front. The building is set back from the frontage behind a surface level car park that would have originally formed the front garden. The car park and more attractively landscaped rear garden are enclosed by a brick and flint boundary wall, which is Grade II listed.

10.5.199 The heritage value of the building derives from several elements, including the attractive external architectural appearance and domestic vernacular. The plan form and fixtures of the building are well preserved and have architectural and historic value. Watlington House also has historical value as one of the earliest remaining houses in the area, constructed for the former Mayor of Reading.

10.5.200 The Wesley Methodist Church was constructed in 1872 and opened in 1873 as the mother church of the Wesleyan Circuit. The Church was listed Grade II on 14th December 1978, with the listing amended in 1979.

10.5.201 The Wesley Methodist Church is formed of red brick with stone and white brick dressings. The Church is comprised of a four bay aisled nave with flush transept and one bay chancel. The main porch is located to the north-east with three stage tower and white brick steeple.

10.5.202 In 1997/8 the Church was refurbished and given a major extension, including welcome area and coffee bar. The exterior was cleaned, enhancing the decorative masonry, and the interior was repainted.

10.5.203 Wesley methodist church derives historic and architectural interest owing to its survival as a well-preserved late 19th century Methodist church of the Neo-Gothic style. It obtains significant historic interest for its association with John Wesley, and for articulating the influence of non-conformist religions on congregations of the mid to late 19th centuries.

- 10.5.204 The Church of St John the Evangelist was constructed in 1872 to the designs of Mr. W. A. Dixon. The Church, originally Anglican, was saved from demolition in 1982 when acquired by the Polish Catholic community. It is now known as the Sacred Heart.
- 10.5.205 The Church was built in the early French Gothic style of Kentish rag with Bath and red sandstone dressings. The church consists of a chancel, with north organ chamber and vestry, a nave, north and south aisles, slightly projecting north and south transepts, a baptistery at the west end of the north aisle, a south-west tower, the bottom stage of which is used as an entrance vestibule, and a north-west turret and vestibule with a staircase leading to the gallery over the west end of the nave.
- 10.5.206 The spire of the Church of St John the Evangelist and that of the Wesley Methodist Church, form prominent landmarks in the conservation area and surrounding locality. The muscular Watlington House to the south adds much to the ensemble.
- 10.5.207 The interior is understood to be spacious and has arcades of five bays with circular piers, stiff-leaf capitals, and two orders with roll-mouldings in the heads comprise. There are several stained glass windows dating from Edwardian times including four single light ones under the gallery, signed by Clayton & Bell and dating from 1909.
- 10.5.208 The church derives historic and architectural interest as the only Anglican Church by Dixon. His Baptist church, Edgware, c.1872 survives; another Baptist church in Hampstead, 1878 has been demolished. It is of architectural interest owing to its survival as a well preserved example of a church in the early French Gothic style.
- 10.5.209 Heritage value: Very High to High

Contribution of setting to heritage value

- 10.5.210 The setting of Watlington House comprises later Victorian development along Watlington Street, South Street and The Grove. The architectural style, scale and appearance of the properties in the immediate area are complementary to the appearance of Watlington House. In the wider area, beyond the Conservation Area, the observer is aware of greater intensity of development associated with the development of Reading centre.
- 10.5.211 The house's special architectural and historic interest is best appreciated from the east, looking at the main elevation. Views towards the Site are glancing or oblique, and there is a significant separation between the two such the Site presently makes no contribution, positive or negative, to our ability to appreciate the heritage value of the building.
- 10.5.212 The Wesley is near the town centre, in the heart of both the old commercial and residential parts of Reading. The spire of the Wesley Methodist Church and that of the Church of St John the Evangelist, form prominent landmarks in the conservation area and surrounding locality. It faces the road on the north side, and a range of modern commercial and other buildings, and accordingly its context on this side has changed markedly.
- 10.5.213 There is a view of the church spire walking north towards it from the CA, and that feature is backdropped by the recently completing residential tower north of the Canal.
- 10.5.214 The Church of St John the Evangelist orients E-W in the manner of Church of England (as it was originally) churches, and there are attractive views of its tower looking north from the CA, and in those views one appreciates the recently competing residential scheme.
- 10.5.215 Due to the extent of separation distance and extent of interposing development, there is no intervisibility with the current building on Site.

Main Building of Reading Station

10.5.216 The receptor is located approximately 500m to the west of the Site. The first Reading station was designed by Isambard Kingdom Brunel as part of the original line of the Great Western Railway. Between 1865-67, the original station was enlarged and remodelled by architect Mr Lane (Chief Engineer of the GWR Co). The remodelled station is of an Italianate style and comprises a 2-storey symmetrical building of buff brick and Bath stone, incorporating a tower and clock.

10.5.217 The historic value of this building lies in its association with the construction of the Great Western Railway, and in particular its association with the railway's chief engineer Isambard Kingdom Brunel.

10.5.218 Heritage Value: High

Contribution of Setting to Heritage Value:

10.5.219 The location of the station building in close proximity to the railway line positively contributes to an understanding of the buildings historic function and the relationship between the two. The original setting of the receptor has been lost to the modern development and public realm which comprise Reading Station. The building sits with little relation to its surroundings, which comprise tall buildings of modern character. The consistent development which is centred around an area of public realm immediately outside of the station building has established a sense of enclosure to the building's setting. Bar the building's location close to the railway line, its setting does not contribute to an understanding of its significance. Given the extent of separation distance, there is no intervisibility between the receptor and the current building on Site.

Conservation Areas

10.5.220 The conservation areas included within the study area are identified on the heritage asset plan at Appendix J.1 of the Built Heritage Appendix.

London Street/Market Place Conservation Area

10.5.221 The Site lies approximately 260m to the east of this conservation area, at the nearest point. The CA was first designated in 1972 and later extended in 1982.

10.5.222 The conservation area is split into 4 sub areas, only one of which has the potential to be effected. This is the northernmost sub area, 4: Market Place and Environs of St. Laurence Church and Town Hall.

History

10.5.223 The Market Place/London Street Conservation Area is located in central Reading. The northern half of this linear conservation area contains the site of the town's medieval market place, now formally known as 'Market Place', and the recently restored 19th century Town Hall within which are the Museum of Reading and the Reading Concert Hall.

10.5.224 The conservation area is, generally speaking, a tightly knit urban area composed of continuous frontages of two-, three- and four-storey buildings beside streets of varying length and width. Close to St Laurence's Church there is a wide part-pedestrianised area that includes the triangular site of Market Place and an adjoining paved area around the statue of Queen Victoria known as Town Hall Square. This open space, based on the medieval market place and forecourt of a former gateway to the Abbey, provides a good setting for the area's historic buildings especially St Laurence's Church, the Town Hall and a row of listed buildings (nos. 23 to 34) on the north-east of Market Place.

- 10.5.225 St Laurence's Church and the adjacent Town Hall complex are the key buildings of this character area. The early 12th century church looks down the Market Place and overlooks Town Hall Square. Originally the outer gate of Reading Abbey was attached to its south flank. Along the south side of the church, a covered walkway was built by the mathematician John Blagrave in 1619, known as Blagrave's piazza. Later the parish stocks stood beneath it. The walkway was demolished in 1867.
- 10.5.226 The collection of municipal buildings in Blagrave Street is arranged around an 18th century town hall. In 1785 the old town hall in the upper storey of the Abbey Hospitium was demolished and a new one was built, now known as Victoria Hall. It was rebuilt in an Italianate style in 1864 to accommodate the Father Willis Organ. In 1875 a new building designed by Alfred Waterhouse with bricks from the Reading firm of Colliers was completed. Waterhouse wrapped his new building around the earlier town hall and carefully placed the clock tower for views from Friar Street and Market Place. In the next few years, further buildings were added to the complex. A Public Library and Museum by Thomas Lainson was added in 1883-4 and an Art Gallery by W.R.Howell in 1897. This group of buildings, decorated with a lively display of red and blue bricks and terracotta is one of the defining images of Reading's architecture. The pairing of the stone and flint medieval church tower and Waterhouse's red and blue brick clock tower display a lively contrast of colour and building materials, both in a Gothic style.
- 10.5.227 The Market Place and its continuation into the pedestrianised space in front of the Town Hall has its origins in the 12th century but was described in the 1960s by the architectural historian Nikolaus Pevsner as a "triangular space of no visual distinction". Today, its potential as a pedestrianised public open space is constrained by the movement of buses and other vehicles through the area and its location out of sight of Broad Street, Reading's main shopping street. Paving, planters and other features within the public realm are tired and dated and Market Place awaits major environmental improvements.
- 10.5.228 The Market Place was partly destroyed by a bomb in 1943 and the buildings around Market Place show a variety of styles and periods in which, unfortunately, mid 20th century Brutalist architecture figures largely. Nos. 27/28 and 29/31 have timber frames (altered) from the 17th century or earlier. On the opposite side of Market Place, Nos. 13-16 (NatWest Bank) dates from c1875 in a Renaissance palace style. Facing north, on the lower side of Market Place, nos. 48/49 is a stuccoed mid-18th century building.
- 10.5.229 The special interest of sub area 4 of the CA is derived from the following:
- The close proximity of St Laurence's Church and Town Hall buildings makes a strong architectural statement;
 - St Laurence's Church and distinctive tower;
 - The large public open space (part-pedestrianised) composed of Market Place and the area around the statue of Queen Victoria;
 - Town Hall complex comprising Victoria Hall, Concert Hall, Town Hall and Museum, Library and Art Gallery;
 - The collection of historic buildings looking onto Market Place;
 - The monument in Market Place, designed by Sir John Soane in 1804 to commemorate Edward Simeon a mayor of Reading and Governor of the Bank of England, and the statue of Queen Victoria;
 - Good views of Town Hall clock tower and the tower of St Laurence's Church;
 - Trees, greenery and open space of St Laurence's churchyard;

- Trees in the public realm which soften the harsh urban townscape; and
- Natural stone kerbs.

10.5.230 In summary the special interest of the Conservation Area is derived from it's the historic interest as part of the medieval marketplace and its associations as a gateway the abbey. Architectural interest also lies in the individual styles of buildings with particular regard to the town hall and St Laurence's Church. The tight nit urban grain and historic street layout also contributes to heritage value.

10.5.231 Heritage value: High

Contribution of setting to heritage value

10.5.232 The setting of the Conservation Area immediately to the west is the commercial heart of Reading including Broad Street and the modern Oracle Shopping Centre. The large urban footprint of the late 20th century shopping centres have broken up the historic streetscape and form detracting features within the immediate setting of the CA.

10.5.233 Immediately to the east is Forbury Gardens, the site of the outer precinct of Reading Abbey, now a public park and the town centre's largest public open space. The park offers an open space to be able to appreciate the CA from and as such contributes its interest as part of its setting.

10.5.234 The site lies to the north east of the CA, separated from it and the rest of the urban centre by the ring road. The low architectural quality of the current building on Site, combined with its large, vacant car park, forms a detracting feature within the wider setting of the CA.

Eldon Square Conservation Area

10.5.235 Eldon Square Conservation Area comprises a large geographical area and is located approximately 400m to the south of the Site, at the nearest point. It was first designated in 1972 and extended in 1982 by the addition of Watlington Street, to the west, and Eldon Street, Victoria Street and Montague Street, to the east.

10.5.236 The Conservation Area comprises domestically scaled properties, with civic buildings of landmark quality. It is a generally close-knit urban area with few areas of open space, including Eldon Square.

10.5.237 The Eldon Square Conservation Area Appraisal was prepared in 2007. It provides a succinct description of the special character and appearance of the area:

- Eldon Square, a mid-19th century planned formal town square comprising an enclosed park surrounded on three sides by Bath stone detached and semi-detached buildings;
- Eldon Road, part of the formal arrangement of Eldon Square notable for a row of mid 19th century dwellings on its west side;
- The park at Eldon Square, known as King George V Gardens, which is enclosed by grade II listed railings and contains mature trees and other greenery and a large statue of the first Marquess of Reading, died 1935;
- Nos 163 to 189 (odd) Kings Road, a long row of prestigious Bath stone former early 19th century residences with good quality Classical and Italianate detailing;
- The architectural and historic interest of the area's buildings, including two grade II* listed buildings (Watlington House and 173-183 (odd) Kings Road);

- Two churches in unusually close proximity (Wesley Methodist Church and Church of St John the Evangelist) the spires of which are a local landmark;
- 19th century street pattern on either side of Eldon Road with traces of an earlier unrealised formal layout in the vicinity of The Oval;
- Cohesive architectural development of the mid 19th century with contrasting middle-class and working class housing;
- Lengths of historic stone kerbs and gulleys and remnants of old railings;
- Good examples of small mid 19th century terraced houses probably occupied by workers in nearby Huntley and Palmers, the largest employer in 19th century Reading;
- Trees and groups of trees in the park in Eldon Square and in the curtilage of Watlington House and The Oval;
- The prevalent use of Bath stone and local brick; and
- Distinctive local details such as cast iron street name signs and old lamp posts.

10.5.238 The area is set within an urban context and bounded by the busy vehicular routes of London Road and Kings Road. As a consequence the area is discernibly contained and there is a distinction between the lower scale and fine grain residential development in the area and the modern twentieth century development on the periphery.

10.5.239 The Conservation Area Appraisal sub-divides the area into character areas. The area closest to the Site and where there is potential for the Proposed Development to impact setting is character area 2. This character area is predominantly residential with some houses in multiple occupation. Watlington Street is described as the primary street, punctuated by two churches and Watlington House.

10.5.240 The most prominent landmarks in the sub-area and the conservation area as a whole, are the spires of the Wesley Methodist Church (1872) and the Church of St John the Evangelist (1872), now known as the Polish Church of the Sacred Heart. The spires form landmarks both within the Conservation Area and the surrounding locality.

10.5.241 Heritage value: High

Contribution of setting to heritage value

10.5.242 The boundary of the CA comes up abruptly to Queen's Road, where there is a sharp change in character. Modern residential development of a considerable scale (of up to 9 storeys) aligns the northern side of the road. Beyond this, the River Kennet and island peninsula form an interposing natural and built form to the north of the CA.

10.5.243 One is aware that the CA is an area of enclosed, historic landscape in the context of a busy urban centre, which is continuously evolving. Currently the setting makes no particular contribution to our ability to appreciate the special interest of the CA except, as it happens, by contrast between the busy modern areas outside it. Given the extent of separation distance and interposing development, there is no intervisibility between the Site and the conservation area.

Non-Designated Heritage Receptors

10.5.244 The non-designated heritage receptors identified within the study area are shown on the heritage asset plan at Appendix J.1 of the Built Heritage Chapter.

Locally Listed Buildings

Group 10: Kings Road Garden, Huntley and Palmers Social Club and the Former Gas Works Social Club – locally listed

- 10.5.245 Kings Road Garden and Huntley and Palmers Social Club are located approximately 260m to the southeast of the Site, at the nearest point.
- 10.5.246 King's Road Garden comprises a small garden on the southern side of King's Road, at a busy junction of the Inner Distribution Road. It was formerly the Huntley & Palmers Garden, indicated by the inscribed gates with 'H and P'. Iron railings and a low brick wall encloses the gardens with impressive iron gates.
- 10.5.247 Huntley and Palmers Social Club comprises what survives of the former factory of the biscuit makers, Huntley and Palmers, who were originally based in Reading. The company created one of the world's first global brands and ran what was once the world's largest biscuit factory.
- 10.5.248 The building shows the established date of the company to be 1841 and this building is all that remains of the former large-scale factory. This building was converted into the Factory Social Club in 1938, after it became vacant when new offices were constructed next door on the King's Road frontage. In the 1920s the company originally had major plans to build a large purpose-built social centre opposite the factory in the King's Road. The scheme was never realised and the modest conversion in 1938 was the final result.
- 10.5.249 The building derives historic and architectural interest as a well-preserved 19th century industrial building, used specifically for the production of biscuits. It has historic interest as a remnant of the once dominant Huntley and Palmer's biscuit factory, and as part of Reading's industrial past.
- 10.5.250 The former factory has group value with King's Road Garden opposite, as the two together survive as remnants of Reading's industrial past and the commercial dominance of the Huntley and Palmer's biscuit factory.
- 10.5.251 The former Gas Works social club dates to the late 19th century and was built as a social club for the workers of the Reading Gas Company on a site purchased from the famous Huntley & Palmers biscuit company in 1880. It is now derelict. It derives historic interest as a remnant of Reading's industrial past, particularly of the gas works which used to stand in close proximity. Architecturally, it is a modest red brick building which survives as an example of a late 19th century social club.
- 10.5.252 Heritage value: Low

Contribution of setting to heritage value

- 10.5.253 Kings Road Gardens and the Palmers Social Club are located on opposing sides of the King's Road, close to the busy junction of the Inner Distribution Road. The Former Gas Works Social Club is slightly set back from the Inner Distribution Road, on Gas Works Road.
- 10.5.254 This area was historically the centre of industry in Reading and included the Reading Gas Works. Some remnants of the town's industrial past remain, including the buildings associated with Blake's Lock. However, the receptors no longer relate to their immediate setting which comprises modern, office and residential development of a considerable scale.
- 10.5.255 The receptors are experienced in a busy, urban environment characterised by tall buildings. Their historic setting has been completely eroded and they are very much experienced in the environs of a busy urban centre.

10.5.256 Given the extent of separation distance and interposing development, there is no intervisibility between the Site and this group of receptors.

10.6 Mitigation

10.6.1 Design measures forming part of the embedded mitigation include the form, separation distance and maximum heights set out in the parameter plans. It also includes the specific principles established in the Design Code Document. These mitigation measures seek to break up the perceived mass of the proposals through separation between each of the building blocks, and maximum parameter have been identified to ensure the proposed scheme is contextual to its surroundings, as well as nearby heritage sensitivities. Where applicable, the architectural treatments prescribed in the Design Code Document also forms embedded mitigation, including the following General Principles:

- All buildings must be designed and specified to a high level of quality due to their townscape contribution.
- The visual impact of lift overruns and rooftop plant must be minimised through use of perimeter or localized screening and well considered positioning.
- Ensure buildings have a varied but cohesive architectural style, taking into consideration the key assets around the square.

10.6.2 In relation to the Built Form, the Design Code specifies:

- Materials for the facade must be consistent with the local vernacular of Reading.
- Clear delineation of buildings should be made up of 3 key distinctions; ground floor (base), Middle and top – each with their own architectural distinction as well as being stitched together a clear and coherent design language.

10.6.3 At ground floor, the Design Code specifies:

- Commercial frontage must have a high degree of transparency between public realm and interior.
- Building frontages that are adjacent to primary movement zones must provide active frontage.

10.6.4 The likely effects of the Proposed Development include embedded mitigation which is assumed to have been incorporated into the scheme design from the outset. As a result, there is no requirement for additional mitigation and thus likely residual effects remain the same as the likely effects, unless otherwise stated.

10.7 Assessment of Significant Likely Effects

10.7.1 The following receptors have been scoped out of this stage of the assessment, on the basis of limited visibility with the Proposed Development, as shown by the ZTV at Appendix J.2, as well as the separating distances and lack of historic associations, the Proposed Development would introduce no change to their setting or heritage value:

- Watlington House (Map Ref: 7 of Appendix J.1);
- Abbey Mill Ruins (Map Ref: 21 of Appendix J.1);
- Kings Road Garden, Kings Road (Map Ref: 75 of Appendix J.1);

- Huntley and Palmers Social Club, Kings Road (Map Ref: 76 of Appendix J.1).
- Former Gas Works Social Club (Map Ref: 79 of Appendix J.1).

Demolition and Construction Effects

10.7.2 **Chapter 4** sets out the anticipated programme of works and the key activities that would be undertaken on the Site during demolition and construction necessary to facilitate the Proposed Development. The likely effect of these activities on the value of the heritage receptors identified in the baseline is assessed below.

10.7.3 There are no heritage receptors within the Site boundary so the demolition and construction activities will have no direct physical effects on any receptors.

Indirect Effects (setting impacts)

10.7.4 This phase of the Proposed Development could also introduce new environmental conditions into the setting (and experience) of the heritage receptors: there will be increased noise, vibration, dust and traffic in the surrounding area, which could affect a heritage receptor's significance. Such impacts will mainly be felt within close proximity to the Site, including on the Forbury Road, from within Forbury Gardens RPG and Abbott's Walk.

10.7.5 There will be no permanent change to the way the heritage value of the receptors identified in the assessment are appreciated or understood arising from this phase of the Proposed Development. The appearance of construction activity for the receptors where there is some visual relationship between the Site and the receptor is not considered to materially impact on appreciation of their heritage value.

10.7.6 The heritage receptors considered within this assessment (identified in Table 10.12 below) fall broadly within 500m of the Site and therefore the activities at this stage of the Proposed Development would introduce demolition and construction activities to their setting. This would comprise new visual influences, as well as noise.

10.7.7 The following heritage receptors are most likely to experience the temporary effects to setting of the demolition and construction phases of the Proposed Development owing to their proximity or direct alignment with the Site:

- Reading Abbey Ruins (Grade I)
- Reading Abbey Gate (Grade I)
- Reading Gaol (Grade II)
- Forbury Gardens RPG and associated structures (Grade II)
- Church of St James' (Grade II)
- Church of St James' Presbytery (Grade II)
- The Plummery Wall (Grade II)
- Shire Hall (Grade II)
- Assize Courts (Grade II)

10.7.8 These receptors are considered to have a Low susceptibility to this stage of the Proposed Development because this phase of works would not introduce a permanent change to their

setting. The receptors listed above are therefore considered to have a Low/Medium to Medium sensitivity to the Proposed Development.

- 10.7.9 This stage of the Proposed Development would introduce construction activities to the immediate and wider townscape in which the receptors are appreciated. The appearance of this type of activity would be considered to change the baseline situation, with a Low magnitude of impact identified due to the temporal nature of the works. This is considered to result in an indirect medium term, temporary Minor to Minor/Moderate Adverse likely effect, as the activities are unattractive and change the environmental quality of their setting. This likely effect is Not Significant.
- 10.7.10 All other receptors considered in the assessment will have a Low susceptibility to the Proposed Development and a Low to Medium sensitivity (medium value receptors). The sensitivity of all outstanding receptors is considered to be Low to Medium owing to their separating distance from the Site and the unlikelihood that this stage of works would affect an appreciation of their heritage value or change how they are experienced in their local townscape setting.
- 10.7.11 The magnitude of impact on these receptors from this phase of the Proposed Development is considered to be Nil. This results in a likely None effect for all receptors which is indirect, medium term and temporary. This is Not Significant.

Operational Effects

Listed Buildings and Structures

Group 1: Reading Abbey Receptors

- 10.7.12 This group comprises the following receptors:
- Reading Abbey Ruins – Grade I (Map Ref: 1 of Appendix J.1)
 - Abbey Gate – Grade I (Map Ref: 2 of Appendix J.1)
 - Reading Abbey – Scheduled Monument (Map Ref: 78 of Appendix J.1)
- 10.7.13 The Reading Abbey Ruins and Abbey Gate are experienced in an urban setting which is characterised by surrounding modern development, perceptible from within the Abbey Grounds. Historic landmarks are also a feature of the abbey's immediate setting, including the Church of St James and a cluster of other listed buildings which are situated around Forbury Gardens RPG. The extant development plan identifies the Site as being within the East Side Major Opportunity Area, Forbury Retail Park (Policy CR13). Reading Local Plan (2019) outlines that one of the main visions for this area is to become more urban. As such, it is evident that the Site is located within an area of evolving change and major regeneration.
- 10.7.14 Given the awareness of the wider urban environs of Reading town centre, which is subject to further change, the susceptibility of this group of receptors change is Medium. When calibrated with their Very High value, this equates to a sensitivity of Medium to High.
- 10.7.15 The ZTV at Appendix J.2 illustrates that there will be visibility of the Proposed Development from within the Abbey Ruins. The new buildings on Site will form 12 residential blocks of between 65m to 75m AOD. The mid to upper elements of the proposals will be visible from within the Reading Abbey Ruins.
- 10.7.16 VL3 Reading Abbey Ruins, from the verified views pack prepared by AVR London illustrates how the Proposed Development will appear from within the Reading Abbey Ruins. The Proposed Development largely remains occluded from view, by virtue of the sunken

topography and the enclosed character of the abbey, characterised by the perimeter wall of the prison. The view is representative and the extent of visibility is likely to change as the observer moves around the abbey grounds.

- 10.7.17 Where visible, the Proposed Development does not rise above or compete with the existing scale of the Abbey Ruins. It remains subservient and is understood as part of the existing context of modern development which is visible on the periphery of the Abbey Ruins, including Reading Gaol.
- 10.7.18 The reserved matters design will be controlled by the design codes which are submitted for approval together with the approved parameter plan, these will control the materiality and form of the development. The height steps down on the southern boundary, the element of the proposals closest to the Abbey Ruins, in turn reducing the perception of mass, as illustrated in the illustrative axonometric study and illustrative sectional diagram from the Design Codes document prepared by Squires and Partners. The contextual material palette of the building will respond to the local vernacular, echoing the historic character of the Abbey Ruins.
- 10.7.19 The Abbey Gate is located further away from the Site in comparison to the Abbey Ruins. The upper elements of the new buildings on Site will result in visibility with the Abbey Gate, the lower elements will remain occluded by interposing development. This new built form is understood and appreciated in the existing context of buildings that comprise the wider urban environs of Reading Town centre.
- 10.7.20 For the reasons outlined above, the Proposed Development will have Nil magnitude of impact on this group of receptors, resulting in an effect of None. The effect is not significant and will be indirect, permanent and long term.

Reading Gaol – Grade II (Map Ref: 9 of Appendix J.1)

- 10.7.21 As outlined in **Section 10.5** due to its function, the setting of the Gaol is restricted to its immediate boundaries which are enclosed by a tall boundary wall. The building thus has an inward looking and private character, which means that the setting of the listed building makes no contribution to the special interest of the listed building. Furthermore, the gaol is experienced within the urban environs of Reading town centre which comprises the busy and noisy Inner Distribution Road (IDR). Forbury Retail Park is an allocated site under Policy CR13 of the development plan. It is thus evident that the Site is located within an area of evolving change and major regeneration. Consequently, the susceptibility of the receptor to change is Low. When calibrated with the High value, the sensitivity of the receptor is Medium.
- 10.7.22 The Proposed Development will form 12 new residential blocks of between 65m and 75m, as set out by parameter plan 18111-SQP-ZZ-05-DR-A-PL00013 directly opposite the prison, on the opposing side of the IDR/Forbury Road. The ZTV indicates that there will be visibility from the prison, yet given the confines of the tall boundary wall, only the upper elements of the Proposed Development will be perceptible from within the prison. This development is therefore understood as part of the existing tall building, modern development which forms part of the receptors wider setting.
- 10.7.23 VL13 Kenavon Drive towards Reading Prison of the verified views pack prepared by AVR London, illustrates the impact of the Proposed Development from within the immediate setting of the receptor. The scheme increases the scale of development on the south of the Forbury Road, within the immediate setting of the prison, yet given this is an allocated Site, the increase in units and scale is to be expected.
- 10.7.24 The Design Codes which are submitted for approval provide the set of 'rules' which future applications for approval of reserved matters must comply with. A tapering in height to the south perimeter buildings (Central Blocks 3 and 4) is stipulated in the Design Code to ensure a transition towards the existing built environment on the southern boundary. The Design Code specifies that the main materials of the façade should be in keeping with the local

vernacular, including the red brick masonry of the prison. The proposed elevations are also to have a 'top, middle and bottom' to help break down the overall mass of the building elements closest to Reading Gaol.

10.7.25 The architectural and historic interest of the prison, as outlined in Section 10.5, is derived in its internal plan form of a cellular arrangement, which reflects the use of a 'separate' system of penal management. The impact of the Proposed Development, within the wider setting of the prison, which does not contribute to its significance value, is not considered to cause harm to the receptor. It does not alter the inward looking character of the prison, nor does it change one's appreciation of the heritage value of the prison.

10.7.26 As such, the Proposed Development will have a Low magnitude of impact resulting in an effect of Minor Neutral. The effect is not significant and will be indirect, permanent and long term.

Group 2: Church of St James and St James's Presbytery and St James Former School Buildings – Grade II (Map refs 10 and 11)

10.7.27 The Church of St James and associated presbytery are located within the context of the historic Abbey Ruins and Grade II RPG of Forbury Park. The receptors are also experienced with the later development and environmental influences (noise, pollution etc) associated with the Forbury Road. It is evident that the Site is located within an urban area, which is evolving in accordance with the East Side Major Opportunity Area, Forbury Retail Park (Policy CR13). The dual carriageway forms a distinct visual and physical boundary and the intrinsic parts of the listed buildings setting are located within Forbury Park. The susceptibility of the assets to change is Low. When calibrated with the High value of the receptors', their sensitivity is Medium.

10.7.28 The Proposed Development will introduce 12 residential blocks of between 65m and 75m AOD, directly opposite the church and presbytery, on the opposing side of the Forbury Road. This will introduce new development of scale within the immediate setting of the receptors and within key views of the development from east and west along Forbury Road.

10.7.29 The impact of this is articulated by VL2 Forbury Gardens and 9 prepared by AVR London. VL2 Forbury Gardens illustrates that the Proposed Development will be seen in conjunction with the neighbouring development of No 3 Forbury Place. From within Forbury Park, one's appreciation of the principal gable of the church is altered by the increase in scale to the north of the church, and the significant sky gap that the development takes up. Yet it should be highlighted that the appreciation of the church is kinetic one and this view is illustrative of a singular point.

10.7.30 The introduction of the Proposed Development does not alter the axial view of the principal gable and the proposals remain separated from the church, by virtue of the presence of the large dual carriageway.

10.7.31 VL9 is located to the west of the Church of St James, along Forbury Road. The height is contextual to the surrounding development which comprises neighbouring tall schemes including Forbury Place at 8 storeys and Huntley Wharf in the distance, which stands at 11 storeys. Furthermore, the proposals remain subservient to the ridgeline of the church in views from within Forbury Gardens.

10.7.32 VL2 Forbury Gardens is shown in the winter condition in which the trees have shed their leaf, thus showing the maximum visibility. In summer, when the trees are in leaf, views of the proposals will be heavily filtered by the dense border of mature trees which align the northern boundary of the park.

10.7.33 The reserved matters design will be controlled by the design codes which are submitted for approval together with the approved parameter plans, which will control the materiality and

form of the development. A tapering in height to the south perimeter buildings (CB3 and CB4) is stipulated by the Design Code to ensure a transition towards the existing built environment on the southern boundary, including St James Church, which front the Forbury Road. The Design Code specifies that the main materials of the façade should be in keeping with the local vernacular, including brick masonry that would complement the church. The proposed elevations are also to have a 'top, middle and bottom' to help break down the overall mass of the building elements closest to St James Church.

- 10.7.34 Given the extent of change within the receptor's setting and the proximity of the proposals, the Proposed Development would have a Low magnitude of impact to the value of the receptor. This would give rise to a Minor/Moderate Neutral effect. The effect is not significant and will be indirect, permanent and long term.

The Plummery Wall – Grade II (Map Ref: 14)

- 10.7.35 The historic setting of the plummery wall has been entirely eroded by the construction of the ring road in 1989, which also resulted in elements of the wall being buried. As such, it makes no contribution to the significance of the receptor. Therefore, the susceptibility of the receptor to change, is Low. When calibrated with the High value the sensitivity of the receptor is Medium.

- 10.7.36 The Proposed Development would introduce a number of new buildings within the immediate setting of the receptor. The maximum height of the blocks will vary between 65m and 75m, as set out by parameter plan 13. Yet, given the extent of change within the receptor's setting, the Proposed Development will have a Nil magnitude of impact, resulting in an effect of None. There will be no change to the value of the receptor.

10 and 11 and 12, Abbot's Walk – Grade II (Map Ref: 15)

- 10.7.37 The existing setting of the listed terrace comprises a mixture of historic buildings and landmarks, as well as modern development of scale, located along the Forbury Road and Forbury Roundabout. Whilst initially experienced in an attractive, historic immediate setting, there is still an awareness of the wider urban environs of Reading town centre. Consequently, the susceptibility of the receptor to change is Medium. When calibrated with the High value, the sensitivity of the receptor is Medium/High.
- 10.7.38 The Proposed Development will introduce new built form within the wider setting of the receptor, to the north of the Forbury Road. The scale of development of between 65m and 75m AOD will be visible from the immediate setting of the receptor and in views looking south east along Abbot's Walk. Yet, this will be appreciated in the context of existing modern development of scale along the Forbury Road and will contribute to the wider urban environs of reading town centre.
- 10.7.39 The reserved matters design will be controlled by the design codes which are submitted for approval together with the approved parameter plans, which will control the materiality and form of the development. The Design Code specifies that the main materials of the façade should be in keeping with the local vernacular, including the historic brick work and render of 10,11 and 12 Abbot's Walk. The proposed elevations are also to have a 'top, middle and bottom' to help break down the overall mass.
- 10.7.40 Furthermore, the historic and architectural interest of the building is best appreciated in close up views looking towards the principal elevation of the buildings. In this context, one is orientated away from the Site and the Proposed Development.
- 10.7.41 The Proposed Development would therefore have a Very Low magnitude of impact to the value of the receptor. The Proposed Development would give rise to a Negligible Neutral effect.

Group 3: Forbury Gardens Receptors

10.7.42 This group comprises the following receptors:

- Archway connecting Forbury Gardens to Abbey Ruins – Grade II*
- Shelter at North-east corner of Forbury Gardens – Grade II
- Wall between Forbury Road and Abbott's Walk to West of St James's Church – Grade II
- Anglican Cross within Forbury Gardens – Grade II
- Maiwand Memorial within Forbury Gardens – Grade II
- Forbury Gardens RPG – Grade II

10.7.43 The immediate surroundings of the RPG comprise a historic cluster of Reading's medieval abbey complex, which positively contributes to an understanding for the historic placement of the RPG in this location. Views outwards, through gaps in the tree line provide visibility of large-scale modern buildings which has resulted in this group of receptors being experienced in the wider urban environs of Reading town centre. Consequently, the susceptibility of this group of receptors is Medium. When calibrated with their High value the sensitivity of the receptor is Medium/High.

10.7.44 The Proposed Development will introduce 12 new residential blocks of between 65m and 75m, as set out by parameter plan 13, to the north of the Forbury Road, within the wider setting of the receptor. From within the RPG, there will be views of the new buildings on Site, through gaps in the mature trees which are a common feature of the park. Where visible, the new buildings on Site will be perceptible as part of the already established modern development to the north of the Forbury Road.

10.7.45 VL2 Forbury Gardens illustrates the impact of the Proposed Development from within the RPG, in which there will be views of the new buildings on Site. However, this view shows the 'worst case scenario', the winter condition in which the trees have shed their leaf. In summer, when the trees turn to leaf, the new buildings will only be partially visible through gaps in the mature trees which are a common feature of the park.

10.7.46 Where visible, the new buildings on Site will be seen in conjunction with the already established modern development to the north of the Forbury Road. VL9 Forbury Road (west) from just outside the northern boundary of the park articulates how the new buildings will be perceived in conjunction with the existing development along Forbury Road, the height of the proposals remaining consistent with the datum established by the neighbouring Huntley Wharf and Forbury Place.

10.7.47 Yet the new building will infill a significant sky gap to the north east of the park, where development has largely remained absent from this boundary.

10.7.48 The materiality of the proposals will have reference to the local vernacular and will be contextual to the historic structures within and around the RPG. The landscape proposals will replace the vacant hard standing which currently forms a hostile, unwelcoming environment on the northern side of the Forbury Road.

10.7.49 For many of the listed structures within the park, their historic and architectural interest is best appreciated in close up views, from within the park. The addition of new built form on the periphery of the park will not impact on one's appreciation of the heritage value of these structures, which are already experienced in an urban setting. As such, the Proposed

Development is considered to have a Nil magnitude of impact on the individually listed structures within this group. This will result in an effect of None.

- 10.7.50 Given the enclosure of the RPG to the north east by the Proposed Development, in an area previously absent to larger scale development, a larger magnitude of impact is identified to the RPG as a whole. The magnitude of impact remains Low, by virtue of the mature trees on the northern boundary of the park which, in summer, will largely occlude view of the proposals, as well as the existing established context of modern development on the Forbury Road. Therefore, the Proposed Development would give rise to a Minor Neutral effect. The effect is not significant and will be indirect, permanent and long term.

Kings Meadow Swimming Pool – Grade II (Map Ref: 18)

- 10.7.51 The setting comprises the open fields of Kings Meadow, yet visible within the receptors setting are the tall buildings which align Napier Road to the immediate south, reinforcing the proximity of Reading's urban centre. This includes the Thames Quarter development, which stands at 23 storeys. Consequently, the susceptibility of the receptor to change is Medium. When calibrated with the High value, the sensitivity of the receptor is Medium/High.
- 10.7.52 The Proposed Development will introduce new built form within the wider setting of the receptor, the taller elements of which may be perceptible from the immediate setting of the receptor. This is illustrated by proposed VL5 Kings Meadow Open Space, in which the upper elements of the proposals are visible, appearing above development along Napier Road.
- 10.7.53 Yet this adds to the existing, taller and more proximate development which already exists, to the southeast of the receptor. The proposals remain subservient to the height datum established by the Thames Quarter development which stands at 23 storeys. The new buildings on Site therefore merely add to the existing and emerging tall building context directly to the south of the Lido.
- 10.7.54 The reserved matters design will be controlled by the design codes which are submitted for approval together with the approved parameter plans, which will control the materiality and form of the development. The Design Code specifies that the main materials of the façade should be in keeping with the local vernacular. The proposed elevations are also to have a 'top, middle and bottom' to help break down the overall mass.
- 10.7.55 Furthermore, the architectural and historic interest of the receptor is best appreciated from the interior, given its purpose-built design as a lido. From this context, views outwards are limited and the Proposed Development will not impact on one's appreciation of the historic and architectural value of the building.
- 10.7.56 The Proposed Development would therefore have a Nil magnitude of impact, resulting in an effect of None. There will be no change to the value of the receptor.

Group 4: Assize Courts and Shire Hall– Grade II (Map Ref: 19 and 20)

- 10.7.57 These two buildings have an enclosed setting, on the narrow street of the Forbury, which comprises Forbury Gardens, as well as the cluster of historic buildings and landmarks to the east. However, the neighbouring building comprises a modern office complex of competing scale, and visible across Forbury Gardens is the modern commercial building that aligns the Forbury Road. As such, the receptors are experienced in the context of the wider development of Reading town centre which is evolving. Consequently, the susceptibility of the receptor to change is Medium. When calibrated with the High value, the sensitivity of the receptor is Medium/High.
- 10.7.58 The Proposed Development will introduce 12 new residential blocks of between 65m and 75m, as set out by parameter plan 13, to the north of the Forbury Road, within the wider setting of the receptor. The upper elements of the new buildings on Site will result in visibility

with Assize Courts and Shire Hall, the lower elements will remain occluded by interposing development.

10.7.59 The contextual material palette of the building will respond to the local vernacular, echoing the historic character of the Assize Courts and Shire Hall. The reserved matters design will be controlled by the design codes which outline that the exterior facades must be comprised of local vernacular materials, including brick masonry and concrete.

10.7.60 The Proposed Development will be understood and appreciated in the existing context of buildings that comprise the wider urban environs of Reading Town centre.

10.7.61 Furthermore, the historic and architectural interest of both Assize Courts and Shire Hall is best appreciated in close up views looking towards the principal elevation of the buildings. In this context, one is orientated away from the Site and the Proposed Development.

10.7.62 The Proposed Development would therefore have a Nil magnitude of impact to the value of the receptor. The Proposed Development would give rise to an effect of None.

Group 5: Church of St Laurence Receptors

10.7.63 This group comprises the following receptors:

- Church of St Laurence – Grade I (Map Ref: 3)
- Wall and Gatepiers of St Laurence's Graveyard – Grade II (Map Ref: 22)
- Tracery Fragments in the churchyard of Church of St Laurence– Grade II (Map Ref: 23)
- St Laurence's Church and Churchyard, and Twelve Tombs in St Laurence's Churchyard – Grade II (Map Ref: 25)

10.7.64 This group of receptors is focussed on St Laurence's Church, which forms the centrepiece of the historic town centre north of The Forbury/ Friar Street. This immediate historic setting is surrounded by modern development comprising Reading town centre, which, given the Minster Quarter Framework, is considered to evolve further with an emerging tall building context.

10.7.65 Consequently, the susceptibility of this group of receptors to change is Medium. When calibrated with their High value their sensitivity is Medium/High.

10.7.66 The Proposed Development will introduce 12 blocks of between 65m and 75m, as set out by parameter plan 13, to the north of the Forbury Road, within the wider setting of the receptor. From within the churchyard, views of the upper elements of the proposals may be visible through gaps in the mature trees which are a common feature of the churchyard, as well as Forbury Gardens to the east. Where visible, the upper elements of the new buildings on Site will be perceptible as part of the already established modern development to the north of the Forbury Road.

10.7.67 The historic and architectural interest of the Grade I listed church of St Laurence, is best appreciated in close up views, of its principal exterior elevation which fronts Town Hall Square. From this position, there is no intervisibility with the Proposed Development, given the tight knit urban grain and presence of dominating townscape features of scale. This is illustrated by proposed VL11 Friar Street to St Lawrence Church and Town Hall, in which the green dotted wireline indicates that the proposals will be wholly occluded from view.

10.7.68 The church, churchyard and associated structures are understood as a collective group within the enclosed setting of the churchyard. The modern urban development remains peripheral, and the Proposed Development will form part of this existing, established context.

10.7.69 For the reasons outline above, the Proposed Development will have a Nil magnitude of impact, result in an effect of None. There will be no change to the value of the receptor.

Group 6: Municipal Buildings and Small Town Hall – Grade II (Map Refs: 26 and 31)

10.7.70 The buildings are located within the Market Place/London Street Conservation Area, within the centre of Reading. The group of receptors in this part of the CA form a ‘town hall complex’, providing a historic setting for the buildings. As such, the susceptibility of the receptors to change is Medium. When calibrated with their High value, their sensitivity is Medium/High.

10.7.71 The Proposed Development will form a new residential development within the wider setting of the buildings, to the northeast. This will comprise 12 residential blocks of between 65m and 75m, as set out by parameter plan 13.

10.7.72 Given the tight knit urban grain of the area, and the extent of mature vegetation in St Laurence’s Churchyard, views of the Proposed Development will be limited. The upper elements of the new buildings on Site, may be visible in views looking eastwards, across St Laurence’s churchyard and Forbury Gardens, given the openness that these green spaces afford. However, the interposing vegetation in the form of mature trees within Forbury Gardens will obstruct full views of the proposals.

10.7.73 Where visible, the Proposed Development would be understood as part of the existing context of modern commercial buildings that front Forbury Road. These buildings of up to 8 storeys form the Forbury Place office development, located within the immediate setting of the CA.

10.7.74 Furthermore, the Proposed Development will be located within an element of the CA’s setting that is not considered to contribute to an appreciation of their significance. As such, the Proposed Development is considered to have a Nil magnitude of impact to the value of the receptor, resulting in an effect of None.

Group 7: Reading Museum and the Former School of Art – Grade II (Map Refs: 35 and 29)

10.7.75 The buildings are located within the Market Place/London Street Conservation Area, within the centre of Reading. The group of receptors in this part of the CA form a ‘town hall complex’, providing a historic setting for the buildings. As such, the susceptibility of the receptors to change is Medium. When calibrated with their High value, their sensitivity is Medium/High.

10.7.76 The Proposed Development will introduce 12 new residential blocks of between 65m and 75m, as set out by parameter plan 13, within the receptors’ wider setting.

10.7.77 The ZTV illustrates that there is no visibility with the Proposed Development. This is a result of the east-west orientation of the street, with consistent development of scale on both sides, meaning that views outwards are limited and the receptors’ are only appreciable from this immediate street setting.

10.7.78 Furthermore, the historic and architectural interest of the buildings are best appreciated in views of their principal elevation, located on the south side of Valpy Street. In this scenario, one is orientated from the Site and the Proposed Development.

10.7.79 For the reasons outline above, the Proposed Development will have a Nil magnitude of impact, result in an effect of None. There will be no change to the value of the receptor.

Group 8: Blakes Lock Sewage Pumping Station Receptors (Map Refs 24, 27, 28 and 30 of Appendix J.1)

- 10.7.80 The buildings are located on the River Kennet, which makes an important contribution to the special interest of the listed building. Their wider setting includes later development which has changed the historic character of the area from industrial use to modern residential blocks of flats. Given the extent of separation distance and the presence of residential blocks in the current setting of this group of receptors, their susceptibility to the change is Low. When calibrated with their High value, their sensitivity is Medium.
- 10.7.81 The Proposed Development will introduce 12 new residential blocks of between 65m and 75m, as set out by parameter plan 13, within the receptors' wider setting. The impact of the Proposed Development is illustrated in proposed VL4 Kenavon Drive, adjacent to Riverside Museum, prepared by AVR London. This shows the maximum parameters of the development, visible in views looking north along Kenavon Drive.
- 10.7.82 Part of the development will be largely occluded from view by the adjacent development of Meridian House which stands at six storeys. Where visible, the proposals will be understood as part of the peripheral tall building context of the group of receptors which is already characterised by blocks of residential development.
- 10.7.83 As outlined in the Design Codes document produced by Squires and Partners, the materiality of the new buildings on Site will be contextual to the local vernacular, including the historic red brick of the former sewage pumping station buildings. The proposed elevations are also to have a 'top, middle and bottom' to help break down the overall mass.
- 10.7.84 Furthermore, the heritage value of the receptors are best appreciated in close up views, when one is orientated away from the Site and proposed scheme. In particular, from the opposing side of the River Kennet, in which the proposals will be occluded from view by interposing development. For the reasons outline above, the Proposed Development will have a Nil magnitude of impact on the receptors, resulting in an effect of None. The effect is not significant and will be indirect, permanent and long term.

Group 9: Watlington Street Receptors - Wesley Methodist Church and Church of St John the Evangelist (Map Refs 42 and 57)

- 10.7.85 This group of receptors are located on Watlington Street and are understood and appreciated in the immediate context of Victorian housing, with a backdrop of taller residential development, including the adjacent development 10 storey development of Q2 Watlington Street. Given the prevailing modern character of development to the north of Watlington Street and the Wesley Church's position on a prominent A road in the town centre, the susceptibility of this group of receptors to the proposed change is Low. When calibrated with their High value, their sensitivity is Medium.
- 10.7.86 The ZTV illustrates that there is likely to be some visibility with the receptors and the Proposed Development, which seeks to introduce 12 residential blocks of between 65m and 75m, as set out by parameter plan 13. VL1 Forbury Road (south) of the verified views prepared by AVR London articulates the level of visibility from approximately 250m to the north, in closer proximity to the Proposed Development. From here, the central blocks of the proposals are almost wholly visible, given the wide-open trajectory of the Forbury Road which allows for this level of visibility.
- 10.7.87 Yet given the extent of separation distance with the Watlington Street receptors and combined with the change in alignment of the road, visibility of the proposed scheme from the location of the two churches will be much more limited.

10.7.88 Where visible, the upper elements of the Proposed Development will be seen to form part of the receptors' wider setting and will be understood as part of the existing established context of tall residential blocks which are a key characteristic of Reading town centre.

10.7.89 Furthermore, the heritage value of the churches is best appreciated in close up views, appreciating the finer details of their principal exteriors, in which the Proposed Development will remain peripheral. As such, the magnitude of impact of the Proposed Development is judged to be Nil, resulting in an effect of None.

Reading Station Main Building (Map Ref 74)

10.7.90 The setting of the station building is comprised of contemporary development of varying scales, including the modern extension to Reading Station. This, combined with the sense of enclosure established by the consistent development surrounding the receptor, means that it's susceptibility to the Proposed Development is **Low**. When calibrated with the receptor's High value, its sensitivity is **Medium**.

10.7.91 The ZTV illustrates that there is likely to be some visibility with the receptors and the Proposed Development, which seeks to introduce 12 residential blocks of between 65m and 75m, as set out by parameter plan 13. Yet given the extent of separation distance between the station building and the Site, as well as the enclosure afforded by surrounding development, visibility is likely to be limited.

10.7.92 Furthermore, the principal architectural and historic interest of the building is best appreciated from its principal elevation which fronts on to the public realm of the station, when one is orientated away from the Proposed Development. The Proposed Development, where visible, will be understood as part of the existing, established context of tall building development in Reading town centre and along the Forbury Road. As such, the magnitude of impact of the Proposed Development is judged to be **Nil**, resulting in an effect of **None**.

Conservation Areas

London Street/Market Place Conservation Area (Map Ref: A)

10.7.93 The London Street/Market Place CA is located to the immediate east of the commercial heart of Reading and is thus experienced within the context of a busy, urban town. Whilst the CA comprises a significant number of historic buildings and landmarks, as well as being located in close proximity to the Forbury Gardens cluster, the predominance of tall building forms around Reading town centre, which are likely to evolve given the emerging Minster Quarter framework, result in the CA being experienced in the environs of tall building development. Consequently, the susceptibility of the receptor to change is Low to Medium. When calibrated with the High value, the sensitivity of the receptor is Medium.

10.7.94 The Proposed Development will introduce new built form to the northeast of the CA, within its setting, and will comprise 12 new residential blocks of between 65m and 75m, as set out by parameter plan 13. The ZTV prepared by Stantec suggests that there may be some visibility from the eastern areas of the CA in particular.

10.7.95 This includes the area around St Laurence's church and open churchyard. From here, the upper elements of the Proposed Development may be perceptible, in views looking eastwards. Yet the proposals will remain predominantly occluded by the interposing vegetation in the form of mature trees which are a key feature of the adjacent Forbury Gardens.

10.7.96 Where visible, the Proposed Development would be understood as part of the existing context of modern commercial buildings that front Forbury Road. These buildings of up to 8 storeys form the Forbury Place office development, located within the immediate setting of the CA.

10.7.97 Views from town hall square, the core of the CA, are more limited given the tight knit urban grain of the CA which prominent buildings and landmarks of scale including the Grade I listed Church of St Laurence and Grade II* Town Council Chamber, which serve as interposing built forms, obstructing views outwards.

10.7.98 The Proposed Development is located within an element of the CA's setting, that does not contribute to an appreciation of its significance. As such, the Proposed Development is considered to have a Nil magnitude of impact to the value of the receptor, resulting in an effect of None.

Eldon Square Conservation Area (Map Ref: B)

10.7.99 The Eldon Square Conservation Area borders the Queen's Road, where there is a sharp change in character. Modern residential development of up to 9 storeys aligns the northern side of the road. This, combined with the extent of separation distance between the boundary of the CA and the Site has meant the CA has a Low susceptibility to the Proposed Development. When calibrated with the High value, the sensitivity of the receptor is Medium.

10.7.100 The Proposed Development will introduce new built form to the north of the CA, within its wider setting and will comprise 12 new residential blocks of between 65m and 75m, as set out by parameter plan 13. The ZTV prepared by Stantec suggests there will be some intermittent visibility with the proposals, from along Watlington Road and other north-south orientated roads, including St John's Hill.

10.7.101 The extent of separation distance, however, at 400m at the nearest point, means that the proposed scheme will remain entirely peripheral and will appear in out and of focus in views filtered by interposing development.

10.7.102 Furthermore, given the enclosed, historic character of the CA and the existing context of modern residential development on its northern boundary, where visible, the Proposed Development would be understood as part of this.

10.7.103 The addition of the new residential blocks in the wider setting of the CA will have no effect on its heritage value which remains intrinsic to the historic street pattern and number of historic buildings within the CA.

10.7.104 For the reasons outlined above, the Proposed Development is considered to have a Nil magnitude of impact to the value of the receptor, resulting in an effect of None.

Table 10.12 Summary of Heritage Assessment

Ref	Heritage Receptor	Sensitivity	Magnitude	Likely Effect (Operational)	Likely Effect (Cumulative)
1	Reading Abbey Ruins	Medium to High	Nil	None	None
2	Abbey Gate	Medium to High	Nil	None	None
3	Church of St Laurence	Medium to High	Nil	None	None
4	Archway connecting Forbury Gardens to Abbey Ruins, including retaining walls flanking path	Medium to High	Nil	None	None

Ref	Heritage Receptor	Sensitivity	Magnitude	Likely Effect (Operational)	Likely Effect (Cumulative)
	to Abbey Ruins				
9	Reading Gaol	Medium	Low	Minor Neutral (Not Significant)	Minor Neutral (Not significant)
10	Church of St James's	Medium	Low	Minor/Moderate Neutral (Not Significant)	Minor/Moderate Neutral (Not Significant)
11	St James's Presbytery and St James Former School Buildings	Medium	Low	Minor/Moderate Neutral (Not Significant)	Minor/Moderate Neutral (Not Significant)
12	Shelter at North-East Corner of Forbury Gardens	Medium/High	Nil	None	None
13	Wall between Forbury Road and Abbott's Walk to West of St James's Church	Medium/High	Nil	None	None
14	The Plummery Wall	Medium	Nil	None	None
15	10 and 11 and 12, Abbot's Walk	Medium/High	Very Low	Negligible Neutral (Not Significant)	Negligible Neutral (Not Significant)
16	Anglican Cross	Medium/High	Nil	None	None
17	Maiwand Memorial	Medium/High	Nil	None	None
18	Kings Meadow Swimming Pool	Medium/High	Nil	None	None
19	Assize Courts	Medium/High	Nil	None	None
20	Shire Hall	Medium/High	Nil	None	None
21	Abbey Mill Ruins	Medium	Nil	None	None
22	Walls and Gatepiers of St Laurence's Graveyard	Medium /High	Nil	None	None
23	Tracery Fragments to south of No.10	Medium/High	Nil	None	None
24	The Engine House	Medium	Nil	None	None

Ref	Heritage Receptor	Sensitivity	Magnitude	Likely Effect (Operational)	Likely Effect (Cumulative)
25	St Laurence's Church and Churchyard, and Twelve Tombs in St Laurence's Churchyard	Medium/High	Nil	None	None
26	Municipal Buildings	Medium/High	Nil	None	None
27	The Screens House	Medium	Nil	None	None
28	47-48 Kenavon Drive	Medium	Nil	None	None
29	Former School of Art	Medium/High	Nil	None	None
30	The Pump and Turbine	Medium	Nil	None	None
31	Small Town Hall	Medium/High	Nil	None	None
35	Reading Museum	Medium/High	Nil	None	None
42	Wesley Methodist Church	Medium	Nil	None	None
57	Church of St John the Evangelist	Medium	Nil	None	None
74	Reading Station Main Building	Medium	Nil	None	None
80	Reading Abbey: A Clunian and Benedictine monastery and Civil War earthwork	Medium	Nil	None	None
82	Forbury Gardens RPG	Medium/High	Low	Minor Neutral (Not Significant)	Minor Neutral (Not Significant)
Conservation Areas					
A	Market Place and London Street CA	Medium	Nil	None	None
B	Eldon Square CA	Medium	Nil	None	None

10.8 Secondary Mitigation and Enhancement

10.8.1 The likely effects of the Proposed Development include embedded mitigation. As a result, there is no requirement for additional mitigation and thus likely residual effects remain the same as the likely effects, unless otherwise stated.

10.9 Cumulative Assessment

10.9.1 Paragraph 36 of GPA3 states:

“Cumulative assessment is required under the EU Directive on EIA. Its purpose is to identify impacts that are the result of introducing the development into the view in combination with other existing and proposed developments. The combined impact may not simply be the sum of the impacts of individual developments; it may be more, or less.”

10.9.2 The word ‘cumulative’ in this context should be taken to mean incremental and the practical effect of this would generally be to increase the degree of harmful impact in specific cases, judged on a qualitative basis. Instances of incremental harm have as matters of practice normally come about when previous development is recognised to have created a harmful condition, to which a specific proposal adds, so potentially augmenting the pre-existing harm. In all cases, however, a freestanding assessment is required.

10.9.3 GPA3 states:

“Where the significance of a heritage asset has been compromised in the past by unsympathetic development affecting its setting, to accord with NPPF policies consideration still needs to be given to whether additional change will further detract from, or can enhance, the significance of the asset. Negative change could include severing the last link between an asset and its original setting; positive change could include the restoration of a building’s original designed landscape or the removal of structures impairing key views of it.”

10.9.4 Paragraph 40 of GPA3 states:

“Where attributes of a development affecting setting may cause some harm to significance and cannot be adjusted, screening may have a part to play in reducing harm. As screening can only mitigate negative impacts, rather than removing impacts or providing enhancement, it ought never to be regarded as a substitute for well-designed developments within the setting of heritage assets.”

10.9.5 GPA3 and other guidance (for example, the Greater London Authority’s guidance on World Heritage Sites) uses the word cumulative differently, and in relation to past impacts which have been negative. Thus, according to this approach (which is accepted in decision making), the assessor should consider whether past changes are positive or negative and, if the latter, whether the proposed new change adds to pre-existing harm, and so increases the overall harm caused by proposals. This form of assessment is fact specific and often relies on published documents confirming there has been past harm and why. There is no requirement, however, for such external validation and the matter can arise in individual assessments or through discussions with the competent authority and other stakeholders.

10.9.6 Having reviewed the list and map of Committed Developments at Appendix C of this ES, two schemes have been identified within under 500m of the Site:

- Clarendon House (ref: 180909) of 6 to 9 storeys;
- Sloane Place, 6-8 Market Place (ref: 221446) comprising a part two part three storey extension.

10.9.7 The location of Clarendon House, within an area characterised by tall building development, as well as its situation away from receptors identified in this study radius has meant that it is not considered to change the findings of the proposed assessment.

10.9.8 Given the height of the proposed development at Sloane Place, comprising a maximum of three storeys, within an area that has a high sense of visual enclosure, has meant that it is not considered to change the findings of the proposed assessment.

10.9.9 In conclusion, therefore there are no committed developments that would change the findings of the proposed assessment.

10.10 Summary

Baseline Summary

10.10.1 The Built Heritage Chapter considers the impact of the Proposed Development on heritage receptors within the setting of the Site (i.e. indirect effects). The receptors in the setting of the Site include designated heritage receptors (conservation areas, listed buildings and Registered Parks and Gardens) within 500m of the Site boundary and non-designated heritage receptors (locally listed buildings, Areas of Special Local Character and Local Historic Parks and Gardens) within 250m of the Site boundary, except where additional receptors have been requested for Inclusion by the Council.

10.10.2 There are no heritage receptors within the Site boundary and so the Proposed Development will not result in any direct physical effects in a heritage context.

Summary of Findings – Demolition and Construction Effects

10.10.3 The likely effects on the designated heritage receptors in the study area would range from Minor to Moderate Adverse to None. These effects would be Not Significant, and would be indirect, medium term, and temporary.

Summary of Findings – Completed Development Effects

10.10.4 During the completed stage of the Proposed Development, the assessment of impacts to heritage receptors identified no residual harmful effects. In all instances the Proposed Development is judged to have a Nil or neutral impact upon the setting and value of heritage receptors e.g. their heritage value is not harmed and the ability to appreciate their interest is preserved. The scale of the effect ranges from Minor/Moderate to None. The effects are deemed to be Not Significant and would be indirect, long term and permanent.

Summary of Findings – Cumulative Effects

10.10.5 The cumulative schemes would not introduce new likely effects or materially change the assessment of heritage receptors.

10.11 References

- Planning (Conservation Areas and Listed Buildings) Act 1990;
- National Planning Policy Framework (2021);
- Reading Local Plan (2019);
- Market Place/London Street Conservation Area Appraisal (2007);
- Reading Borough Council, Eldon Square Conservation Area Appraisal (2015);
- Reading Borough Council Proposals Map (Adopted 2019);
- City Centre Framework SPD (2008);

- The Reading Prison Framework (2015);
- Significant Views with Heritage Interest assessment (2018);
- National Planning Practice Guidance (NPPG) (online);
- National Design Guide (2021) by Ministry of Housing, Community and Local Government;
- Good Practice Advice Note 2: Significance in Decision-Taking in the Historic Environment (2015);
- Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2017);
- Statements of Heritage Significance: Analysing Significance in Heritage Assets Advice Note 12 (2019);
- Principles of Cultural Heritage Impact Assessment (2021);
- Historic England Heritage List for England available at:
<https://historicengland.org.uk/listing/the-list/>;
- Historic Environment Record;
- Verified views and Methodology prepared by AVR London (2023).

11 Daylight, Sunlight, and Solar Glare

11.1 Introduction

- 11.1.1 This chapter assesses the likely daylight, sunlight and solar glare effects associated with the Proposed Development. This section sets out the relevant policies, proposed approach and methodology used within the Daylight, Sunlight and Solar Glare assessments. Overshadowing and Light Pollution assessments have been ‘Scoped Out’ of this chapter.
- 11.1.2 This Daylight, Sunlight and Solar Glare chapter has been prepared and carried out by EB7 Limited, a specialist consultancy with over 15 years expertise in daylight and sunlight assessment for EIA.
- 11.1.3 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A.3**.

11.2 Policy Context, Legislation, Guidance and Standards

- 11.2.1 The following local, regional and national guidance has been published in relation to daylight, sunlight and solar glare.

National Planning Policy Framework (2021)

- 11.2.2 The National Planning Policy Framework sets out planning policies for England and how these are expected to be applied. In respect of daylight and sunlight it stresses the need to make optimal use of sites and to take a flexible approach to daylight and sunlight guidance. Para 125 States: -

“11. Making effective use of land:

Achieving appropriate densities

125. Where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities, and ensure that developments make optimal use of the potential of each site. In these circumstances:

c) local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site.”

Reading Borough Council – Local Plan, 2019

- 11.2.3 Reading Borough Council (RBC) provide the following policies within their Local Plan, which relate to daylight, sunlight and overshadowing:

“Policy CC8 – Safeguarding Amenity

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

.... Access to sunlight and daylight;”

“Policy CR10 – Tall Buildings

v) In addition to the area-specific requirements, all tall building proposals should be of excellent design and architectural quality, and should:

Ensure adequate levels of daylight and sunlight are able to reach buildings and spaces within the development;

Avoid significant negative impacts on existing residential properties and the public realm in terms of outlook, privacy, daylight, sunlight, noise, light glare and nighttime lighting;”

11.2.4 Whilst not a direct policy, section 5.3.49 follows Policy CR10 – Tall Buildings, stating that:

“In terms of effects of developments, the Building Research Establishment (BRE)¹¹⁰ has guidelines on assessing daylight and sunlight effects of development, which the Council will apply flexibly given the high density of the central area.”

Building Research Establishment Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice, 2022

11.2.5 The BRE ‘Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice’ document provides advice on site layout planning to achieve good sunlighting and daylighting within buildings, and in the open spaces between them (hereafter referred to as the ‘BRE guidelines’). It is intended to be used in conjunction with the interior daylight recommendations in the BS 8206 Part 2 and the Applications Manual Window Design of the Chartered Institute of Building Services Engineers (CIBSE).

11.2.6 The BRE guidelines are intended for building designers, developers, consultants, and planning officials. The guidance is not mandatory and should not be used as an instrument of planning policy. In this regard the guidelines state the following:

“Its aim is to help rather than constrain the designer. Although it gives numerical guidelines these should be interpreted flexibly since natural lighting is only one of many factors in the application site layout design. In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new Developments are to match the heights and proportions of existing buildings.”

11.3 Consultation

11.3.1 An EIA Scoping Opinion Request was submitted to Reading Borough Council (RBC) the week commencing 24th February 2023 in support of a request for a formal EIA Scoping Opinion. RBC issued an EIA Scoping Opinion on the 18th April 2023.

11.3.2 **Table 11.1** below summarises the consultation that has been undertaken with respect of the Daylight, Sunlight and Solar Glare Assessments.

Table 11.1: Summary of Consultation

Consultation (Who and Date)	Summary of issues raised during consultation	How it has been dealt within this chapter	Where it has been addressed within the chapter (if applicable)
RBC: Scoping Opinion received 18 th April 2023.	Incorrectly stated that Huntley Wharf comprised of 10 storeys	This was a typo and the correct 11 storey massing for Huntley Wharf has been considered.	Assessment of daylight and sunlight impacts on Huntley Wharf are found in section 11.9. of this chapter.
RBC: Scoping Opinion received 18 th April 2023	Levels of daylight and sunlight within the Proposed Development should be Scoped Into the chapter.	Internal Daylight and Sunlight assessments are a design issue. Notwithstanding this, a summary of the Internal Daylight and Sunlight assessment has been provided in this chapter.	Section 11.9.
RBC: Scoping Opinion received 18 th April 2023	Assessment of the adjacent future developments at the CR13b Forbury Retail Park allocation (land to the east) as part of the Daylight and Sunlight assessment.	This is being dealt with separately from the ES Chapter and will be dealt with as part of the Planning Statement.	

11.4 Methodology

Study Area

- 11.4.1 The assessment of daylight and sunlight considers the surrounding residential receptors in proximity to the Proposed Development that have windows facing the Site as well as other sensitive buildings which are deemed to have a requirement for natural light, including, for example, churches and hospitals. Professional judgment has been applied in order to take a reasonable approach to distance within which surrounding receptors could be affected by the Proposed Development and as such are included within the assessment. These receptors were agreed with RBC as part of EIA Scoping.
- 11.4.2 The full list of receptors considered for the daylight and sunlight assessments is provided below:
- St James Roman Catholic Church;
 - Forbury Gardens Day Nursery;
 - Former HM Young Offenders Prison Reading; and
 - Huntley Wharf.
- 11.4.3 St James Roman Catholic Church, Forbury Gardens Day Nursery and Huntley Wharf are all located within proximity to the Proposed Development, such that there may be an impact to

their daylight and sunlight levels. These receptors are in active use and are comprised of Religious, Education and Residential uses respectively. Therefore, these are each considered relevant for assessment.

- 11.4.4 It should be noted that since its closure in 2014, the HM Young Offenders Prison is not currently in use as a prison and has been used irregularly as a temporary arts space. For completeness this building has been included in the assessment.
- 11.4.5 The sensitive receptors considered with regard to reflected solar glare effects are drivers of trains on the railway line to the north of the Site, as well as drivers of vehicles and cyclists on roads surrounding the Site. Viewpoints were selected as those where a driver faces the Proposed Development and or where they may need to make a decision; this being sensitive to an instance of distraction/disability glare.

Baseline Data Collection

- 11.4.6 The assessment has been undertaken via the creation of a digital three-dimensional model of the Site and surroundings, this has been informed by a laser scan measured survey in regard to neighbouring buildings and window positions. For the solar glare assessment, additional massing of the railway lines and Reading Train Station has been informed by a Photogrammetric survey model. Combined, this will be referred to in this ES chapter as the 'baseline scenario'.
- 11.4.7 As set out in the EIA Scoping Report, internal daylight and sunlight of the residential units within the Proposed Development is considered a design issue and is not considered within this ES. The internal daylight and sunlight assessment is presented in a standalone Internal Daylight, Sunlight and Overshadowing report which accompanies the planning application.

Assessment

- 11.4.8 Assessment of the Proposed Development has been based on 3D maximum parameter massing model, which draws upon the maximum parameters defined within the Parameter Plans (**Appendix A.2**) sought for approval. The maximum parameter massing model presents full extents the Proposed Development can be built at and therefore represents a worst-case scenario in terms of the impacts on existing surrounding receptors.
- 11.4.9 Following the completion of the assessments presented in this chapter, minor amendments were made to the proposed 'Maximum Deviation Plan'. The changes include the omission of balcony tolerance in some locations on the proposed blocks, therefore resulting the in the maximum parameters reducing in size in some locations. Due to minor nature of the changes and reduction in massing, it has not been deemed necessary to update the daylight, sunlight and solar glare assessments to reflect this reduction in massing. Therefore, the results discussed within this chapter and associated appendices reflect a larger massing, which would likely have a greater impact on the surrounding receptors, that the final proposed maximum parameter massing.
- 11.4.10 It should be noted that the maximum parameters have been designed to allow for a level of flexibility for the future detailed design of these plots. Therefore, these maximum parameters are forms of massing that are not proposed to be built out in the real-world scenario and so the impacts presented within this ES chapter will be greater or equal to the eventual real-world effects of the detailed design.
- 11.4.11 In regard to Solar Glare, an additional assessment of the 'Illustrative Massing' has also been considered. This has been undertaken to present a more realistic and informative assessment of likely effects.

Daylight Assessments

11.4.12 The BRE Guidance provides two different methods for assessing daylight for existing residential accommodation: the Vertical Sky Component (VSC) method and the No Sky Line Contour (NSL) method. Each method is summarised in the following sections.

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

The Vertical Sky Component (VSC) Method

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

No Sky Line Contour (NSL) Method

11.4.15 The NSL method is a measure of the distribution of daylight at the 'working plane' within a room. In residential properties, the 'working plane' means a horizontal 'desktop' plane 0.85 metres (m) in height. The NSL divides those areas of the working plane in a room which receives direct sky light through the windows from those areas of the working plane which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room will be poor and supplementary electric lighting may be required.

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

Sunlight Assessment

The Annual Probable Sunlight Hour (APSH) Method

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

11.4.18 The BRE Guidance also note:

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

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

Solar Glare

11.4.20 Viewpoints were selected at the potentially affected traffic intersections around the Site and as defined in 'Methodology: Assessment' section of this Chapter. In some cases, where a driver has multiple signals to consider, more than one assessment has been provided. These consider the drivers focal point looking straight ahead and at each signal.

11.4.21 For each viewpoint two sets of angular images were generated:

- Images displaying the time of the year: The sunpath is divided in months, taking the 21st of each month as the limit for each section; and
- Images displaying the time of the day: In this case the sunpath is divided by hours of the day. The hours represent mean solar time and not local time, and therefore they do not take daylight saving hours into account.

Methodology for Defining Effects

Receptors and Receptor Sensitivity

11.4.22 In terms of sensitivity, all of the receptors for the Daylight and Sunlight assessment are considered to be of high sensitivity.

11.4.23 Drivers of cars and trains are both considered to be receptors of high sensitivity for the Solar Glare assessment.

Magnitude of Impact

11.4.24 Appendix I of the BRE Guidance states the following for use in Environmental Impact Assessments (EIA), when considering the magnitude of impact on daylight, sunlight and overshadowing:

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

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

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

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

Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse.

Factors tending towards minor adverse effect would include:

- *Only a small number of windows or limited area or open space are affected;*
- *The loss is only marginally outside the guidelines;*
- *The affected room has other sources of skylight or sunlight;*
- *The affected building or open space only has a low level requirement for skylight or sunlight; and*

- *There are particular reasons why an alternative, less stringent guidelines should be applied.*

Factors tending towards a major adverse effect include:

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

Defining the Effect

- 11.4.25 The specific criteria targets are discussed below and can be used to apply significance to any effects. It should be noted that each property will be served by a number of windows/rooms showing a range of magnitudes of impact. In such cases the guidance from the BRE has been used to define the magnitude of impact and hence, significance of effect. The BRE guidelines explain that the BRE guidelines are not mandatory and that the guide should not be seen as an instrument of planning policy. Although it gives numerical guidelines these should be interpreted flexibly since natural lighting is only one of the many factors in site layout design.
- 11.4.26 Should the various assessment methodologies show varying significance levels for the same building, professional judgement should be applied to assign significance based on all evidence available. In some instances, technical breaches of the guidance may occur as a result of self-limiting light features. These include windows that are recessed into the building's facade or placed beneath overhanging balconies, which provide the occupants with private external amenity space but limit the amount of daylight that can reach the window surface from directly above.
- 11.4.27 The nature of effects is defined as beneficial or adverse, with beneficial effects being where a noticeable improvement in daylight or sunlight levels occurs within a receptor, and adverse effects being where a noticeable loss of light occurs. Negligible effects are defined as where a loss occurs, but said loss is deemed so minor as not to be noticeable.

VSC Criteria

- 11.4.28 The BRE Guidance recommend that a window serving a habitable room should be able to benefit from a minimum VSC value of 27%.
- 11.4.29 In order to be regarded as meeting the VSC criteria once the Proposed Development has been constructed, a window should either:
- Retain at least 27% VSC in absolute terms; or
 - Retain at least 80% of its existing VSC value after the Proposed Development is constructed.
- 11.4.30 In certain circumstances it may be appropriate to use different target values. Appendix F within the BRE Guidance, states for example, in an historic city centre or in an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings. This is acknowledged by RBC's Local Plan, 2019, which as stated above, states that the BRE Guidelines will be applied flexibly given the high-density nature of the central area. The Proposed Development sits on a site that is allocated for high density residential as a Major

Opportunity Area under policies CR11-13 and SR1-3, as well as an Allocated Development site under policies CR11-14, SR1-4, WR1-3, CA1 and ER1.

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

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

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

NSL Criteria

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

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

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

11.4.36 Where there will be a noticeable change, the results have been summarised dependant on how far beyond the suggested targets the reductions from baseline levels will occur. For NSL, based on professional judgement the ranges of reduction have been set at:

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

Sunlight Assessment

11.4.37 The BRE Guidance for the APSH method state that if a window:

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

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

- Retain at least 25% total APSH and 5% APSH in the winter months in absolute terms;

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

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

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

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

Solar Glare

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

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

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

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

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

11.4.45 Where potentially significant instances of glare occur that are caused by the fully reflective nature of the outline massing, a detailed assessment of the illustrative massing has been undertaken.

11.4.46 Potentially significant instances of glare have been considered to be viewpoints which are deemed to present a moderate adverse or major adverse effect, as per the descriptions above.

11.4.47 Those viewpoints which may potentially lead to significant effects as a result of the maximum extent outline massing, are then reconsidered using the illustrative massing to provide a more realistic assessment of a likely 'real-world scenario'. Significance of effect has then been assigned to each of the viewpoints considered as part of the illustrative assessments.

11.4.48 This is because the fully reflective nature of the maximum parameter massing is the worst-case and is unlikely to be built out when progressed through detailed design.

Limitations

11.4.49 As noted above at paragraph 11.6.4, the maximum parameter massing considered in the assessments within this chapter, presents a slightly larger massing than the final proposed maximum parameters. Therefore, it is assumed that the effects described in this chapter present a higher level of worst case scenario than those that would be presented if the revised scheme was considered.

11.4.50 In some cases, drawings retrieved from the planning portal and / or historic sales particulars and typical layouts of similar local buildings have been used to determine room use. Where internal configuration information was not available for relevant properties, reasonable assumptions have been applied to the room layouts behind the fenestration. A standard 4.27 m (14 ft) room depth has been assumed unless the building form dictated otherwise. This assumed depth is a reasonable industry standard. Where this was inappropriate to follow, the most realistic and practical design was used, and where there were multiple possible scenarios which could be reasonable, the worst-case option was always chosen to represent the potential for more significant effects.

11.4.51 Reasonable estimations of internal reflectance are used if not known.

11.4.52 For the solar glare assessment, the maximum parameter massing of Proposed Development has been assumed to be fully reflective, to again present the worst-case scenario. This is due to the lack of detailed façade design of these plots, which will be developed at the detailed design stage, and therefore represents the worst-case scenario for assessment.

11.4.53 Where glare has been identified as a result of the outline massing, this can be further mitigated at the detailed design stage. To demonstrate this, an additional assessment of the Illustrative Massing has been undertaken. The Illustrative Massing highlights an assumed scheme option which highlights a 'real world' design option. Therefore, it is assumed that this presents a fair indicative summary of likely solar glare effects.

11.4.54 In addition, the Solar Glare assessment assumes full sun throughout the year and is not based on climatic data. For this reason, the assessment assumes a worst-case scenario.

11.5 Baseline Conditions

The Site

The Surrounding Area

11.5.1 The baseline scenario considered in this ES chapter comprises the Site currently occupied by a variety of low-rise massing and vacant land including; a large shopping facility; a car-park and a small commercial restaurant.

11.5.2 Therefore, the existing structures on the Site present little obstruction to the surrounding receptors, resulting in minimal effect on neighbouring light levels. Under such conditions, any meaningful development of the Site will inevitably result in greater changes in light.

Daylight and Sunlight

11.5.3 **Table 11.2** to **Table 11.4** summarise the baseline daylight and sunlight results for the baseline scenario. Full results of the baseline assessments can be found within **Appendix K.2**.

Table 11.2: Baseline VSC Summary

Receptor	Total number of windows	Total number of windows that achieve or exceed VSC levels suggested in the BRE Guidance	Total number of windows that achieve VSC levels below those suggested in the BRE Guidance
St James Roman Catholic Church	77	59	18
Forbury Gardens Day Nursery	16	7	9
Former HM Young Offenders Institution Reading	138	107	31
Huntley Wharf	270	219	51
Total	501	392	109

Table 11.3: Baseline NSL Summary

Receptor	Total number of rooms	Total number of rooms that achieve or exceed NSL levels suggested in the BRE Guidance	Total number of rooms that achieve NSL levels below those suggested in the BRE Guidance
St James Roman Catholic Church	12	9	3
Forbury Gardens Day Nursery	10	7	3
Former HM Young Offenders Institution Reading	84	72	12
Huntley Wharf	207	204	3
Total	313	292	21

Table 11.4: Baseline APSH Summary

Receptor	Total number of rooms facing the Site within 90° of due South	Total number of rooms that achieve or exceed both Winter and Annual APSH levels suggested in the BRE Guidance	Total number of rooms that achieve Annual and or Winter APSH levels below those suggested in the BRE Guidance
St James Roman Catholic Church	3	2	1
Forbury Gardens Day Nursery	0	0	0
Former HM Young Offenders Institution Reading	4	2	2
Huntley Wharf	26	0	26
Total	33	4	29

- 11.5.4 The baseline daylight assessments (VSC and NSL) indicate that the majority of the existing surrounding properties tested experience high levels of daylight. This is entirely to be expected due to the absence of any significant massing on the Site. These baseline levels are unusual in urban locations, and this should be considered when applying the BRE numerical targets.
- 11.5.5 The baseline sunlight assessment (APSH) indicates that the vast majority of rooms relevant for assessment, are still primarily orientated to the east or west, in order them to have a view of the Proposed Development and sit within 90 degrees of due south.
- 11.5.6 Where there are deviations from the targets in the baseline scenario, these are primarily driven by self-limiting features such as overhanging eaves, balconies, and access decks. These features place constraint on the daylight and sunlight potential on the windows and rooms below and will make them more susceptible to additional reductions. Controls on balconies are set out in the Design Codes.

Baseline Evolution

- 11.5.7 The evolution of the baseline revolves around the development of the surrounding relevant cumulative schemes. For the purposes of the Daylight, Sunlight and Solar Glare assessments, none of the cumulative schemes outlined within **Appendix A.6** sit within a c.100m of the Site. Therefore they are not considered to be within a reasonable proximity to the site to be relevant deemed for assessment.
- 11.5.8 Therefore, the evolved baseline scenario is not considered a relevant consideration for this ES chapter, and a cumulative effects assessment has not been undertaken.

11.6 Mitigation

- 11.6.1 Primary mitigation measures have been embedded into the design process for daylight, sunlight and solar glare, including numerous rounds of design stage analysis on the illustrative massing configuration which have been reflected in the Design Codes. This has been done to

ensure an optimised form and design for this location, resulting in the most appropriate balance of effects and scale and mass, when the scheme is eventually brought forward.

- 11.6.2 The eventual detailed design of the Proposed Development which will come forward at the reserved matters stage will act as secondary mitigation in itself, with the refined massing likely to present reduced impacts compared to the maximum extent massing.
- 11.6.3 Therefore, no secondary mitigation measures are proposed for construction or operational phases.

11.7 Assessment of Significant Likely Effects

Demolition and Construction Effects

- 11.7.1 For the purposes of Daylight, Sunlight and Solar Glare assessments presented within this ES chapter, the 'Operational Effects' scenarios present the worst-case scenarios given that the Proposed Development will be at its greatest massing extent when fully constructed and therefore, the impacts of the demolition and construction scenarios would be the same or less than those that may arise as a result of the Operational Effects scenario.

Operational Effects

Daylight and Sunlight

- 11.7.2 Full detailed results of the VSC, NSL and APSH assessments for the Operational Effects can be found within ES Volume 3, Appendix K.2.
- 11.7.3 A summary of these results can be found in **Table 11.5** to **11.7** below.

Table 11.5: Operational Effects - VSC in relation to the BRE Guidance

Receptor	Total number of windows	Total number of windows that achieve or exceed VSC levels suggested in the BRE Guidance	Total number of windows that achieve VSC levels below those suggested in the BRE Guidance			
			20% - 29.9% reduction	30% - 39.9% reduction	≥40% reduction	Total
St James Roman Catholic Church	77	75	2	0	0	2
Forbury Gardens Day Nursery	16	16	0	0	0	0
Former HM Young Offenders Institution Reading	138	137	0	1	0	1
Huntley Wharf	270	242	9	15	4	28
Total	501	470	11	16	4	31

Table 11.6: Operational Effects - NSL in relation to the BRE Guidance

Receptor	Total number of rooms	Total number of rooms that achieve or exceed NSL levels suggested in the BRE Guidance	Total number of rooms that achieve NSL levels below those suggested in the BRE Guidance			
			20% - 29.9% reduction	30% - 39.9% reduction	≥40% reduction	Total
St James Roman Catholic Church	12	12	0	0	0	0
Forbury Gardens Day Nursery	10	10	0	0	0	0
Former HM Young Offenders Institution Reading	84	83	0	0	1	1
Huntley Wharf	207	196	5	3	3	11
Total	313	301	5	3	4	12

Table 11.7: Operational Effects - APSH in relation to the BRE Guidance

Receptor	Total number of rooms	Total number of rooms that achieve or exceed both Annual and Winter APSH levels suggested in the BRE Guidance	Total number of rooms that achieve Annual APSH levels below those suggested in the BRE Guidance				Total number of rooms that achieve Winter APSH levels below those suggested in the BRE Guidance			
			20% - 29.9% reduction	30% - 39.9% reduction	≥40% reduction	Total	20% - 29.9% reduction	30% - 39.9% reduction	≥40% reduction	Total
St James Roman Catholic Church	3	3	0	0	0	0	0	0	0	0
Forbury Gardens Day Nursery	0	0	0	0	0	0	0	0	0	0
Former HM Young Offenders Institution Reading	4	4	0	0	0	0	0	0	0	0
Huntley Wharf	26	26	0	0	0	0	0	0	0	0
Total	33	33	0	0	0	0	0	0	0	0

- 11.7.4 The results of the daylight assessments (VSC and NSL) show that the effect on Forbury Gardens Day Nursery would be fully compliant with the BRE Guidance, with the Proposed Development in place. Therefore, the impact to this property is considered to be local, long term, direct and negligible (not significant).
- 11.7.5 The remaining properties present some daylight deviations and therefore have been discussed in more detail below.
- 11.7.6 The results of the sunlight assessment (APSH) shows that all properties assessed would show full compliance with the BRE Guidance, presenting no sunlight deviations. Therefore, the effect on these properties is considered to be local, long term, direct and negligible (not significant).
- 11.7.7 It is important to consider that most of the windows and rooms within the neighbouring properties, directly overlooking the Site, enjoy very high levels of existing daylight due to the low to mid-rise buildings on the existing site. Therefore, any meaningful redevelopment will inevitably result in a noticeable relative change in light levels.
- 11.7.8 It should be noted that a number of properties are further inhibited by overhanging balconies or deep eaves. These design features act as a constraint in regard to the daylight potential to the window and the room set behind / beneath. The BRE guidelines at paragraph 2.2.11 states:

“Existing windows with balconies above them typically receive less daylight. Because the balcony cuts out light from the top part of the sky, even a modest obstruction opposite may result in a large relative impact on the VSC, and on the area receiving direct skylight.”

St James Roman Catholic Church

- 11.7.9 This two-storey church is located to the south-west of the Proposed Development. Whilst not serving a residential use, this property is still considered to be sensitive from a daylight and sunlight perspective.
- 11.7.10 The results of the VSC assessment show that 75 out of the 77 windows assessed within this property would not see a noticeable reduction as a result of the Proposed Development and are therefore compliant with the BRE Guidance. The two remaining windows present minor adverse reductions. In both cases, the windows would experience proportional reductions of 20% - 21%, marginally in excess of the noticeable threshold of 20%. The windows are assumed to serve a larger room, which is served by multiple other fully compliant windows. As such, the impact to the room as a whole is unlikely to be considered noticeable, as suggested by the NSL assessment.
- 11.7.11 The NSL assessment shows full compliance with the BRE Guidance.
- 11.7.12 Based on the above, considering the isolated and minor VSC deviations, coupled with the full compliance of the NSL assessment, the effect on daylight within this property is considered to be local, long term, direct and negligible (not significant).

Former HM Young Offenders Prison Reading

- 11.7.13 This part two, part four storey former prison sits to the south-west of the Proposed Development. Whilst this property is not currently in use, it is still considered as potentially sensitive pending future use.
- 11.7.14 The results of the VSC assessment show that 137 out of the 138 windows assessed within this property would not see a noticeable reduction as a result of the Proposed Development and are therefore compliant with the BRE Guidance. The remaining window presents a moderate adverse reduction. The window would experience a proportional reduction of 36%

compared to the noticeable threshold of 20%. The window is overhung by an awning which limits the daylight potential, and is assumed to serve a larger room, which is served by multiple other fully compliant windows. As such, the impact to the room as a whole is unlikely to be considered noticeable, as suggested by the NSL assessment.

11.7.15 The NSL assessment shows full compliance with the BRE Guidance.

11.7.16 Based on the above, considering the isolated VSC deviation, coupled with the full compliance of the NSL assessment, the effect on daylight within this property is considered to be local, long term, direct and minor (not significant).

Huntley Wharf

11.7.17 Huntley Wharf is a residential led development located to the south-east of the Proposed Development. The three residential blocks range up to 11 storeys in height, and directly face onto the Proposed Development.

11.7.18 The results of the VSC assessment show that 242 out of the 270 windows assessed show full compliance with the BRE Guidance. Of the remaining 28 windows, 9 present minor adverse impacts, 15 present moderate adverse impacts and 4 present major adverse impacts. Of the 28 deviations, 20 windows retain a VSC level of 20%, which is generally considered to be good for this emerging context. All 8 of the deviating windows which present retained levels lower than 20% are overhung by balconies. As mentioned previously, balconies are self-constraining features which limit the daylight or sunlight to the windows and rooms below.

11.7.19 The results of the NSL assessment show that 196 of the 207 rooms assessed show full compliance with the BRE Guidance. Of the remaining 11 rooms, 5 present minor adverse impacts, 3 present moderate impacts and 3 present major impacts. All of the 11 deviations occur in rooms which are overhung by overhanging balconies. These rooms are referred to as R9, R12, R13, R15, R17, R18 on the 1st floor, R15, R16, R20, R23 on the 2nd floor and R10 on the 3rd floor.

11.7.20 Based on the above, considering the high overall VSC and NSL compliance, alongside the high retained levels in non-overhung windows, and that most deviations are driven by overhanging balconies, the effect on daylight within this property is considered to be local, long term, direct and minor adverse (not significant).

Solar Glare

11.7.21 For the purposes of the Solar Glare assessment, two assessments have been undertaken. The maximum parameter massing has been assessed to present the worst-case scenario, treating the massing as fully reflective. Whilst this is the worst-case, this is not a realistic assessment, as when the detailed scheme is brought forward, the massing would likely be primarily non-reflective (brick, render or matt cladding for example). To demonstrate this, the illustrative scheme has also been undertaken at the same viewpoints.

11.7.22 The assessments consider a total of 27 viewpoints, across different routes travelling east and west on the train tracks to the north, as well as travelling north, east and west on the roads to the south of the Site. A summary of these viewpoints has been discussed below.

11.7.23 These 27 viewpoints have been discussed in detail below.

11.7.24 Full images of both the maximum parameter and illustrative assessments can be found at **Appendix K.3**.

Viewpoints A1 – A4 – Trains travelling east from Reading Train Station

- 11.7.25 With the maximum parameters in place, train drivers travelling this route, east towards the Proposed Development from Reading Station will see instances of solar glare between 3° and 10° in the morning, for an hour from 0500hrs, during the autumn and spring months. There may also be instances of glare occurring between 10° and 30°, either at 0400hrs or 1700hrs during the autumn and spring months. This presents the worst-case scenario, with the real-world massing unlikely to be fully reflective.
- 11.7.26 With the illustrative massing in place, train drivers will see nonmaterial instances of solar glare between 10° and 30°, as a result of the illustrative massing, for an hour at either 1600hrs or 1700hrs during the autumn and spring months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme.
- 11.7.27 Therefore, based on the results of the illustrative massing assessment, the impact of additional solar glare on these viewpoints is considered to be local, long term, direct and negligible (not significant).

Viewpoints B1 – B3 – Trains travelling west approaching Reading Train Station

- 11.7.28 With the maximum parameters in place, train drivers travelling this route, west towards the Proposed Development and Reading Train Station will see instances of solar glare between 3° and 30°, between 0600hrs and 0700hrs, during the autumn and spring months. Again, these instances are the worst-case cause by the assumed fully reflective nature of the maximum parameter massing.
- 11.7.29 With the illustrative massing in place, train drivers will see instances of solar glare between 3° and 30° as a result of the illustrative massing, for an hour at 0600hrs during the autumn and spring months. This brief instance of glare is unlikely to be material as they are heavily broken up by the detailed façade of the illustrative scheme and occur perpendicular to the glass, resulting in weaker reflections.
- 11.7.30 Therefore, the impact of additional solar glare on these viewpoints is considered to be local, long term, direct and minor adverse (not significant).

Viewpoints C1 – C3 – Trains travelling east from Reading Train Station

- 11.7.31 With the maximum parameter massing in place, train drivers travelling this route, east towards the Proposed Development from Reading Station would see non-material instances of glare between 3° and 30°, at 0500hrs during the spring months. These instances are heavily obstructed by bridges and overhead obstructions.
- 11.7.32 With the illustrative massing in place, train drivers would not see any material instances of solar glare within 30° as a result of the illustrative massing.
- 11.7.33 Therefore, the impact of additional solar glare on these viewpoints is considered to be local, long term, direct and negligible (not significant).

Viewpoint D1 – D3 – Trains travelling west approaching Reading Train Station

- 11.7.34 With the maximum parameter massing in place, train drivers travelling this route, west towards the Proposed Development and Reading Station would see instances of solar glare between 3° and 10°, for an hour at 1800hrs during the spring months. There would also be instances occurring between 10° and 30°, between 0600hrs to 0800hrs during the autumn and winter months.

11.7.35 With the illustrative massing in place, train will see instances of solar glare between 10° and 30° as a result of the illustrative massing, between 0600hrs to 0700hrs during the autumn and winter months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme.

11.7.36 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and minor adverse (not significant).

Viewpoints E1 – E3 – Trains travelling east from Reading Train Station

11.7.37 With the maximum parameters in place, train drivers travelling this route, east towards the Proposed Development from Reading Station will result in non-material instances of solar glare within 10°, for an hour at 0500hrs, during the spring and autumn months. These instances would be heavily obstructed by bridges and overhead obstructions.

11.7.38 With the illustrative massing in place, train drivers travelling this route, east towards the Proposed Development from Reading Station will not see any material instances of solar glare within 30° as a result of the illustrative massing,

11.7.39 Therefore, the impact of additional solar glare on these viewpoints is considered to be local, long term, direct and negligible (not significant).

Viewpoint F1 – F3 – Trains travelling west approaching Reading Train Station

11.7.40 With the maximum parameters in place, train drivers travelling this route, west towards the Proposed Development and Reading Station will see instances of solar glare between 3° and 10°, for an hour at 1800hrs during the spring months. There would also be instances occurring between 10° and 30°, between 0600hrs to 0800hrs during the autumn and winter months.

11.7.41 With the illustrative massing in place, train drivers travelling this route would see instances of solar glare between 10° and 30° as a result of the illustrative massing, between 0600hrs to 0700hrs during the autumn and winter months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme.

11.7.42 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and minor adverse (not significant).

Viewpoint R1 – Cars travelling northwest on Kenavon Drive

11.7.43 With the maximum parameters in place, car drivers travelling this route, northwest towards the Proposed Development on Kenavon Drive will see instances of solar glare within 3°, for one hour from 0400hrs and again for one hour during 1600hrs, during the spring, autumn and summer months. There are also other brief instances between 10° and 30°, at various points throughout the day, throughout the year.

11.7.44 The instances will only be experienced for a brief moment, as the viewpoint occurs on a curving road, where there are no traffic signals. Therefore, the driver is not likely to be making a decision at this viewpoint. Furthermore, the design codes require that the detailed design would take note of this assessment to minimise any potential solar glare impacts.

11.7.45 With the illustrative massing in place, car drivers travelling this route will see instances of solar glare within 3° and also between 3° and 30° as a result of the illustrative massing, for one hour from 0400hrs during the spring and summer months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme and again the instances will only be experienced for a brief moment, as the viewpoint occurs on a curving road, where there are no traffic signals.

11.7.46 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and minor adverse (not significant).

Viewpoint R2 – Cars travelling northwest on Kenavon Drive

11.7.47 With the maximum parameters in place, car drivers travelling this route, northwest towards the Proposed Development on Kenavon Drive will see instances of solar glare within 10° for one hour from 1600hrs, during the spring and autumn months.

11.7.48 There are also instances between 10° and 30° at numerous points throughout the day, at differing points of the year. These instances of glare are driven by the fully reflective nature of the maximum parameters. Again, there are no traffic signals on this route, and so the driver will not be making decisions and these points.

11.7.49 With the illustrative massing in place, car drivers travelling this route, northwest towards the Proposed Development on Kenavon Drive will see instances of solar glare between 10° and 30° as a result of the illustrative massing, between 0600hrs to 0700hrs during the spring and summer months and between 1300hrs and 1400hrs during the winter months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme. Again, there are no traffic signals on this route, and so the driver will not be making decisions and these points.

11.7.50 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and minor adverse (not significant).

Viewpoint R3 – Cars travelling northwest on Kenavon Drive

11.7.51 With the maximum parameters in place, car drivers travelling this route, northwest towards the Proposed Development on Kenavon Drive will see a brief instance of solar glare within 10°, for from 0500hrs to 0600hrs and briefly at 1500hrs, during the winter, spring and autumn months. The instance will only be experienced for a brief moment, as the viewpoint occurs on a curving road.

11.7.52 There are also instances occurring between 10° and 30° at various points throughout the day. These instances of glare are primarily driven by the assumed fully reflective massing of the maximum parameters.

11.7.53 With the illustrative scheme in place, car drivers travelling this route, will see a brief instance of solar glare within 3° as a result of the illustrative massing, for one hour at 0600hrs during the spring and autumn months. The instance will only be experienced for a brief moment, as the viewpoint occurs on a curving road.

11.7.54 There are also instances occurring between 3° and 30° as a result of the illustrative massing, for one hour from 0600hrs during the spring and summer months and again for one hour from 1300hrs in the autumn and winter months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme. Again, as the viewpoint occurs on a curving road the instances of glare will be brief, and there are no traffic signals on this route and so the driver would not be making decisions. Furthermore the design codes require that the detailed design would take note of this assessment to address any potential solar glare issues.

11.7.55 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and moderate adverse (significant). This could be mitigated further through the use of materials in the final detailed design of the scheme.

Viewpoint R4A – Cars travelling north on Forbury Road

- 11.7.56 With the maximum parameters in place, car drivers travelling this route, north towards the Proposed Development on Forbury Road approaching the roundabout, will see brief instances of solar glare between 3° and 10°, at 0600hrs and again at 0800hrs, during the winter months. The instance will only be experienced for a brief moment, with the driver having multiple viewpoints to choose from as they approach the roundabout.
- 11.7.57 There are also instances occurring between 10° and 30° between 0600hrs to 0900hrs, and also at 1100hrs and again briefly at 1400hrs, at varying points of the year. These instances are primarily driven by the maximum parameter massing, which have been assumed to be fully reflective as a worst-case.
- 11.7.58 With the illustrative scheme in place, car drivers will see an instance of solar glare between 3° and 10° as a result of the illustrative massing, between for an hour at 1800hrs during the winter months. The instance will only be experienced for a brief moment, with the driver having multiple viewpoints to choose from as they approach the roundabout.
- 11.7.59 There are also instances occurring between 10° and 30° as a result of the illustrative massing, for an hour at 0800hrs during the winter months and again for one hour at 1100hrs in the autumn and winter months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme. Again, as the viewpoint occurs approaching a roundabout without traffic signals, the driver has multiple other points of view.
- 11.7.60 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and minor adverse (not significant).

Viewpoint R4B – Cars travelling north on Forbury Road

- 11.7.61 With the maximum parameters in place, car drivers travelling this route, north towards the Proposed Development on Forbury Road approaching the roundabout, will see an instance of solar glare between 3° and 10°, between 1400hrs and 1600hrs during the winter months. The instance will only be experienced for a brief moment, with the driver having multiple viewpoints to choose from as they approach the roundabout.
- 11.7.62 There are also instances occurring between 10° and 30°, between 1400hrs and 1700hrs during the winter months and again for one hour at 0800hrs and 1100hrs in the autumn and winter months. Again, as the viewpoint occurs approaching a roundabout without traffic signals, the driver has multiple other points of view.
- 11.7.63 With the illustrative massing in place, car drivers will see an instance of solar glare between 3° and 10° as a result of the illustrative massing, between 1400hrs and 1600hrs during the winter months. The instance will only be experienced for a brief moment, with the driver having multiple viewpoints to choose from as they approach the roundabout.
- 11.7.64 There are also instances occurring between 10° and 30° as a result of the illustrative massing, between 1400hrs and 1600hrs during the winter months and again for one hour at 0800hrs and 1100hrs in the autumn and winter months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme. Again, as the viewpoint occurs approaching a roundabout without traffic signals, the driver has multiple other points of view.
- 11.7.65 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and minor adverse (not significant).

Viewpoint R5 – Cars travelling west on Forbury Road

- 11.7.66 With the maximum parameters in place, car drivers travelling this route, west past the Proposed Development on Forbury Road over the roundabout, will see an instance of solar

glare between 3° and 30°, between 1400hrs and 1800hrs during the winter months. The instance will only be experienced for a brief moment, with the driver having multiple viewpoints to choose from as they approach the roundabout.

11.7.67 With the illustrative massing in place, car drivers will see instances of solar glare between 3° and 10° as a result of the illustrative massing, between 1400hrs and 1600hrs during the winter months. The instance will only be experienced for a brief moment, with the driver having multiple viewpoints to choose from as they approach the roundabout.

11.7.68 There are also instances occurring between 10° and 30° as a result of the illustrative massing, between 1400hrs and 1600hrs during the winter months. These instances of glare are heavily broken up by the detailed façade of the illustrative scheme. Again, as the viewpoint occurs approaching a roundabout, the driver has multiple other points of view to choose from.

11.7.69 Therefore, the impact of additional solar glare on this viewpoint is considered to be local, long term, direct and minor adverse (not significant).

Viewpoint R6 – R8 – Cars travelling east on Forbury Road

11.7.70 With the maximum parameters in place, car drivers travelling this route, east towards the Proposed Development on Forbury Road over the roundabout, will see an instance of solar glare between 3° and 10°, for one hour at 0700hrs and again 1700hrs during the autumn and spring months, which will move to between 10° and 30° as they get closer to the Proposed Development. The instance will be nonmaterial as the reflections occur perpendicular to the glass, resulting in weaker reflections.

11.7.71 With the illustrative massing in place, car drivers will see an instance of solar glare between 3° and 10° as a result of the illustrative massing, for one hour at 1700hrs during the autumn and winter months, which will move to between 10° and 30° as they get closer to the Proposed Development. The instance will be nonmaterial as the reflections occur perpendicular to the glass, resulting in weaker reflections.

11.7.72 Therefore, the impact of additional solar glare on these viewpoints is considered to be local, long term, direct and minor adverse (not significant).

Internal Daylight, Sunlight and Overshadowing

11.7.73 An assessment of the internal daylight, sunlight and overshadowing levels within the Proposed Development has been presented in a standalone report. The report details an assessment of the light provision within the lowest floor of the illustrative massing and layouts of the Proposed Development, and an internal overshadowing assessment of the provision of direct sunlight to the proposed amenity spaces. Full details of these assessments can be found in the standalone Internal Daylight and Sunlight report.

11.7.74 The results of the Daylight Illuminance assessment indicate that 76% of the typical units assessed meet the BRE targets for their specific room use. This compliance rate at first floor level considers the lowest units of the proposal where daylight levels will be more constrained. This is however a good level of compliance with the detailed results, discussed below, confirming many rooms significantly exceed the BRE targets. Overall compliance will only increase to the upper levels and detailed design will present the opportunity to optimise the scheme including both the unit layouts and the facade / balcony detail.

11.7.75 The results for the sample show that appropriate daylighting levels can be achieved across the various block typologies around the site. As such the overall compliance is commensurate with schemes of a similar scale and context and good levels of internal amenity will be achieved for future residents.

- 11.7.76 Whilst direct sunlight levels are more orientation specific, the Proposed Development limits the properties outside of a southerly orientation and maximises dual aspect rooms, particularly to main living spaces. Where units do not have a southerly aspect, they enjoy a mitigating factor as recognised within the BRE guide such as a pleasant outlook to the central landscaped areas of the site.
- 11.7.77 In respect of direct sunlight, the target is for units to achieve at least 1.5 hours of direct sunlight on March 21st ideally within the main living space.
- 11.7.78 Overall, the scheme performs well with 81% of the sample first floor units meeting or exceeding the BRE target, with all of these units achieving the figure within the main living space. This indicates that appropriate compliance may be achieved in the detailed design of the proposals.
- 11.7.79 Overall, our daylight and sunlight analysis of the lowest residential units indicate a good level of compliance. The current performance shows the potential for high levels of daylight within the scheme and across the Proposed Development as a whole. The overall compliance will only increase to the upper levels and is considered to be both acceptable and commensurate with schemes of a similar scale and context.
- 11.7.80 In terms of overshadowing, the scheme provides a varied mix of spaces of different character. This includes more open public and private courtyards to the west and east of the site and the more sheltered central Woodland Gardens. The Plummary Gardens and Green Street elements provide varied opportunities for moving past and through the site as well as space to dwell and opportunities for play.
- 11.7.81 Overall, the amenity provision within the scheme exceeds the BRE target for sunlight on the 21st March achieving 2 hours of direct sunlight to 54% of the space. Both residents and visitors will have a wide number of options for amenity throughout the year and, at all times, there are opportunities for enjoying more sunlit or sheltered spaces.
- 11.7.82 Our assessment of the June 21st summer position shows how direct sunlight levels increase in summer reflecting the time of year when the use of the spaces for sitting out and child play will be highest. This accords with the importance that the BRE guide places on the sunlight in the warmer months for these activities whilst still providing elements of shelter. Overall, the sunlight levels fully meet the BRE targets and provide a well-designed and varied mix of public and private amenity.

11.8 Secondary Mitigation and Enhancement

- 11.8.1 There are no significant effects to daylight and sunlight levels as a result of the Proposed Development. Therefore, no secondary mitigation is required in respect of daylight and sunlight.
- 11.8.2 There is a significant impact on solar glare at Viewpoint R3 as a result of the illustrative design of the Proposed Development. As per the Design Codes, the detailed design of the Proposed Development will take reference of the assessment, to address any potential significant solar glare impacts, through the design of the façade. This could be done by reducing the proportions of glazing to minimise the reflections that occur or using a low reflectivity glass.

11.9 Residual Effects

- 11.9.1 There are no significant daylight and sunlight effects that require mitigation.
- 11.9.2 If the secondary mitigation described above is adhered to, there would be not significant effects to solar glare as a result of the Proposed Development.

11.10 Cumulative Assessment

11.10.1 Upon review of the list of cumulative schemes, none of the schemes sit within a reasonable proximity to be considered as sensitive or relevant for daylight, sunlight, overshadowing, solar glare and light pollution assessments. Schemes typically within 100m of the Proposed Development are considered relevant, however this varies from site to site and depends on the surrounding context.

11.11 Monitoring

11.11.1 As there are no residual significant effects, monitoring measures are not required in relation to daylight, sunlight or solar glare.

11.12 Summary

11.12.1 The results of the baseline assessment typically show that the vast majority of the surrounding receptors experience good levels of daylight and sunlight. This is primarily driven by the low-rise and underdeveloped nature of the existing site, which has resulted in unusually high levels for an urban context.

11.12.2 The scheme has been designed with daylight and sunlight as a primary consideration. Numerous iterations of design stage analysis have been undertaken in order to minimise the impacts to neighbours wherever possible through the careful orientation and positioning of the proposed massing on the Site.

11.12.3 Using the assessment methodologies set out by the BRE Guidance, an assessment of daylight and sunlight levels within the existing surrounding receptors has been undertaken. This assessment has considered the Proposed Development at its maximum extents to present the worst case.

11.12.4 The results of this assessment show that whilst reductions to daylight levels occur, these are typically minor and generally there are good levels of retained daylight. It should be noted that the daylight reductions are driven by the high levels of existing daylight, which result in higher proportional reductions or where an overhanging balcony limits the daylight potential of the windows and rooms below. The results of the sunlight assessment show full compliance with the BRE Guidance.

11.12.5 There are no significant effects to either daylight or sunlight levels as a result of the Proposed Development.

11.12.6 The solar glare assessment has considered two scenarios, one including the maximum extent massing and one considering the illustrative detailed massing. This has been done to represent both the worst-case and a more realistic scenario of the likely real world solar glare effects.

11.12.7 The results of this show a variety of impacts, and where impacts are presented by the maximum extent massing, the illustrative assessment demonstrates that a detailed design would present non-significant effects. Controls are set out in the design codes to mitigate such effects. There is one isolated instance of a significant effect presented by the illustrative massing, however this instance occurs on a curved road and so will only be experienced briefly, where no traffic decisions need to be made. The instance of reflection occurs perpendicular with the glass and so the reflections will also be weak and only occur for a short period of time. As this is only the illustrative massing, the detailed design of the Proposed Development could be designed to reduce or remove this instance of glare.

11.13 References

- Building Research Establishment. Site Layout Planning for Daylight and Sunlight. A guide to good practice. (BRE Guidance 2022)
- Reading Borough Council. Local Plan 2019.

12 Wind Microclimate

12.1 Introduction

- 12.1.1 This chapter presents an assessment of the likely significant effects of the Proposed Development on the local wind microclimate within and around the Site. In particular, consideration is given to pedestrian comfort as well as the potential for occasional strong winds to be generated.
- 12.1.2 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in Appendix A.3.

12.2 Policy Context, Legislation, Guidance and Standards

National Planning Policy

National Planning Policy Framework²³ (2021)

- 12.2.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. It states that the purpose of the planning system is to contribute to the achievement of sustainable development; and that the planning system must meet interdependent overarching objectives summarised as: an economic objective, a social objective and an environmental objective.
- 12.2.2 There are no policies or statements that are directly related to the wind microclimate, although the promotion of high-quality built environments was emphasised in the NPPF. For instance, paragraph 8 describes environmental objectives for sustainable development:
- c) "[...] to protect and enhance our natural, built and historic environment [...] and mitigating and adapting to climate change".*
- 12.2.3 Additionally, paragraph 130 states the following:

"f) Create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users".

National Planning Practice Guidance (NPPG)²⁴ (2019)

- 12.2.4 The NPPG was published in November 2016 to support the NPPF and was updated in October 2019.
- 12.2.5 The NPPG identifies the potential for tall and large buildings to affect the wind microclimate. The National Design Guide states in Paragraph 71 that:
- 12.2.6 "Proposals for tall buildings (and other buildings with a significantly larger scale or bulk than their surroundings) require special consideration. This includes their [...] environmental impacts, such as [...] wind. These need to be resolved satisfactorily"

²³ Department for Communities and Local Government, 2021. Revised National Planning Policy Framework. London. HMSO.

²⁴ Ministry of Housing, Communities & Local Government, 2019. Planning Practice Guidance

National Standards and Guidance

Historic England Advice Note 4: Tall Buildings²⁵ (2022)

12.2.7 The Historic England Advice Note 4: Tall Buildings (2022) states in Section 4.1:

“The following checklist summarises the main considerations for tall building policies [...].

3) The tall building policy should:

j) Address the following: Environmental impacts, such as [...] wind.”

Local Planning Policies

Reading Borough Local Plan²⁶ (2019)

CC8: Safeguarding Amenity, states:

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

- Wind, where the proposals involve new development of more than 8 storeys.”

12.2.8 CR10, Tall Buildings, states:

“Tall buildings will meet all the requirements below.

- V) Mitigate any wind speed or turbulence or overshadowing effects through design and siting.”

12.2.9 Section 5.3.45 – Street environment, states:

“Tall buildings need not prejudice the creation or retention of a human scale street environment, provided that they [...] have regard to the effects on the microclimate. There are a number of design solutions that can be used to assist in creating a human scale street environment:

- *Stepping down a large mass to its neighbours;*
- *[...];*
- *Mitigating against the adverse impacts a tall building can often make on the microclimate;*
- *[...];*
- *Providing green infrastructure for a comfortable microclimate.”*

12.2.10 Section 5.3.47 – Wind and Solar effects on tall buildings, states:

“Tall buildings can adversely affect the environmental quality of surrounding areas, particularly through the diversion of high speed winds to ground level [...]. However, good design and siting can successfully mitigate these impacts. A building, or grouping of buildings, should be

²⁵ Commission for Architecture and the Built Environment and English Heritage, 2007. Guidance on tall buildings. London. CABE and English Heritage

²⁶ Reading Borough Council, 2019. Reading Borough Local Plan. Reading. RBC

modelled and simulated within its surrounding context, to examine environmental performance at an early design stage to highlight any potential issues that need to be addressed. Wind should be assessed against the Lawson Criteria.”

12.2.11 Section 5.3.48 states:

“In terms of wind effects, the use of architectural devices such as screens, terraces and awnings as well as façade set-backs can be used to minimise the effects of high wind speed at the base of a tall building.”

12.3 Consultation

12.3.1 An EIA Scoping Report was prepared by Stantec and submitted to Reading Borough Council (RBC) on 24th February 2023. A scoping opinion was received from Reading Borough Council on 18th April 2023, requesting the scheme be assessed through wind tunnel testing. RWDI reviewed the Proposed Development in the context of the existing surrounding buildings. The height of the tallest maximum parameter massing is 12 storeys tall, not substantially taller than the nearby surrounding buildings. As such, CFD methods were considered appropriate, and testing was undertaken in March 2023.

12.4 Methodology

Study Area

- 12.4.1 The main interactions of wind with a building occurs relatively close to the building, particularly when there are neighbouring buildings and streets along which the wind can be channelled. This means that the focus of the assessment will be within the Site boundary and the immediate surrounding streets and public realm. Conditions will be assessed on the relative comfort and safety of the Proposed Development's residents, visitors and users of the public, communal and private open spaces, as well as pedestrians utilising other public realm areas such as pedestrian routes within, and bordering, the Proposed Development.
- 12.4.2 Due to the scale of the Proposed Development, a comprehensive assessment of baseline (existing) and likely pedestrian level wind conditions upon completion of the Proposed Development was undertaken, based on Computational Fluid Dynamic (CFD) simulations and the industry standard Lawson Comfort Criteria²⁷.
- 12.4.3 The CFD model of the Proposed Development includes the surrounding area within a 400m radius of the centre of the Site. The immediate surrounding area consists of a mixture of low- to mid-rise urban residential and commercial developments, and the Proposed Development is up to 36m tall. Based on this height and the surrounding context, a 400m radius is considered an appropriate study area for the wind assessment to allow for proper development of low wind flow patterns and identify the potential influence of the Proposed Development. Results are assessed around a 200m radius of the Proposed Development.
- 12.4.4 It should be noted this assessment is based on the parameter massing, therefore the effects reported are considered a worst-case scenario in terms of wind microclimate, and likely to be less in comparison to the future detailed design of the scheme.
- 12.4.5 No cumulative schemes have been identified within the 400m radius of the detail model surrounding the Site.

²⁷ Building Aerodynamics, (2001); Lawson T.

Baseline Data Collection

- 12.4.6 The baseline conditions around the Proposed Development were defined using CFD simulations to provide a quantitative assessment.
- 12.4.7 Wind conditions are assessed quantitatively by numerically modelling the wind flow around the Proposed Development, and measured for both the windiest season (normally winter in the UK) to show the worst-case scenario, and summer season for amenity spaces (amenity spaces were 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).
- 12.4.8 The results were combined with long-term meteorological climate data (approximately 30 years of data) for the Reading area (Heathrow Airport). The meteorological data used in this assessment is deemed to be representative of the local wind microclimate for the Reading area. The meteorological data used is presented in **Figure 12.1** (See **Section 12.5**).
- 12.4.9 The baseline conditions are reflected within the wind scenario – ‘Configuration 1: The Existing Site with Existing Surrounding Buildings’ (also referred as the ‘Baseline Scenario’). Further detail on the CFD methodology can be found in **Appendix L.1: Wind Microclimate Technical Report**.

Assessment

Operational Phase

- 12.4.10 In order to assess the local wind environment associated with the completed and operational Development and the resulting pedestrian comfort within and surrounding the Site, CFD simulations of the Proposed Development have been undertaken.
- 12.4.11 The following two configurations have been assessed, landscaping details have not been included with the assessment as the detailed landscaping design will be approved via reserved matters, with the design codes providing clear rules to ensure high quality landscaping is provided). Therefore providing an understanding of the worst-case wind environment:
- Configuration 1: Existing Site with Existing Surrounding Buildings; and
 - Configuration 2: Proposed Development with Existing Surrounding Buildings.
- 12.4.12 To determine the wind microclimate around the Proposed Development, the following has been undertaken:
- A 3D model has been created of the Proposed Development and the surrounding area up to a 400m radius from the centre of the Site in order to capture detail of the surrounding context. A 400m radius was chosen as this distance was deemed large enough to identify the extent of influence the Proposed Development would have on the local wind microclimate, along with ensuring appropriate development of local flow; and as agreed at EIA scoping stage.
 - Wind conditions were assessed quantitatively by numerically modelling the wind flow around the Proposed Development in the context of both the existing and the cumulative surrounding buildings.
 - It should be noted that the assessment was carried based on a set of maximum parameters that included an increased allowance for balconies and it is expected that

further testing will be undertaken at a later date in order to assess the detailed version of the scheme.

12.4.13 The computational model was constructed in Orbital Stack, RWDI's in-house CFD tool. CFD is a computer modelling technique for numerically simulating wind flow in complex environments.

12.4.14 In total, 18 wind directions were tested, equally spaced out around the compass (equal 20° intervals). Although the strongest winds originate from the south-westerly sector, testing for 18 wind angles provides a sufficient coverage of all aerodynamic interactions for winds from all angles.

12.4.15 The study utilises a Reynolds Averaged Navier-Stokes (RANS) CFD approach, with the resultant turbulence effects modelled using an RNG k-ε type turbulence closure model. The statistically steady solution obtained by RANS simulations provide a good understanding of mean wind flows. Therefore, the RANS simulation output has been interpreted to provide the final assessment of wind conditions around the Site. Similarly, the potential for strong winds leading to potential safety issues was assessed using informed professional judgement.

Assessment Criteria

12.4.16 The assessment of the wind conditions requires a standard against which the measurements can be compared. The assessment of the wind tunnel results presented in this chapter adopts the Lawson Comfort Criteria. The Lawson Comfort Criteria define the reaction of an average pedestrian to the wind and are described in **Table 12.1**. If the measured wind conditions exceed the threshold wind speed for more than 5% of the time, then they are unacceptable for the stated pedestrian activity and the expectation is that there may be complaints of nuisance or people will not use the area for its intended purpose.

12.4.17 The Lawson Criteria sets out five pedestrian activities (comfort categories) and reflect the fact that less active pursuits require more benign wind conditions. The four categories are: 'Sitting', 'Standing', 'Strolling' and 'Walking', in ascending order of activity level, with a fifth category for conditions that are 'Uncomfortable' for all uses. In other words, the wind conditions in an area required for 'Sitting' need to be calmer than a location that people merely walk past.

12.4.18 The distinction between 'Strolling' and 'Walking' is that in the 'Strolling' scenario pedestrians are more likely to take on a leisurely pace, with the intention of taking time to move through the area, whereas in the 'Walking' scenario pedestrians are intending to move through the area quickly and are therefore expected to be more tolerant of stronger winds. For a mixed-use development site, such as the Proposed Development, the desired wind microclimate would typically need to have areas suitable for sitting, standing and strolling use.

12.4.19 The Lawson Criteria are derived for open air conditions and assume that pedestrians will be suitably dressed for the season. Thermal comfort is not evaluated as part of the assessment.

Table 12.1: Lawson Comfort Criteria

Key	Comfort Category	Threshold	Description
	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.
	Standing	4–6 m/s	Gentle breezes suitable for main building entrances, pick-up/drop-off points and bus stops.
	Strolling	6–8 m/s	Moderate breezes that would be appropriate for strolling along a city/town centre street, plaza or park.

Key	Comfort Category	Threshold	Description
	Walking	8-10 m/s	Relatively high speeds that can be tolerated if the objective is to walk, run or cycle without lingering.
	Uncomfortable	>10 m/s	Winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended.

Strong Winds

12.4.20 The Lawson Criteria also specifies a strong wind threshold when winds exceed 15m/s for more than 0.025% of the time (approximately 2.2 hours of the year) would have the potential to cause distress to pedestrians and cyclists. Exceedance of this threshold may indicate a need for mitigation measures or a careful assessment of the expected use of that location; e.g. is it reasonable to expect older adults or young children to be present at the location on the windiest day of the year?

12.4.21 Wind speeds that exceed 20m/s for more than 0.025% of the time (approximately 2.2 hours of the year) represent safety issue for all members of the population, which would require mitigation to provide an appropriate wind microclimate environment.

12.4.22 Strong winds are generally associated with areas which would be classified as acceptable for walking or conditions considered uncomfortable. In a mixed-use urban development scheme, walking and uncomfortable conditions would not usually form part of the 'target' wind environment and would usually require mitigation due to pedestrian comfort considerations. This mitigation would also have the impact of reducing the frequency of, or even eliminate, any strong winds.

12.4.23 It should be noted that the CFD simulations provide an average expected wind speed for the windiest season (typically the winter months – December to February) and summer season (June to August) in regard to pedestrian comfort. Areas which would have uncomfortable wind conditions would be likely to have instances of strong winds. As such, professional judgement incorporating RWDI's experience of a large number of similar projects both within the UK and internationally has been applied, informed by the CFD results to identify areas of the Proposed Development likely to have instances of strong winds.

Target Wind Conditions

12.4.24 Sensitive receptors include the following locations (where present within and around the Proposed Development) with the required wind conditions specified for each use:

- Thoroughfares – targeting strolling wind conditions during the windiest season;
- Main entrances – targeting standing wind conditions during the windiest season;
- Secondary entrances – targeting strolling wind conditions during the windiest season;
- Bus stops – targeting standing wind conditions during the windiest season;
- Seating areas – targeting sitting wind conditions during the summer season;
- Amenity spaces (ground level and terrace levels) – targeting sitting wind conditions during the summer season (with standing conditions acceptable at mixed-use amenity areas);

- Roads and cyclists – The Lawson Comfort Criteria do not specify criteria for acceptable wind conditions for cyclists and pedestrians on the road; however, they do specify that the occurrence of winds exceeding the strong winds threshold would be considered unsuitable for cyclists. The assessment for roads and cyclists focuses on annual strong winds.

Limitations

- 12.4.25 This assessment is based on worst-case wind speeds, expected to be encountered during the winter season (December, January and February) in the UK. Additional consideration has been made for summer wind conditions due to the presence of outdoor amenity spaces and elevated spaces.
- 12.4.26 This study utilises a Reynolds Averaged Navier-Stokes (RANS) CFD approach, with the resultant turbulence effects modelled using an RNG k- ϵ type turbulence closure model. The statistically steady solution obtained by RANS simulations provides a good understanding of mean wind flows. However, it is RWDI's opinion that these methods do not provide an adequately robust prediction of the fluctuating or gusty nature of wind. Therefore, the potential for strong winds at the Site generally driven by gust events has been assessed qualitatively by an experienced wind engineer through review of the RANS simulation output to provide the final assessment of wind conditions around the Site.
- 12.4.27 It should be noted that the CFD simulations will provide an average expected wind speed for the windiest (typically the winter months – December to February) and summer season in regard to pedestrian comfort. Areas which would have wind conditions suitable for walking use would be likely to have instances of strong winds. As such, professional judgement incorporating RWDI's experience of a large number of similar projects both within the UK and internationally has been applied, informed by the CFD results to identify areas of the study area likely to have instances of strong winds.

Significance Criteria

Receptors and Receptor Sensitivity

- 12.4.28 The sensitivity of a receptor at and around the Site in the presence of the Proposed Development is high and equal for all measurement locations. This is because the significance criteria for the wind assessment is based on whether the wind environment of the Site is acceptable for the intended use. As such, an equal sensitivity is assigned to each receptor within and surrounding the Proposed Development; as well as the existing buildings and their surroundings. The geographical extent of the wind microclimate is expected to be within the Site and its immediate surroundings i.e. a local effect, for all receptors.
- 12.4.29 The following description of receptor categories for the Site and approach taken to the allocation of the measurement locations to the categories is as follows:

On-Site Locations:

- Thoroughfares;
- Entrances; and
- Amenity Areas (at ground level and terraces).

Off-Site Locations

- Thoroughfares;

- Bus Stops; and
- Entrances.

Magnitude of Impact

12.4.30 The magnitude of impact for all receptors is defined as high. The impact on all receptors is consistent (in respect of the specific wind direction and speed defined by standard meteorological data) and the effect at each location is in accordance with the Lawson Comfort Criteria, described in **Table 12.1**. The impacts on all receptors are the same, as any receptor which has wind conditions windier than required for the intended use will require mitigation, regardless of location.

Effect Significance

12.4.31 The assessment of the likely scale of effect is based on the comparison of the predicated wind conditions at a particular measurement location with the desired pedestrian use of the Site and surrounding area as defined in the Lawson Comfort Criteria and set out in **Table 12.1**. Where there is no change of pedestrian use, wind conditions at and surrounding the Site are also compared against the baseline conditions.

12.4.32 In line with the Lawson Comfort Criteria's overall methodology, strong winds (affecting pedestrian safety) are reported separately from the comfort assessment and do not form part of the scale of effect criteria. This is due to the fact that any strong wind exceedance is considered to be significant regardless of scale. Where strong winds occur, mitigation is required (as per adverse effects related to pedestrian comfort).

Table 12.2: Significance Criteria

Expected Wind Microclimate	Significance Criteria
Wind conditions are 3-steps calmer than those desired	Major Beneficial
Wind conditions are 2-steps calmer than those desired	Moderate Beneficial
Wind conditions are 1-step calmer than those desired	Minor Beneficial
Wind conditions are as desired	Negligible
Wind conditions are 1-step windier than those desired	Minor Adverse
Wind conditions are 2-steps windier than those desired	Moderate Adverse
Wind conditions are 3-steps windier than those desired	Major Adverse

12.4.33 The minor, moderate and major scale of effects indicate the severity of the change in wind conditions between the desired wind microclimate and wind microclimate presented in the modelled results. As an example, if the desired wind conditions at a location are required to be suitable for 'Standing', but the predicted wind conditions are suitable for 'Strolling', the difference between the desired and predicted wind conditions is one category windier than desired. In this case, the scale of the effect would be identified as being of 'minor adverse significance'.

12.4.34 The assessment of the wind microclimate differs from other disciplines in that any adverse effect (minor, moderate or major) is a 'significant effect'. This is because it implies that a location, or area, has a wind microclimate that is unsuitable for the desired use of that area and is likely to be perceived as too windy by users and therefore may not be utilised for the

intended use. On this basis, effects that are adverse need mitigating. In addition, any identified strong winds will be classed as 'significant'.

12.4.35 As required, measures will be suggested to mitigate the event of adverse effects and all measures will be described within this chapter.

12.4.36 In terms of off-Site areas, wind conditions are compared to the Baseline Scenario and the intended use of each measurement location. If off-Site wind conditions were suitable in the Baseline Scenario and remain suitable (or calmer) in the Proposed Development scenario, then the effect would be negligible (likewise for unsuitable conditions that remain windier than desired). If conditions are windier than the Baseline Scenario, but remain suitable for the intended use, the increase in wind speeds as a result of the Proposed Development will be stated. Off-Site conditions that become windier than desired for the intended use as a result of the Proposed Development would be considered adverse. Off-Site conditions that were windier than desired in the Baseline Scenario and are made suitable by the Proposed Development would be considered beneficial.

12.5 Baseline Conditions

Meteorological Data

- 12.5.1 The meteorological data are presented by season in **Figure 12.1** as wind roses. The radial axis indicates the percentage time per season that the wind speed exceeds the particular wind speed range. The seasons are defined as spring (March, April and May), summer (June, July and August), autumn (September, October and November) and winter (December, January and February). The meteorological data indicate that the prevailing wind direction throughout the year is from the south-west. This is typical for many areas of southern England. There is a secondary peak from the north-westerly winds, especially during the spring.
- 12.5.2 The meteorological data has been adjusted from meteorological station to account for the effects of the terrain surrounding the Site using the methodology set out in ESDU 01008. Full details of this approach are set out in **Appendix L.1**.

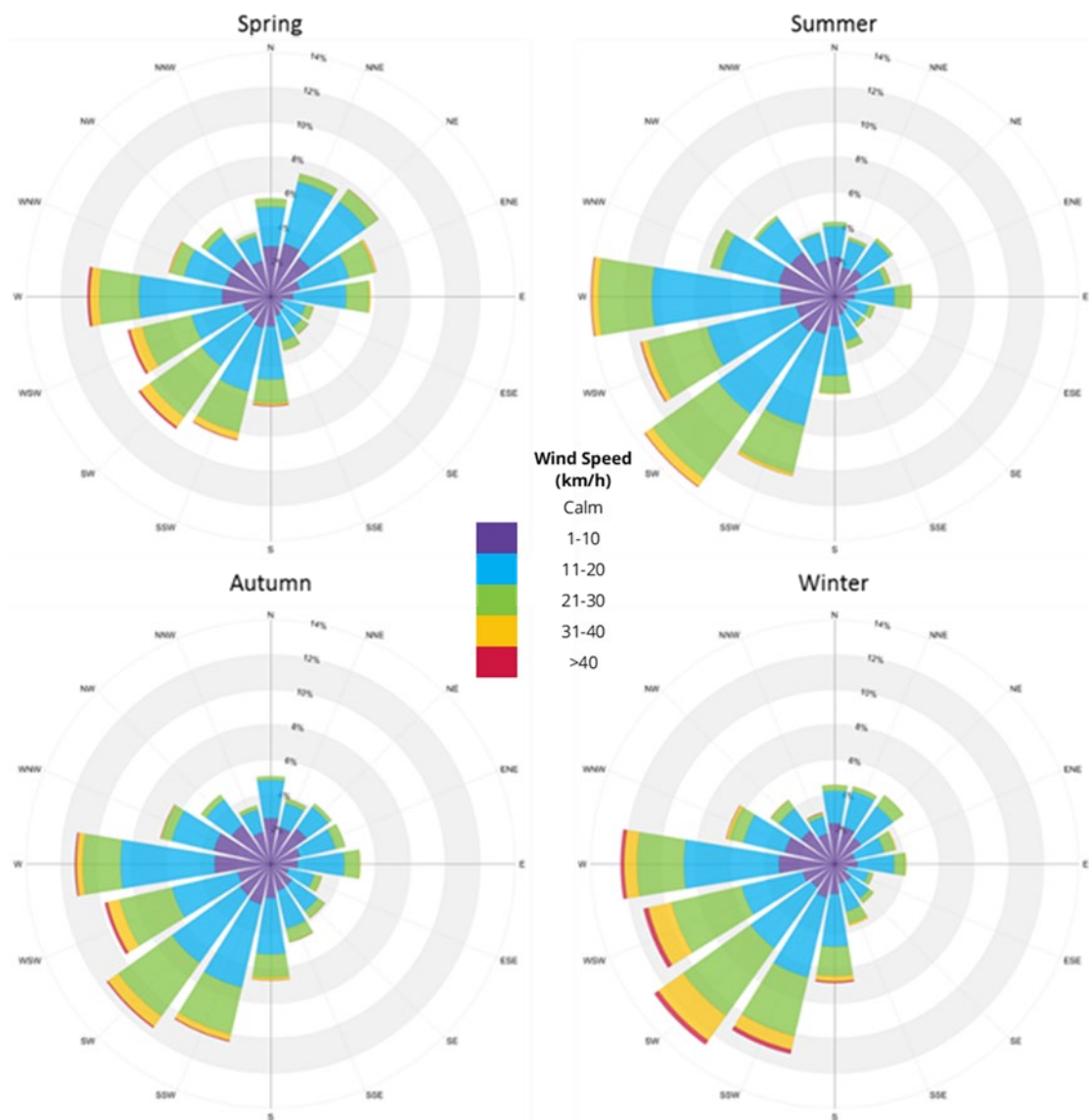


Figure 12.1: Seasonal Wind Roses for London Heathrow airport (in m/s) (Radial axis indicated the percentage time for which the stated wind speed threshold is exceeded)

Configuration 1: Existing Site with Existing Surrounding Buildings

12.5.3 Wind conditions for Configuration 1 are presented in **Figures 12.2** and **12.3** for the windiest and summer season respectively.

Pedestrian Comfort

Thoroughfares

12.5.4 Thoroughfares within and around the Site have wind conditions ranging from suitable for sitting to strolling use during the windiest season. This range in wind conditions is suitable for the current pedestrian uses. There is a small area of walking use conditions situated around the south-eastern corner of No. 3 Forbury Place; the area of walking conditions would be situated on the car park access road.

Bus Stops

- 12.5.5 Bus stops off-Site on Kenavon Drive would have standing conditions during the windiest season, suitable for the current pedestrian use.

Entrances

- 12.5.6 Entrances within the current Site and surrounding area would be suitable for sitting and standing use during the windiest season, appropriate conditions for the current pedestrian uses.

Strong Winds

- 12.5.7 Strong winds exceeding 15m/s for more than 2.2 hours per annum are expected to occur where wind conditions would be suitable for walking or uncomfortable for all uses during the windiest season. As such, strong winds are anticipated to occur on the road around the south-eastern corner of No. 3 Forbury Place.

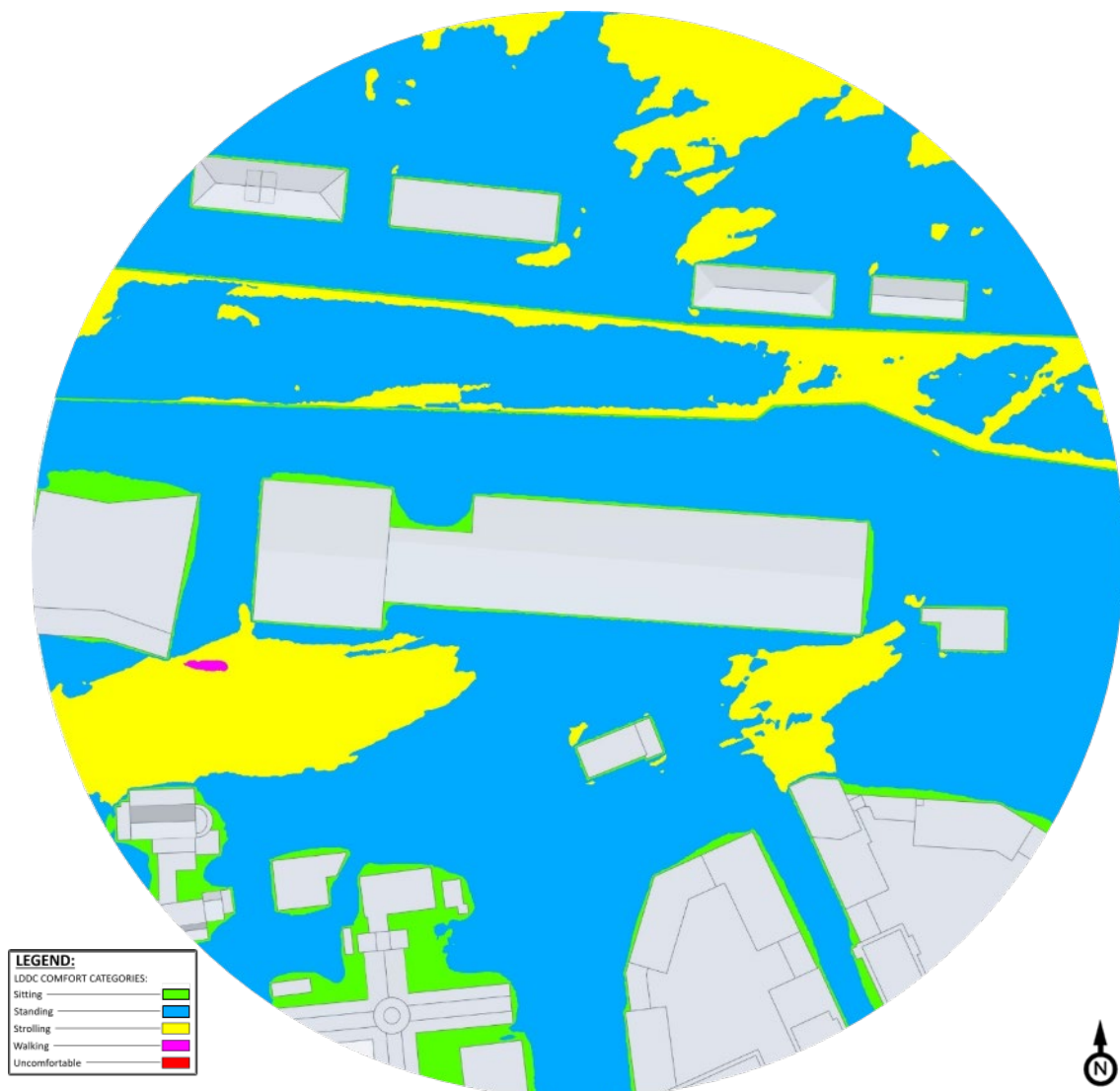


Figure 12.2: Configuration 1 – Existing Site with Existing Surrounding Buildings – ground level, windiest season

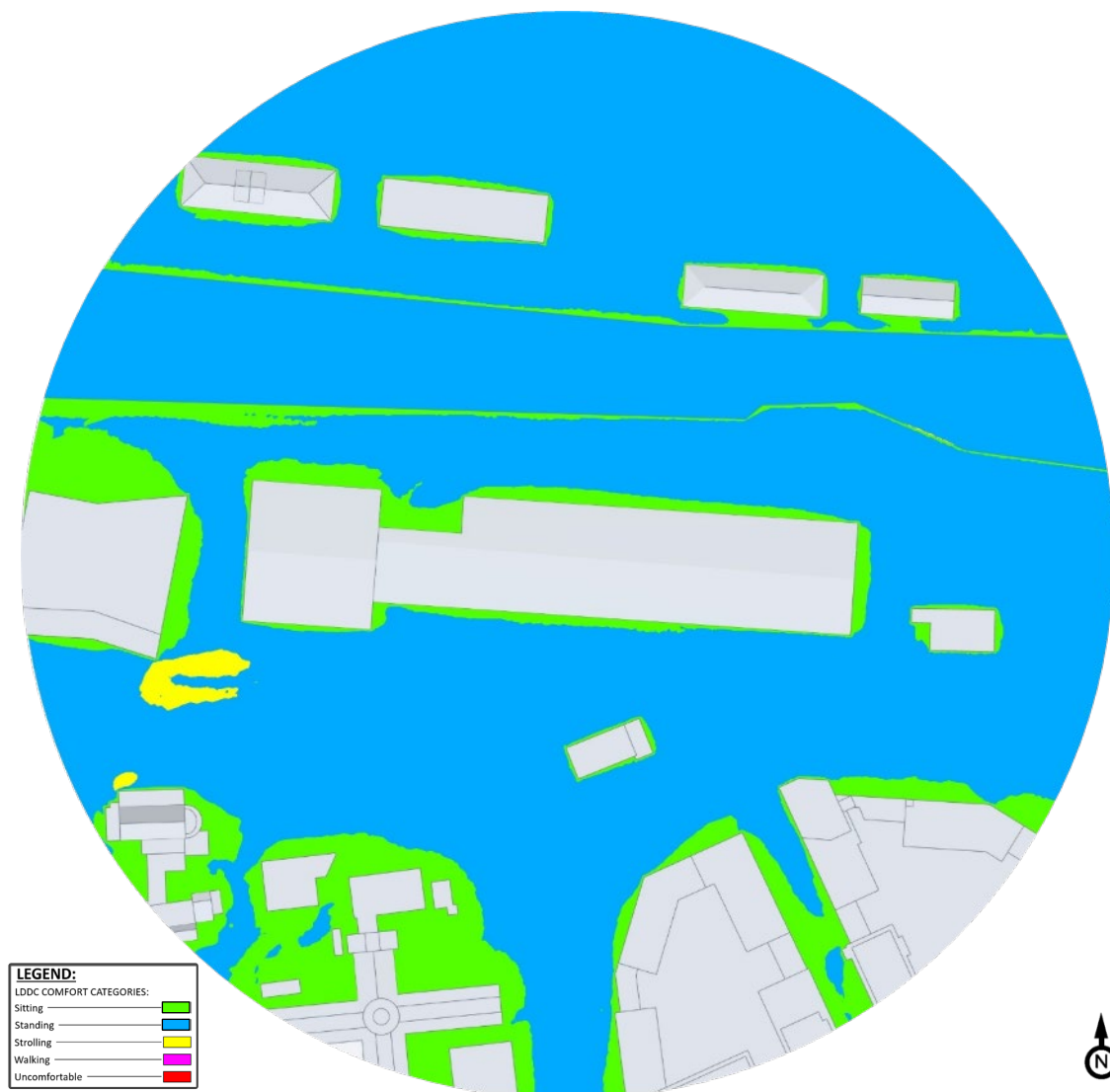


Figure 12.3: Configuration 1 – Existing Site with Existing Surrounding Buildings – ground level, summer season

Baseline Evolution

- 12.5.8 The evolution of the baseline conditions (in the event the Proposed Development does not come forward) has been considered using professional judgement informed by the results of the Baseline Scenario (Configuration 1).
- 12.5.9 No cumulative schemes have been identified within the 400m radius of the detail model surrounding the Site. As such, it is expected that should the Proposed Development not come forward, wind conditions within the evolved baseline scenario, would remain as presented in Configuration 1. Development of schemes beyond the extent of the detail model would not be expected to affect wind conditions around the Site.

Climate Change

12.5.10 The UK Climate Projections (UKCP18) published by the Met Office presents a number of different predicted scenarios. The 'Climate Projects Report'²⁸ published by UKCP18 presents the probable changes in wind speed for 2070 - 2099 in both the summer and winter seasons.

12.5.11 With these predictions, the current trends in the climate change are not likely to have any significant effects on the predicted wind microclimate conditions in and around the Proposed Development. Therefore, this has not been considered further in this assessment.

12.6 Mitigation

12.6.1 No mitigation measures have been included in the assessment of operational effects (Configuration 2: Proposed Development with Existing Surrounding Buildings) in order to present a worst-case (i.e. windy) scenario and that, where necessary, secondary wind mitigation has been discussed as necessary below.

12.7 Assessment of Significant Likely Effects

Operational Effects

Configuration 2: Proposed Development with Existing Surrounding Buildings

12.7.1 Wind conditions for Configuration 2 are presented in **Figure 12.4** for the windiest season and **Figure 12.5** for the summer season at ground level. **Figures 12.6** and **12.7** present the windiest season and summer season results on the roof levels respectively.

12.7.2 See **Paragraph 12.7.16** for Figures **12.4 - 12.7**.

Pedestrian Comfort

Thoroughfares

12.7.3 Thoroughfares on-Site within the Proposed Development would range from suitable for sitting to walking use during the windiest season. Areas of sitting, standing and strolling would represent **permanent, long-term moderate beneficial, minor beneficial and negligible effects** respectively (not significant). Small areas of walking conditions would be situated close to the western façade of both West Block 3 and West Block 4 which would represent **permanent, long-term minor adverse effects** (significant) and require mitigation measures, which are discussed further in section 12.8.

12.7.4 Thoroughfares off-Site would range from suitable for sitting to strolling use, representing **permanent, long-term negligible effects** (not significant).

Bus Stops

12.7.5 Bus stops off-Site on Kenavon Drive would have standing use conditions during the windiest season, suitable for the current pedestrian use. This would represent a permanent, long-term negligible effect (not significant).

Entrances

12.7.6 As the Proposed Development is being submitted for an outline planning application, entrance locations are not expected to be defined until the development of the detail design.

12.7.7 Wind conditions close to the façades of the Proposed Development would range from suitable for sitting to walking use during the windiest season. Areas of sitting conditions are situated

²⁸ Met Office, 2018. UKCP18 Science Overview Report

along the northern and southern façades for the majority of the Blocks, and areas of standing conditions are situated along the western and eastern façades along the majority of Blocks. Entrances placed here would be appropriate, and represent permanent, long-term minor beneficial and negligible effects (not significant) respectively. Areas of strolling conditions are situated along the western façades of Central Block 4, West Block 3 and West Block 4, and along the southern façade of West Block 3. Entrances should be avoided here as this would represent permanent, long-term minor adverse effects (significant) and wind mitigation measures would be required. If entrances were to be situated in areas of walking conditions along western façades of West Block 3 and West Block 4; these would represent permanent, long-term moderate adverse effects (significant) and require mitigation measures.

- 12.7.8 Off-Site entrances would be suitable for sitting and standing use during the windiest season, representing permanent, long-term insignificant effects (not significant).

Ground Level Amenity

- 12.7.9 Ground level amenity spaces on-Site are expected to be defined as the detail design of the Proposed Development emerges, with the design codes providing clear rules ensuring the quality of these spaces.
- 12.7.10 Wind conditions around the Proposed Development during the summer season would range from suitable for sitting to strolling use. There would be large areas suitable for sitting use between the northern and southern blocks. These locations would have appropriate wind conditions for occupant amenity provision, and would therefore represent a permanent, long-term negligible effect (not significant). Areas suitable for standing use situated around all the blocks associated with the Proposed Development, and strolling conditions situated along western façades of West Block 3 and West Block 4 would be windier than suitable for seated amenity use. These areas would represent permanent, long-term minor adverse and moderate effects respectively (significant) and require mitigation measures, which are discussed further in section 12.8.

Roof Level Amenity

- 12.7.11 Roof levels have been assessed for the potential of accessible amenity for occupants, should these become accessible spaces for occupants in the detailed design. However, it is not currently intended for roof levels to accommodate amenity space.
- 12.7.12 Roof levels have been assessed devoid of a parapet and as such would represent a worst-case scenario. Should these spaces be occupant accessible, wind conditions during the summer season would range from suitable for strolling to walking use. The majority of the terraces would have standing and strolling conditions, with smaller areas of walking use conditions close to the south-western corner of the southern blocks. Walking conditions would be three categories windier than suitable if seating is placed here. This would represent **permanent, long-term major adverse** (walking conditions), **moderate adverse** (strolling conditions), and **minor adverse** (standing conditions) effects (significant) and require mitigation measures.

Strong Winds

- 12.7.13 Strong winds exceeding 15m/s for more than 2.2 hours per annum are expected to occur where wind conditions would be suitable for walking or uncomfortable for all uses during the windiest season.
- 12.7.14 As such, localised strong winds are anticipated to occur at ground level along the western façades of West Blocks 3 and 4. At roof levels, as shown in the windiest season results presented in **Figure 12.6**, walking or windier conditions would occur on all roofs. This would likely result in strong winds occurring in these spaces. Mitigation measures would be required

to reduce the occurrence of strong winds at ground level, and roof level if these are accessible to occupants.



Figure 12.4: Configuration 2 – Proposed Development with Existing Surrounding Buildings – ground level, windiest season



Figure 12.5: Configuration 2 – Proposed Development with Existing Surrounding Buildings – ground level, summer season

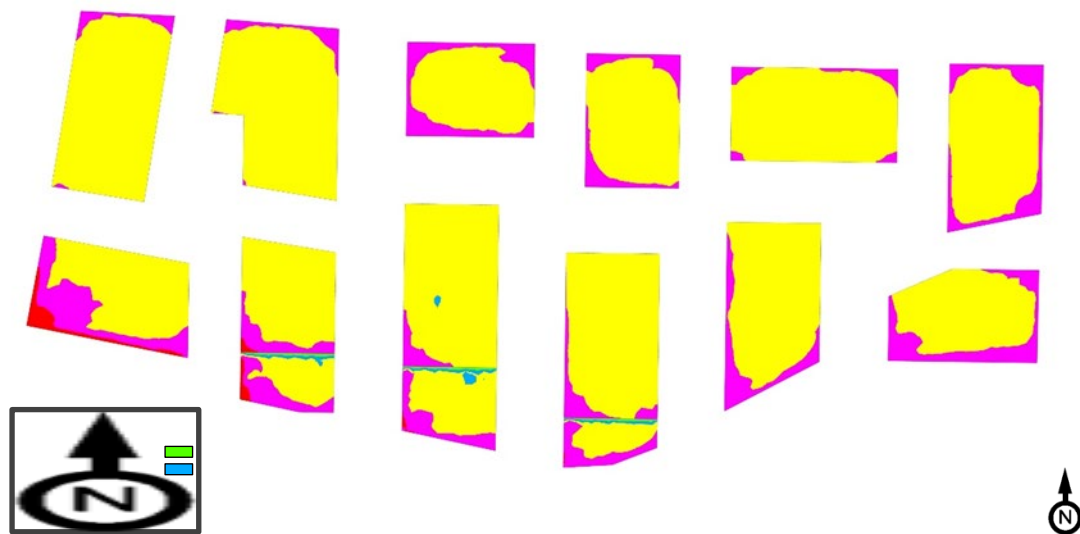


Figure 12.6: Configuration 2 – Proposed Development with Existing Surrounding Buildings – roof levels, windiest season



Figure 12.7: Configuration 2 – Proposed Development with Existing Surrounding Buildings – roof levels, summer season

12.8 Secondary Mitigation and Enhancement

Operational Phase

- 12.8.1 Adverse wind conditions have been identified at ground level, where walking conditions would occur along the western façades of West Blocks 3 and 4 (**Figure 12.4**). Wind conditions would be expected to adjust as the detail design of the southern aspects of the Proposed Development comes forward, which would have the potential to reduce the occurrence of windy conditions through the use of set-backs, colonnades or chamfered building corners for example. Additionally, a landscaping scheme comprising elements such as trees (at least 5m tall) or screens (at least 3m tall) in the vicinity of these windy areas and the south-eastern

corners of the adjacent buildings would help break up south-westerly winds flowing along the building. Mitigation measures would be further developed and assessed as the detailed design emerges.

- 12.8.2 Entrance locations have not been finalised and it is expected that wind conditions would adjust from the likely worst-case outline parameters as the detail design emerges. Entrances located in areas of sitting or standing use conditions during the windiest season would require no wind mitigation. Should entrances be situated in areas suitable for strolling or walking use (**Figure 12.4**), mitigation measures would be required. Providing a transition zone adjacent to entrances by recessing the entrance by 1.5m, or placing landscaping features either side of the entrances such as planting or screens (at least 1.8m tall) would locally shelter the entrances.
- 12.8.3 It is expected that ground floor amenity provision will evolve as the detail design comes forward. Focussing ground level amenity space in areas between the northern and southern blocks would provide inherent shelter from the prevailing south-westerly winds. Any ground level amenity such as seating situated in areas with standing or strolling conditions during the summer season (**Figure 12.5**) would benefit from landscaping elements such as trees (at least 3m tall), screens (at least 3m tall) and planting (at least 1.5m tall) to provide appropriate shelter.
- 12.8.4 Should the roof spaces be made accessible for occupant amenity as the detail design emerges, mitigation in the form of solid or porous balustrades (50% open, at least 1.5m tall) would provide shelter near the edges, in combination with landscaping elements such as trees (at least 3m tall), screens (at least 3m tall) and planting (at least 1.5m tall) to further break up winds entering the terraces.
- 12.8.5 As the scheme is in outline, all the mitigation details discussed above can be further developed and assessed during the detailed design.

12.9 Residual Effects

Operational Phase

- 12.9.1 Prior to the development of the detail design it is expected that the above wind mitigation measures would be required to improve wind conditions at the Proposed Development. It is expected that with the development and implementation of these measures the residual effects would be improved such that no adverse significant effects would occur. As the scheme is in outline, all the mitigation details discussed above can be further developed and assessed during the detailed design.

Thoroughfares

- 12.9.2 The residual effect along thoroughfares would be expected to be **permanent, long-term moderate beneficial, minor beneficial and negligible** (not significant).

Entrances

- 12.9.3 The residual effect along entrances would be expected to be **permanent, long-term, minor beneficial and negligible** (not significant).

Ground Level Amenity

- 12.9.4 The residual effect at ground level amenity would be expected to be **permanent, long-term and negligible** (not significant).

Roof Level Amenity

- 12.9.5 The residual effect at roof terraces amenity would be expected to be **permanent, long-term and negligible** (not significant).

12.10 Cumulative Assessment

- 12.10.1 No cumulative schemes have been identified within the detail model's 400m radius of the Site. Cumulative schemes outside of this radius would not be expected to have a substantial influence on the local wind microclimate around the Proposed Development and have been accounted for within the assessment of the surrounding terrain set out in **Section 12.5.2**.

12.11 Monitoring

- 12.11.1 Monitoring would not be required as with the mitigation in place, no significant residual effects would be expected to occur.

12.12 Summary

- 12.12.1 An assessment of the likely wind conditions as a result of the Proposed Development and the suitability of these in terms of pedestrian comfort and safety was undertaken. The assessment has been informed by appropriate meteorological data and Computational Fluid Dynamic (CFD) simulations.
- 12.12.2 Meteorological data for the Site identifies prevailing winds blowing from the south-west throughout the year. There are secondary peaks from north-easterly winds during the spring.
- 12.12.3 The wind microclimate within the baseline scenario identified that the majority of areas have wind conditions suitable for the current pedestrian uses. Strong wind exceedances are anticipated to occur around the south-eastern corner of No. 3 Forbury Place on the car park access road.
- 12.12.4 With the introduction of the Proposed Development, wind conditions off-Site would slightly improve. The strong winds around the south-eastern corner of No. 3 Forbury Place would now no longer occur. On-Site, the majority of areas would have suitable wind conditions. Pre-mitigation, strong wind exceedances would be anticipated to occur along the western façades of West Blocks 3 and 4, and on the roof levels.
- 12.12.5 As the scheme is being submitted in outline, the detailed pedestrian uses of the Proposed Development, such as entrances and amenity spaces have not been finalised. Wind mitigation has been suggested to inform the detail design for the siting of entrances, ground level amenity and potential roof level amenity.
- 12.12.6 Mitigation measures have been suggested in the form of on-Site landscaping elements and balustrade treatment. With the implementation of the proposed mitigation, no significant effects would be expected to occur.
- 12.12.7 As the scheme is in outline, the mitigation can be further developed and assessed during the detailed design stages of the blocks.

12.13 References

- Department for Communities and Local Government, 2021. Revised National Planning Policy Framework. London. HMSO.
- Ministry of Housing, Communities & Local Government, 2019. Planning Practice Guidance

- Commission for Architecture and the Built Environment and English Heritage, 2007. Guidance on tall buildings. London. CABE and English Heritage
- Reading Borough Council, 2019. Reading Borough Local Plan. Reading. RBC
- Building Aerodynamics, (2001); Lawson T.
- Met Office, 2018. UKCP18 Science Overview Report

13 Townscape and Visual Impact Assessment

13.1 Introduction

13.1.1 This chapter of the ES has been prepared by Stantec UK Limited (Stantec) and provides a Townscape and Visual Impact Assessment, which comprises a baseline report and assesses the likely significant townscape and visual effects associated with the Proposed Development.

13.1.2 The TVIA identifies and assesses the negative and positive effects and significance of change arising from the Proposed Development on the townscape as an environmental resource in its own right and on people's views and visual amenity. **Section 13.2** sets out the relevant policies, proposed approach and methodology used within this Townscape and Visual Impact Assessment (TVIA).

13.1.1 Townscape is defined in Transport Analysis Guidance (WebTAG) Unit A3, chapter 7: Impacts on Townscape (Department for Transport, May 2022), paragraphs 7.1.1 and 7.1.2:

"7.1.1 Townscape is the physical and social characteristics of the built and non-built urban environment and the way in which we perceive those characteristics. It is this mix of characteristics and perceptions that make up and contribute to townscape character and give a 'sense of place' or identity.

7.1.2 The physical characteristics of a townscape are expressed by the development form of buildings, structures and spaces. The development form influences the pattern of uses, activity and movement in a place and the experience of those who visit, work and live there."

13.1.2 This Chapter has been prepared by Stantec UK Limited. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this ES is provided in **Appendix A.3**.

13.1.3 The following appendices and figures should be read together with this chapter:

- Appendix M.1 – TVIA Methodology
- Appendix M.2 – Figures:
 - Figure 13.1 Townscape Context Plan
 - Figure 13.2 ZTV Plan (Percentage Visibility)
 - Figure 13.3 Landscape and Townscape Character
 - Figure 13.4 View Location Plan
- Appendix M.3 – Townscape Effects Table
- Appendix M.4 – Visual Effects Tables, Baseline Photographs and Verified Views (Parts 1, 2 and 3)

13.1.4 Stantec has a dedicated landscape architecture team that specialises in undertaking landscape, townscape and visual impact assessments and appraisals for development schemes, including land development, regeneration, energy and infrastructure projects. The landscape team includes experienced staff, who have relevant academic and professional qualifications, including those who are a Chartered Member of the Landscape Institute (CMLI). In addition, Stantec is a Registered Practice of the Landscape Institute and a corporate

member of IEMA. This TVIA has been undertaken and prepared by a chartered Landscape Architect (CMLI).

- 13.1.5 In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended, a statement outlining the relevant expertise and qualifications of competent experts appointed to prepare this chapter of the ES is provided in **Appendix A.3**.

13.2 Policy Context, Legislation, Guidance and Standards

- 13.2.1 **Chapter 6: Planning and Policy Context** sets out detail of legislation and policy context in relation to the Proposed Development. However, in summary, the following policies and guidance have been referred to and are pertinent in preparing this TVIA. **Figure 13.1 Townscape Context Plan, Appendix M.2** illustrates the landscape planning context and designations relevant to the TVIA and which are applicable to the Site and surrounding area.

Legislation

- 13.2.2 The European Landscape Convention (2000, Convention of the Council of Europe) is the first international treaty dedicated to the protection, management and planning of all landscapes in Europe. Signed by the UK government in 2006 and introduced in March 2007, the European Landscape Convention provides a people-centred and forward-looking way to reconcile management of the environment with the social and economic challenges of the future and aims to help people reconnect with place. The European Landscape Convention contains 18 articles which, collectively, promote landscape protection, management and planning and organising European cooperation on landscape issues.

- 13.2.3 The Landscape Institute / Institute of Environmental Management and Assessment 'Guidelines for Landscape and Visual Impact Assessment', (3rd Edition, 2013) notes in paragraph 1.17, page 9, in reference to the European Union Directive 2011/92/EU:

"The Directive is clear that the emphasis is on the identification of likely significant environmental effects. This should embrace all types of effect and includes, for example, those that are positive/beneficial and negative/adverse, direct and indirect, and long and short term, as well as cumulative effects. Identifying significant effects stresses the need for an approach that is in proportion to the scale of the project that is being assessed and the nature of its likely effects. Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional. This does not mean that effects should be ignored, or their importance minimised but that the assessment should be tailored to the particular circumstances in each case."

- 13.2.4 On the 31st of December 2020 the UK left the European Union. The European Union (Withdrawal) Act 2018 provides the new constitutional framework for continuity of retained EU law in the UK. This Directive is retained and in UK law achieved through the Town and Country Planning (Environmental Impact Assessment) Regulations 2017

National Planning Policy

National Planning Policy Framework (2021)

- 13.2.5 National planning policy is set out in the National Planning Policy Framework (NPPF), July 2021. The purpose of the planning system is to help achieve sustainable development. There are three overarching objectives of the NPPF: economic, social (which includes health and wellbeing) and environmental. The environmental objective at NPPF Paragraph 8c) states:

"...to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising

waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

13.2.6 Paragraphs of the NPPF which are of relevance to the planning application and townscape and visual issues, include the following:

- **Section 8: Promoting healthy and safe communities – Paragraph 92 (c)** requires planning decisions to *"enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling."*
- **Section 8: Promoting healthy and safe communities – Open Space and Recreation Paragraph 98** *"Access to a network of high-quality open spaces and opportunities for sport and physical activity is important for the health and well-being of communities..."*
- **Section 11: Making effective use of land – Paragraph 119** which states planning decisions should *"promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions..."*
- **Section 11: Making effective use of land – Paragraph 120 (a)** *"encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains..."*
- **Section 11: Making effective use of land – Paragraph 120 (c)** planning policies and decisions should *"give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs..."*
- **Section 12: Achieving well-designed places – Paragraph 130** states that planning decisions should ensure developments: **(b)** *"are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;"* **(c)** *"are sympathetic to local character and history, including the surrounding built environment and landscape setting..."*; **(d)** *"establish or maintain a strong sense of place, using the arrangement of streets, spaces building types and materials to create attractive, welcoming and distinctive places to live, work and visit;"* **(e)** *"optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space)..."*; **(f)** *"create places that are safe, inclusive, accessible and which promote health and well-being..."*.
- **Section 12: Achieving well-designed places – Paragraph 131** acknowledges the important contribution that trees make to character and quality of places, and in helping to address climate change. It states that planning decisions should: *"...ensure that new streets are tree-lined, that opportunities are taken to incorporate trees elsewhere in developments (such as parks and community orchards), that appropriate measures are in place to secure the long-term maintenance of newly-planted trees, and that existing trees are retained, wherever possible."* In addition, there is a need to ensure that the right trees are planted in the right places.
- **Section 12: Achieving well-designed places – Paragraph 132** refers to design quality and working with the local community, stating: *"...Applications that can demonstrate early, proactive and effective engagement with the community should be looked on more favourably than not."*
- **Section 12: Achieving well-designed places – Paragraph 134** states: *"Development that is not well designed should be refused, especially where it aims to reflect local design policies and government guidance on design, taking into account any local design guidance and supplementary planning documents such as design guides and codes. Conversely, significant weight should be given to: a) development which reflects local design policies and government guidance on design, taking into account any local design guidance and supplementary planning documents such as design guides and codes; and/or b) outstanding or innovative designs which promote high levels of sustainability, or*

help raise the standard of design more generally in an area, so long as they fit within the overall form and layout of their surroundings.”

Planning Practice Guidance

13.2.7 Relevant planning practice guidance is as follows:

- **Climate Change (March 2019):** integration of climate adaptation and mitigation approaches through the *“provision of multi-functional green infrastructure, which can reduce urban heat islands, manage flooding and help species adapt to climate change as well as contributing to a pleasant environment which encourages people to walk and cycle.”*
- **Design: Process and Tools (October 2019):** planning for well-designed places in accordance with the National Design Guide (January 2021). Reference is also made to local design guides and design codes, which should be informed by the National Design Guide. In addition, guidance is provided for effective community engagement on design.
- **Effective Use of Land (July 2019):** making effective use of land and planning for higher density development.
- **Healthy and Safe Communities (November 2019):** *“The design and use of the built and natural environments, including green infrastructure, are major determinants of health and wellbeing.”* Reference is also made to the National Design Guide.
- **Natural Environment (July 2019):** Green infrastructure – achieving well-designed places, promoting healthy and safe communities, mitigating climate change, flooding and coastal change, conserving and enhancing the natural environment. Trees and woodland – *“Well-placed and well-chosen trees on streets and in urban spaces can provide a range of benefits: encouraging walking and enhanced physical and mental health; contributing to local environmental character and distinctiveness; providing habitats for wildlife; reducing noise and excessive heat; and supporting sustainable drainage... trees of the right species and age profile are essential...”*
- **Open Space, Sports and Recreation Facilities, Public Rights of Way and Local Green Space (March 2014):** provides advice on open space, sports and recreation facilities, public rights of way and Local Green Space designation.

National Design Guide

- 13.2.8 The National Design Guide was updated in January 2021. Its purpose is to demonstrate how *“well-designed places that are beautiful, healthy, greener, enduring and successful can be achieved in practice.”* (Paragraph 3, National Design Guide).
- 13.2.9 The National Design Guide sets out principles for good design under 10 characteristics: context, identity, built form, movement, nature, public spaces, uses, homes and buildings resources, lifespan.

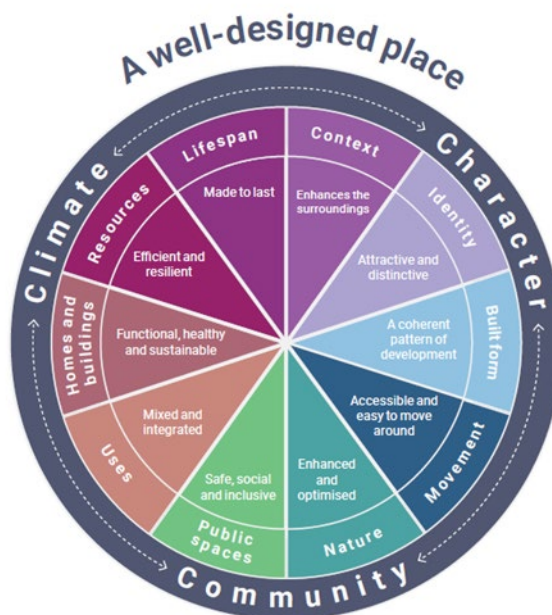


Figure 13.1: The Ten Characteristics of Well-Designed Places, National Design Guide (Page 8), January 2021

- 13.2.10 Components of good design are described as including: the context for places and buildings, hard and soft landscape, technical infrastructure and social infrastructure (Paragraph 20, National Design Guide). In addition, reference is also made to the importance of making the right choices about: the layout (masterplan), the form and scale of buildings, their appearance, landscape, materials and their detailing (Paragraph 21, National Design Guide).
- 13.2.11 The National Design Guide requires new development to incorporate green infrastructure including street trees.
- 13.2.12 The Design & Access Statement provides detail on how a high-quality design would be achieved.

Green Infrastructure Framework

- 13.2.13 Natural England has published a Green Infrastructure Framework in January 2023, which aims to help increase the amount of green cover in urban residential areas to 40%. The Green Infrastructure (GI) Framework comprises GI Principles, GI Standards, GI Maps, GI Planning and Design Guide, and GI Process Journeys.
- 13.2.14 The headline GI Standards includes requirements for major development to have a green infrastructure plan, which may be part of a Design and Access Statement (DAS), and for green infrastructure delivered within major developments to be managed, maintained and monitored for a minimum of 30 years. Additionally, accessible greenspace standards reference size and proximity criteria, namely that everyone has access to good quality green spaces within a 15-minute walk from their home. Local authorities are required to set targets for urban nature recovery, and developers of major development schemes are required to identify in their GI plan for the development, how the development contributes to delivery of the local nature recovery objectives. Urban Greening Factor Standards are noted as requiring at least 40% average green cover in urban residential neighbourhoods and no net loss of green cover; as well as a requirement for major development to meet National Urban Greening Factors of at least 0.4 for residential development in an urban area. The Urban Tree Canopy Cover Standard requires major development to contribute to meeting local targets for tree canopy cover, and to incorporate new and existing trees including as street trees in line with the requirements of Paragraph 131 of the NPPF.

13.2.15 The GI Planning and Design Guide provides evidence-based practical guidance on how to plan and design good GI; and complements the National Model Design Code and National Design Guide.

Local Planning Policy

Reading Borough Local Plan

13.2.16 The Reading Borough Local Plan was adopted in November 2019. Planning policies pertinent to townscape and visual issues are summarised below.

- **CR2: Design in Central Reading:** requires new development within Central Reading (the Site is within this area), to demonstrate several design principles including: respecting the existing grid structure of the area; provision of well-designed public spaces and public realm with high quality hard and soft landscaped areas; include green infrastructure as an inherent part of the development's design; utilise high-quality architectural details and materials and be designed with consideration of adjacent development sites.
- **CR3: Public Realm in Central Reading:** new development is required to make a positive contribution to the quality of public realm.
- **CC3: Adaptation to Climate Change:** new development is required to identify measures which have been incorporated into the design to adapt to climate change. This includes use of trees and other planting to provide shading and to help connect habitats, utilising native plants that can adapt to changing climatic conditions.
- **CC7: Design and the Public Realm:** All development is to be of a high design quality, which also maintains and enhances the character and appearance of the area within which the development is situated. Urban structure and grain, landscape, density and mix of development, scale: height and massing, and architectural detail and materials will all be considered by the local authority to ensure that the development makes a positive contribution to the following urban design objectives: character, continuity and enclosure, quality of public realm and provision of green infrastructure, ease of movement and permeability, legibility, adaptability and diversity. Additionally, development proposals are required to, *"Respond positively to their local context and create or reinforce local character and distinctiveness, including protecting and enhancing the historic environment of the Borough and providing value to the public realm."* Requirements are also set out for new developments to be, *"...visually attractive as a result of good high quality built forms and spaces, the inclusion of public art and appropriate materials and landscaping."*
- **CR10: Tall Buildings:** This policy defines Tall Buildings in Reading as 10 storeys of commercial floorspace or 12 storeys of residential use buildings. (For the purpose of clarity in this TVIA chapter, 'Tall Buildings' (with capital letters utilised) are those which are defined as set out in Policy CR10; whereas 'tall buildings' (all lower case) refer to buildings which are tall, but which are of lower height than the definition of Tall Buildings which is set out in Policy CR10.) The Proposed Development therefore falls within the remit of this planning policy. The policy states that Tall Buildings are appropriate within designated Areas of Potential for Tall Buildings on the Proposals Map. The Site does not fall within one of these designated areas but lies adjacent to the western edge of CR10a Station Area Cluster. For local views, the policy explanation notes that the interrelationship of the building's base and the immediate setting will be important, so the quality of materials and detailing are important. For middle distance views, the overall composition and detail are perceived in balance so there is importance to the hierarchy and articulation of elevations. For longer distances, it is noted that *"...overall massing and proportion is most important, and the relationship between the silhouette and the skyline should inform the design."* (Paragraph 5.3.42, Reading Borough Local Plan). Key

panoramic views of the central area are noted in the explanatory notes at Paragraph 5.3.43 of the Reading Borough Local Plan, which include views from Kings Meadow which lies to the north of the Site and mainline railway. Additionally, requirements are set out for Tall Buildings; those that are pertinent to townscape and visual issues include:

- Enhance Reading's skyline, have a distinctive profile and be of considered design;
 - Contribute to high-quality views, including those from local, middle-distance and long-distance views;
 - Take account of the Tall Building's context; this context including urban grain, streetscape, built form and architectural style;
 - Avoidance of bulky, over-dominant massing;
 - The setting of Conservation Areas and Listed Buildings to be conserved and enhanced;
 - Use of high-quality materials;
 - The creation of attractive spaces and public realm around the Tall Buildings;
 - Innovative ways to provide green infrastructure, for example: green roofs and green walls.
- **CR13 East Side Major Opportunity Area, CR13b: Forbury Retail Park:** The East Side Major Opportunity Area policy seeks to provide a "*more defined urban area than currently exists, of a medium to high density..*". The Site falls within sub-area CR13b Forbury Retail Park. The policy states that this sub-area would be a focus for a new residential community, and that new additional development may be required to improve the existing urban form of the area, noting a requirement for a new area of open space. Huntley Wharf development of up to 11 storeys' height, which is under the final stages of construction at the time of preparing this TVIA, is also within the CR13b sub-area.
 - **EN7: Local Green Space and Public Open Space:** protects existing green and open spaces identified on the Proposals Map. The policy notes that development proposals which would erode their quality through insensitive adjacent development will not be permitted. Relevant open spaces in proximity to the Site are **EN7Cb Forbury Gardens** and **EN7Cd Kings Meadow and the Coal Woodland**.
 - **EN13: Major Landscape Features and Areas of Outstanding Natural Beauty:** requires new development not to detract from the character or appearance of an identified Major Landscape Feature. The relevant Major Landscape Feature in proximity to the Site is The Thames Valley, which covers the River Thames corridor and Kings Meadow open space, located to the north of the Site and mainline railway.

Reading Climate Emergency Strategy 2020-25

13.2.17 Published in November 2020, the Reading Climate Emergency Strategy sets out required action to work towards the objective of a net zero carbon Reading by 2030. The strategy sets out themed action plans. The Nature Theme Action Plan refers to the **Trees for Reading initiative**, which seeks to increase tree cover in the town. Objective **N1: Increasing Tree Cover Across the Town** identifies need to plant more street trees, and objective **N20: Green Infrastructure** identifies the need to utilise green infrastructure to promote urban cooling and reduce carbon emissions from buildings through green walls and green roofs on new buildings and implement planting to provide shading of cycle and pedestrian routes. **N21: Develop Green Space to Enable Increased Health Benefits** notes that tree / hedge planting provides shade and helps reduce particulate pollution and oxides of nitrogen.

Reading Tree Strategy

- 13.2.18 The Reading Tree Strategy was published in March 2021. Objectives include: increasing diversity of tree stock; to increase tree canopy cover to 25% by 2030; and that tree protection, retention and new tree planting within development sites are to be in accordance with the aims of the Tree Strategy and Reading Borough Local Plan policies.

Guidance and Standards

- 13.2.19 The following standards and guidance documents have been used in devising the methodology for data collection and assessment of townscape and visual impacts:
- Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3) (Landscape Institute and IEMA, 2013)
 - GLVIA3 Statement of Clarification 1/13 (Landscape Institute, 2013)
 - An Approach to Landscape Character Assessment (Natural England, 2014)
 - Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals (Landscape Institute, 2019)
 - Technical Information Note on Townscape TIN 05-2017 Updated April 2018 (Landscape Institute, 2017)
 - Technical Information Note 08/2015 'Landscape Character Assessment' (Landscape Institute, 2015)
 - Technical Guidance Note 'Assessing Landscape Value Outside National Designations' 02/21 (Landscape Institute, 2021)
 - WebTAG Unit A3, Chapter 7: Impacts on Townscape (Department for Transport, May 2022)

13.3 Consultation

- 13.3.1 Consultation on the proposed visual receptor's view locations for assessment, prior to the collection of baseline photography, was undertaken with a Planning Officer at Reading Borough Council, in February 2022. A preliminary selection of visual receptors for the visual effects assessment in the TVIA, alongside the reasoning for their inclusion was provided. As a result of that initial consultation, three additional view locations were requested; these being within/adjacent to the listed St James Roman Catholic Church on Forbury Road and Reading Prison, from or within the Huntley Wharf development, and to the western edge of Forbury Road.
- 13.3.2 Two of these three additional view locations have been included as visual receptors for the visual effects assessment. The visual receptor view from the car park of the St James Roman Catholic Church has been excluded, as it is located in a private car park rather than in the public realm.
- 13.3.3 Additionally, the proposed townscape and visual receptors, including proposed and requested view locations, and the methodology for the TVIA, were set out in the TVIA chapter of the Scoping Report, which was submitted to RBC in February 2023.
- 13.3.4 The RBC Scoping opinion was issued on 18th April 2023. Consultee and RBC officer comments regarding TVIA matters are summarised in **Table 13.1**, together with how those comments have been addressed.

Table 13.1: Scoping Comments and Response

Scoping Opinion Comment:	Response:
<u>Natural England:</u> Landscape and visual impacts – reference to be made to National Character Areas. Request for a full assessment of potential impacts on local landscape character and for assessment to be based on the Guidelines for Landscape and Visual Impact Assessment 2013 (3rd Edition) by the Landscape Institute and IEMA. Request for cumulative effects assessment. Request for high quality development which responds to and enhances local landscape character and distinctiveness, siting and design to reflect local characteristics and use of local materials; with reference to local design policies, design codes and guides as well as the National Design Guide and National Model Design Code. Request for the Environmental Statement (ES) to set out measures to be taken to ensure the development will deliver high standards of design and green infrastructure, with detail of layout alternatives and justification of the selected option in terms of landscape impact and benefit. Request for the ES to consider potential impacts on Public Rights of Way and access to nature within the development site. Relevant aspects of local authority green infrastructure requested to be incorporated where appropriate.	The TVIA includes baseline review of National Character Area (NCA) 115 and local character areas. Effects on NCA115 were scoped out of the assessment; effects on local character areas have been assessed. Cumulative townscape and visual effects assessment is included in the TVIA. Due reference is made to the National Design Guide in the TVIA. The Design Codes and the Design and Access Statement (DAS) which accompany the application, set out the principles to achieve high quality development, and the proposed strategy for green infrastructure provision within the new development. There are no direct impacts on Public Rights of Way. Effects on existing trees and vegetation of the Site have been assessed in the TVIA.
<u>Berkshire Gardens Trust (BGT) on behalf of The Gardens Trust:</u> Notes that there is a close relationship between the LVIA and the assessment of impact on Forbury Gardens and its listed buildings and structures. BGT considered that there would be views of the Proposed Development from the boundary of Forbury Gardens next to the listed Plummery Wall along Forbury Road, from the path in the park adjacent to the wall and from the raised mound.	The TVIA includes the assessment upon Forbury Gardens as a townscape receptor in its own right, as well as effects on people's views from within Forbury Gardens and from Forbury Road adjacent to Forbury Gardens. It should be noted that the assessment of townscape and visual effects on Forbury Gardens for this TVIA utilises GLVIA3 methodology and is therefore of a completely different assessment approach to that taken in the separate assessment of Heritage effects, which is provided elsewhere in the Environmental Statement.

Scoping Opinion Comment:	Response:
Internal Consultees and Officer comments: Notes in regard to paragraph 11.2.2 of the Scoping Report that the Huntley Wharf development includes buildings up to 11 storeys in height, not 10 storeys. Notes that reference is required to Policy CR10 Tall Buildings; and that at 12 storeys height proposed development would be deemed Tall Buildings in a location outside of the designated areas for Tall Buildings. Notes that paragraph 13.2.11 incorrectly refers to Huntley Wharf development as being from 12 to 13 storeys and reiterates that the Huntley Wharf development is of a maximum 11 storeys high and therefore does not include Tall Buildings as defined in Policy CR10. Request for two additional view locations to be included in the assessment, these being view 6 from Caversham Bridge and view 17 from the A4 London Road looking west, from the Reading Borough Council Tall Building Strategy, including Tall Building Strategy 2018 Update Note (EV031).	The TVIA does not state that Huntley Wharf is a Tall Building as defined by Policy CR10. Policy CR10 is referred to in the TVIA and acknowledgement is made that the Site is outside of, but adjacent to, the designated area for Tall Buildings, Policy CR10. The TVIA notes that the Huntley Wharf development is up to 11 storeys. The two additional view locations which were requested in the Scoping Opinion have been included in the TVIA as VL20 and VL21 and verified views have also been provided for these.

13.4 Methodology

- 13.4.1 The methodology used for undertaking the TVIA is set out in detail in **Appendix M.1 TVIA Methodology**. Stantec's methodology for TVIA is based on the Landscape Institute / Institute of Environmental Management and Assessment 'Guidelines for Landscape and Visual Impact Assessment' (3rd Edition, 2013) (GLVIA3), combined with our professional experience and judgement. The TVIA considers the effects on landscape and townscape character, townscape elements / features which contribute to the Site's character, and people's views / their visual amenity from publicly accessible locations, as separate assessment components.
- 13.4.2 The assessment of landscape and visual effects aims to be as objective as possible, however professional judgements are required to be made, as the GLVIA3 explains in paragraph 2.23, page 21:
- 'Professional judgement is a very important part of LVIA. Whilst there is some scope for quantitative measurement of some relatively objective matters, for example the number of trees lost to construction... much of the assessment must rely on qualitative judgements, for example about what effect the introduction of a new development of land use change may have on visual amenity, or about the significance of change in the character in the landscape and whether it is positive or negative.'*
- 13.4.3 The TVIA has been based upon the proposals described in **Chapter 3** of this ES and the application Parameter Plans, including those at **Appendix A.2**.

- 13.4.4 The assessment of landscape and visual effects makes comparison with the baseline year of 2023 and identifies effects during the construction period, and on completion of the development (i.e. operation). The assessment of effects 15 years after completion of the development is only included where relevant, for when new planting is assumed to have successfully established and grown to provide effective mitigation.

Study Area

- 13.4.5 A Zone of Theoretical Visibility (ZTV) plan was prepared extending to 2km from the Site boundary (see **Figure 13.2, Appendix M.2**). The spatial scope of the TVIA was refined to a 1km study area through desktop study combined with visits to the Site and surrounding area, to determine the Site's existing visual envelope and the extent to which the Proposed Development is likely to be visible from within the surrounding area. Professional experience of other assessments and appraisals for this type of development indicates that townscape or visual effects would not be significant beyond 1km from the Site boundary.
- 13.4.6 The spatial scope, together with a review of potential visual receptors, guided the selection of representative view locations that would be included within the visual impact assessment.
- 13.4.7 Listed Buildings, Scheduled Monuments and Register of Parks and Gardens of Special Historic Interest were considered for up to 0.5km from the Site boundary because townscape and visual effects upon the setting of such heritage features are typically not significant beyond 1km. Additionally, the Heritage study considers all relevant heritage assets within **Chapter 10** in greater detail.

Baseline Data Collection

- 13.4.8 A data review was undertaken to establish the baseline landscape and townscape character information, including topography, townscape planning designations and published sources of landscape and townscape character; alongside a review of current relevant planning policy. Sources of information are set out in **Section 3.1 of Appendix M.1. TVIA Methodology**.
- 13.4.9 In addition to the baseline data collection and desktop study, a townscape and visual survey of the Site and surrounding area, including collection of baseline photography, was undertaken primarily during 2022 and later with some additional surveying undertaken in March 2023.
- 13.4.10 The latest baseline photographs representing people's views and visual amenity from the selected view locations were taken in March 2023. These are presented in within **Appendix M.4 Visual Effects Assessment, Baseline Photographs and Visualisations**.

Assessment

- 13.4.11 The methodology which has been utilised for the assessment is set out in detail at **Section 3 of Appendix M.1, TVIA Methodology**, including how quantitative thresholds/qualitative criteria have been used to judge the significance of effects and methods for determining receptors' value, sensitivity, magnitude of change and levels of significance of effects.

Limitations

- 13.4.12 The assessments in this TVIA consider the maximum parameters for the Proposed Development as described in **Chapter 3**, and for the purposes of the ZTV plans assumes maximum heights as provided in the 3D model of the Proposed Development (as shown on the Building Heights Parameter Plan). Verified views are provided, which provide visualisations of the maximum parameter heights and massing in blue chalk render or blue outline, and the illustrative scheme is green chalk render or green outline.

- 13.4.13 This TVIA identifies the likely significant townscape and visual effects arising from the Proposed Development, rather than identifying every conceivable townscape and visual effect.

13.5 Baseline Conditions

The Surrounding Area: Site Context

Landform and Watercourses

- 13.5.1 Reading is located within the valley floor of the River Thames; and the Site is situated within the existing urban area on that valley floor, at approximately 37-38m Above Ordnance Datum (AOD). As shown on **Figure 13.1, Appendix M.2**, the Site is located on a low-lying spur of land, which has the River Thames to the north and the River Kennet to the south.

Land Use and Settlement

- 13.5.2 The Great Western mainline railway which runs between London and the west of England and Wales, crosses through the centre of the spur of land. To the north of the railway are Thames Quarter, commercial and residential properties and a supermarket, all accessed from Napier Road. To the north of that built form lies the public open space of Kings Meadow, leading to the River Thames corridor, Caversham Lock and the Thames Path which follows the course of the river. The Site lies within the settlement area which is located to the south of the railway and includes a mixture of uses including commercial, retail units, and residential; the railway line forming the northern boundary of the Site. To the south of the Site are Reading Prison and Reading Abbey Ruins, St. James Roman Catholic Church, and Huntley Wharf leading to Blake's Wharf which lies adjacent to the River Kennet. To the southwest of the Site lies Forbury Gardens public park.
- 13.5.3 The Site is situated between the mainline railway line and Forbury Road / roundabout / Kenavon Drive. Forbury Road extends southwards from the roundabout adjacent to the Site, to cross over the River Kennet.

Public Rights of Way, Long Distance Routes and National Cycle Routes

- 13.5.4 There are no Public Rights of Way (PROW), Long Distance Routes / Paths or National Cycle Network (NCN) routes within the Site. The Thames Path Long Distance Route and NCN 5 follow the bank of the River Thames, to the north of the Kings Meadow open space. There is a PROW which runs alongside the River Kennet, from the south of the ruins of Reading Abbey, along Chestnut Walk and Blake's Wharf. Further PROW and NCNs extend through the wider urban area of Reading.

Green Infrastructure and Tree Cover

- 13.5.5 Forbury Gardens public park is located to the southwest of the Site, on the opposite side of Forbury Road. This is an historic town park comprising amenity open space, with planting and trees. There is tree cover at the edge of Reading Abbey ruins, along parts of the River Kennet, along the mainline railway, in churchyards and cemeteries, and within the larger open space area of Kings Meadow and around the River Thames corridor. Additionally, there are smaller trees, and formal, low-level shrubs associated with recent residential development and existing commercial and retail uses.

Landscape / Townscape Designations

- 13.5.6 Relevant designations to the Site and the surrounding area are set out in **Table 13.2** and on **Figure 13.1, Appendix M.2**.

Table 13.2: Landscape / Townscape Designations

Typical Designation and Importance (Value) and Description	Actual Designation Applicable to the Site and Surrounding Area
World Heritage Site: International (Very High) Unique sites, features, or areas of international importance with settings of very high quality.	None within 2km of the Site.
National Parks, Areas of Outstanding Natural Beauty (AONB), Conservation Areas, curtilage of Grade I, II* and II Listed Buildings; Register of Parks and Gardens of Special Historic Interest, Scheduled Monuments. National (High). Sites, features, or areas of national importance with settings of high quality.	<u>National Parks</u> None within the 1km study area. <u>Area of Outstanding Natural Beauty (AONB)</u> None within the 1km study area. <u>Conservation Areas</u> The Site is not within a Conservation Area. Within 1km of the Site: Eldon Square Conservation Area (approx. 0.4km from the Site); Market Place / London Street Conservation Area (approx. 0.2km from the Site); Alexandra Road Conservation Area (approx. 0.75km from the Site); and St. Mary's Butts / Castle Street (approx. 0.6km from the Site) <u>Register of Parks and Gardens of Special Historic Interest</u> Within 0.5km of the Site: The Forbury Gardens. <u>Listed Buildings within 0.5km of the Site</u> There are several Listed Buildings within 0.5km of the Site, many of which are in cultural heritage designations of Conservation Areas, Scheduled Monument or the designation Register of Parks and Gardens of Special Historic Interest. Please see the separate Heritage Assessment for more details. Listed Buildings which are not within a Conservation Area, Scheduled Monument or within the designation Register of Parks and Gardens of Special Historic Interest are Kings Meadow Swimming Pool (Grade II) 0.2km from the Site. Fisherman's Cottage Inn (Grade II) 0.4km from the Site. 47-48 Kenavon Drive (Grade II) 0.26km from the Site. The Screens House (Grade II) 0.25km from the Site. The Pump and Turbine House (Grade II) 0.27km from the Site. The Engine House (Grade II) 0.24km from the Site. Walls Enclosing Gardens to West of Number 44, Watlington House (Grade II) 0.5km from the Site. 3 and 5 Sidmouth Street (Grade II) 0.47km from the Site. House at Rear of Nos 18 and 20 Kings Road (Grade II) 0.41km from the Site. Abbey Mill Ruins (Grade II) 0.28km from the Site. Assize Courts (Grade II) 0.2km from the Site. Shire Hall (Grade II) 0.2km from the Site. The Plummery Wall (Grade II) 0.07km from the Site. Walton Parsons Corn Stores (Grade II) 0.35km from the Site. The Statue of King Edward VII (Grade II) 0.5km from the Site. Great Western House (Grade II) 0.49km from the Site. 15, Friar Street (Grade II) 0.47km from the Site. 14, Friar Street (Grade II) 0.45km from the Site. 13, Friar Street (Grade II) 0.44km from the Site. 12, Friar Street (Grade II) 0.44km from the Site.

Typical Designation and Importance (Value) and Description	Actual Designation Applicable to the Site and Surrounding Area
	11, Friar Street (Grade II) 0.43km from the Site. 154, Friar Street (Grade II) 0.46km from the Site. 155 Friar Street (Grade II) 0.46km from the Site. 1-31, Queen Victoria Street (Grade II) 0.5km from the Site. <u>Scheduled Monuments within 0.5km of the Site</u> Reading Abbey.
Long Distance Routes, National Cycle Routes (NCR) Regional (High/Medium) Routes of regional importance which provide amenity and vested interest in place and / or surroundings and / or with a cultural association.	<u>Long Distance Routes:</u> Within 1km of the Site: Thames Path <u>National Cycle Route:</u> Within 1km of the Site: NCR 4 and NCR 5
Designated Public Open Space Local (Medium) or Regional (High or Medium) Public open spaces, parks, recreational spaces; Country Parks	Within 1km of the Site: Forbury Gardens park, Kings Meadow and other open spaces in the urban area.
Tree Preservation Orders (TPOs) Protected trees within the Site	There are no TPOs within the Site

Conservation Areas, Listed Buildings, Register of Parks and Gardens of Special Historic Interest and Scheduled Monuments

13.5.7 The Site does not lie within a Conservation Area, and it is not identified on the Register of Parks and Gardens of Special Historic Interest (RPG). Furthermore, there are no Listed Buildings or Scheduled Monuments within the Application Boundary. See **Figure 13.1: Planning Context, Appendix M.2.**

13.5.8 The following Conservation Areas are located within 1km of the Site:

- Eldon Square Conservation Area;
- Market Place / London Street Conservation Area;
- Alexandra Road Conservation Area; and
- St. Mary's Butts / Castle Street.

- 13.5.9 Of these Conservation Areas, from review of the ZTV analysis (**Figure 13.2 in Appendix M.2**) and Site survey it is considered there is potential intervisibility between the Site and Eldon Square and Market Place / London Street Conservation Areas, which are considered further in the **Townscape Effects Table in Appendix M.3**. Due to existing built form and / or vegetation, it is considered that the remaining Conservation Areas are not anticipated to have intervisibility with the Site or Proposed Development that would affect their settings, and therefore they are not considered further in this TVIA.
- 13.5.10 There are many Listed Buildings within 0.5km of the Site, including those located in the Market Place / London Street Conservation Area and around Reading Abbey Scheduled Monument and in Forbury Gardens listed on the Register of Parks and Gardens of Special Historic Interest (RPG). None of the Listed Buildings are located within or on the Site boundary. A Heritage Assessment has been separately prepared, which contains further information about, and analysis of effects on, Listed Buildings at **Chapter 10**; and therefore, individual Listed Buildings are not considered further in this TVIA.
- 13.5.11 There is one RPG located within 40m to the southwest of the Site, The Forbury Garden (Grade II), List entry number: 1000586. The Forbury Garden is a 2ha site, enclosed for the most part by a brick and flint wall. The setting is noted in the listing as being urban, with intervisibility with the adjacent St James' Church and rebuilt Abbey gateway. A substantial mound, thought to be a reworked Civil War earthwork, is at the northern boundary. This RPG is considered further in the **Townscape Effects Table in Appendix M.3**, additionally visual receptors within the RPG designation area are considered in the **Visual Effects Table in Appendix M.4**.
- 13.5.12 There are two Scheduled Monuments (SM) within 0.5 km of the Site. The largest, and which comprises four separate parts, is Reading Abbey: A Cluniac and Benedictine monastery and Civil War earthwork; the closest point of this SM being less than 25m to the south of the southwestern corner of the Site. The ruined abbey buildings have survived well and are almost at their original heights. This SM is considered further in the **Townscape Effects Table in Appendix M.3**, additionally visual receptors within the SM designation area are considered in the **Visual Effects Table in Appendix M.4**.
- 13.5.13 The second SM is High Bridge (List entry number: 1005388), designed in 1788 and which marks the location of an older bridge crossing over the River Kennet. Due to existing built form, and informed by the Zone of Theoretical Visibility analysis, this SM is not anticipated to have intervisibility with the Site or Proposed Development, and therefore it is not considered further in this TVIA.
- 13.5.14 A separate Heritage Assessment has been prepared, which contains further information on cultural heritage designations at **Chapter 10**.

Landscape / Townscape Character

- 13.5.15 Relevant landscape and townscape character areas for the study area are shown on **Figure 13.3 Appendix M.2**. These include:
- National Character Areas (Natural England);
 - Reading Borough Council Tall Building Strategy: Townscape Character Areas.

National Character Area

- 13.5.16 The Site and the whole of Reading lie within National Character Area (NCA) 115. Thames Valley – NE379, which contains a diverse landscape of urban and sub-urban settlements, infrastructure, transport corridors, fragmented agricultural land, historic parks and is of an urban character. Key characteristics relevant to the Site and surrounding context include:

- This NCA has an urban character, though the area is environmentally important. Very few villages of more traditional character;
- Much development in this area in recent history and continuing pressures;
- Flat and low-lying land, rising to low, river terraced hills;
- Densely populated and developed, with pockets of woodland, open grassland, parkland, wetlands and intimate meadows provide escape and tranquillity;
- Towards London, the natural character of the area is overtaken by urban influences.

Townscape Character Areas

13.5.17 The Reading Borough Council Tall Building Strategy, including Tall Building Strategy 2018 Update Note (EV031), includes a townscape character assessment for Reading, which considers suitability of those townscape character areas for Tall Buildings. A Tall Building in Reading is defined as 10 storeys of commercial floorspace or 12 storeys of residential use buildings, this definition recognising the context of existing building heights. The TBS 2008 identified 26 Townscape Character Areas (TCAs) and their capacity to accommodate Tall Buildings.

13.5.18 The Site is located within TCA10: Forbury Retail Park. Key characteristics include:

- Large scale office developments, retail warehouses, car parks and commercial / office developments and some recent residential development. Buildings are late 20th century, corrugated iron and plastic clad retail units and modern houses and apartment blocks.
- The block size is large and there are numerous large warehouse buildings, creating a large-scale townscape, with finer-grained townscape at the eastern end of the character area due to the recent residential development.
- All of the buildings are intact and occupied, but the scattered buildings, separated by expansive parking areas creates an indifferent townscape condition.
- Despite tall warehouses present within the character area, their frequency results in none of them being particularly discernible as a landmark structure.
- The area is characterised by large blocky structures.
- A Tall Building would not appear uncharacteristic in terms of urban grain and townscape scale.
- There are few key views which characterise the area and therefore Tall Buildings would not jeopardise the visual experiences of the area.
- There are no buildings over 10-storeys within the area. The character information notes that a Tall Building would not appear uncharacteristic in terms of urban grain and townscape scale; and whilst a significantly taller building would become visually prominent, such a building could provide focus to the area with due consideration being given to the building's design and placement. This creates a medium townscape sensitivity.
- Townscape condition has improved within the residential area, but most of the area remains as described. There has been residential development at Kenavon Drive to the east, and further residential developments are expected.

- Key view from Kenavon Drive to the wall of Reading Prison.
- Built form within this area contributes to the view of central Reading from Caversham Park, Balmore Park and Horse Close.

13.5.19 Adjacent and nearby TCAs which, from analysis of the ZTV plan, are anticipated to have intervisibility with the Site and Proposed Development are:

- TCA2: Reading Station East;
- TCA8: Forbury Gardens;
- TCA9: Reading Prison;
- TCA11: Napier Road;
- TCA21: Forbury South;
- TCA22: Vastern Road; and
- TCA23: King's Meadow.

13.5.20 The key characteristics of these TCAs beyond the Site, are set out in the **Townscape Effects Table, Appendix M.3**.

Character of the Site

13.5.21 Most of the Site comprises large-scale but low-rise warehouse style retail buildings and hardstanding areas for footways and car parking. The fast-food chain KFC sits adjacent to the southern boundary; this being large scale but at a lower height than the retail buildings. On the Site there is a surface car park with 313 spaces; there is signage, and bollards align the frontage of the stores.

13.5.22 Around the Site entrance and car park there are some landscaped areas including semi-mature trees and mown grassland. Trees and scrub line the northern boundary of the Site adjacent to the railway line.

13.5.23 The character is of an established, but outdated and run-down, urban, retail park of large block and large mass structures, with ground surface dominated by hard materials.

The Site: Townscape Elements

Scale, Grain and Massing of the Site

13.5.24 The block size of the built form is largely formed by several large commercial unit buildings, creating a large-scale to this part of the townscape, with coarse grain and large massing.

Appearance of the Site

13.5.25 Large-scale muted grey tones buildings, with blue grey flat roofscape, colour and branded retail signage, bollards and expansive tarmacked parking areas with cars in front of the stores, which in combination creates an indifferent townscape condition. The appearance is dated and is of a monolithic retail land use in the urban environment, with little green infrastructure. No scenic quality.

Legibility of the Site

13.5.26 Legibility in the townscape is the ease of understanding a site or place, ease of identifying where things are in that site or place, and the image or impression that it conveys. It can be analysed by five elements: paths, edges, districts, nodes and landmarks (Lynch's Five Elements of Legibility). A place with good legibility may include landmarks and focal points, key views in or out of the place, clear and easily navigable routes, gateways to particular areas, lighting, public works of art, signage and waymarkers.

13.5.27 There is some legibility provided through the retail / commercial signage and the position of KFC adjacent to the roundabout. The retail park is accessible via car parking areas and footways. However, the Site currently contributes little to the overall legibility of the surrounding townscape.

Public Realm in the Site

13.5.28 The retail park is privately owned and there is no public realm, although access is provided to the public through the Site's retail use and footways adjacent to roads and hard surfaced parking spaces.

Townscape Features: Trees and Vegetation within the Site

13.5.29 Around the Site entrances/exits and at the edge of the car park adjacent to Forbury Road, the roundabout and Kenavon Drive, there are linear landscaped areas, which include young and semi-mature trees, low growing and trimmed shrubs, and small areas of mown grass. Trees and shrubs align the northern boundary of the Site, screening part of the metal security palisade fencing, adjacent to the railway line.

Selection of Townscape Receptors for the Landscape / Townscape Effects Assessment

13.5.30 Based on professional experience and following review of baseline data, the Zone of Theoretical Visibility analysis, and completion of a Site survey, the following townscape receptors are not considered likely to experience significant effects as a result of the Proposed Development and are therefore scoped out and not considered further in this TVIA:

- National Landscape Character Area: 115 Thames Valley;
- Conservation Areas: Alexandra Road Conservation Area and St. Mary's Butts / Castle Street Conservation Area; and
- High Bridge, Scheduled Monument.

13.5.31 Townscape receptors which are scoped into the townscape effects assessment are:

- Townscape Character Areas: TCA10: Forbury Retail Park, TCA2: Reading Station East, TCA8: Forbury Gardens, TCA9: Reading Prison, TCA11: Napier Road, TCA21: Forbury South, TCA22: Vastern Road, and TCA23: Kings Meadow;
- Eldon Square Conservation Area;
- Marketplace / London Street Conservation Area;
- The Forbury Garden (Grade II), Register of Parks and Gardens of Special Historic Interest;
- Reading Abbey, Scheduled Monument;

- Character of the Site;
- Townscape element: Appearance of the Site;
- Townscape element: Legibility;
- Townscape element: Public Realm; and
- Townscape features: Trees and Vegetation.

Townscape Value

13.5.32 Townscapes may be valued at community, local, national level, or international level. Existing townscape/landscape planning designations are taken as an initial guide to value, as shown in **Table 13.1** of this TVIA chapter. The value attached to undesignated townscapes also needs to be considered and other factors which influence townscape value are also considered as appropriate, as per the detailed criteria in **Table 3.2, Appendix M.2 TVIA Methodology**, for determining townscape value.

13.5.33 As part of the baseline review, an assessment of value is made for the Site's character and the individual townscape elements which would be affected by the Proposed Development. Townscape values are set out in detail in **Appendix M.3 Townscape Effects Table**.

Key Views, People's Views and Visual Amenity (Visual Receptors)

Key Views

13.5.34 Reading Borough Council published an Assessment of Significant Views with Heritage Interest (January 2018), which identifies and analyses nine key views in Reading. However, the Site does not fall within the identified view cones for these key views.

13.5.35 The Reading Borough Local Plan (Adopted November 2019) identifies Major Landscape Features which are protected through Policy EN13: Major Landscape Features and Areas of Outstanding Natural Beauty. The Thames Valley is identified as a Major Landscape Feature, which covers the River Thames corridor and associated open space, including Kings Meadow which is to the north of the Site (see **Figure 13.1** in **Appendix M.2**). Whilst there are no key views specifically associated with the Major Landscape Features, the explanatory text for Policy EN13, at Paragraph 4.2.65 of the Local Plan, states:

"Reading is primarily an urban area, but it benefits from a number of natural features that have remained largely undeveloped. The urban context means that the preservation of these features as a backdrop is of particular importance. New development should seek to maintain and enhance the natural beauty and visual amenity of the identified major landscape features. The extent to which new development prevents or minimises the visual impact on major landscape features and other landscape values is largely dependent on the location, design and scale of proposals..."

13.5.36 Visual receptors at selected view locations VL5, VL6 and VL17 represent people's views and visual amenity from within the area designated as a Major Landscape Feature (see **Figure 13.2, Appendix M.2**) and which have potential intervisibility with the Site and Proposed Development.

People's Views and Visual Amenity

13.5.37 All visual receptors are people. Potential visual receptors include those people who use the network of PROW and Long Distance Routes, open spaces, outdoor recreational facilities and the road network, and who are visiting, living or working within the study area.

13.5.38 Representative view locations (which represent people's views and visual amenity) which are selected for the visual effects assessment are set out in **Table 13.3** below. The visual receptor / view locations are identified on **Figure 13.4 View Location Plan** within **Appendix M.2**. Accurate visual representations, as verified views to Type 4 (Landscape Institute Technical Guidance Note 06/19) are provided for each of the view locations, to illustrate the scale, massing, and height of the Proposed Development within its townscape context as seen in people's views from those locations. The verified views demonstrate the maximum parameters scheme, which, as it is the worst-case scenario, has been assessed for the TVIA, and is shown as a blue chalk render or blue wireline. Additionally, the illustrative scheme is shown as a green chalk render of green outline. Verified views are provided as Part 3 of Appendix M.4.

Table 13.3: Representative View Locations

Representative views:	Representative of people's views and visual amenity from within the townscape, public spaces and road network in the area around the Site. Key views to and from the Forbury Retail Park townscape character area have also been considered in the selection
Visual receptors:	Residents and workers, visitors, road users, PROW users.
Approach:	Visual assessment from each representative view location, supported by a photograph representing the baseline view. Verified views (wireframes as accurate visual representations to be provided (Type 4, LI TGN 06/19)) and ZTV plan to demonstrate understanding of likely visual effects.
View Reference and Location	Reasonings & Comments
VL1 Forbury Road (south)	Short distance view from busy vehicular and pedestrian route. Framed view of the Site which contains views of the red brick wall and façade of Reading Prison which are recognised key views with the Forbury Retail Park townscape character area. Likely high level of perceptible change due to proximity and nature of the Proposed Development.
VL2 Forbury Gardens	Short distance view, representative of users of the Grade II Registered Parks and Garden of Special Historic Interest (RPG). Highly sensitive receptor due to designation. The Proposed Development is likely to be partially visible above the tree line and roofline of Grade II Listed Building Church of St James Roman Catholic Church, causing as perceptible change to the view.
VL3 Reading Abbey Ruins	Short distance view, from Scheduled Monument and important landmark within Reading townscape. Highly sensitive receptor due to designation and amenity value. Also contains partial view of Reading Prison to the east which has local importance to landscape character. Potential glimpsed views of the Proposed Development are anticipated between Abbey Ruins and Reading Prison, causing a perceptible change to the view.
VL4 Kenavon Drive, adjacent to Riverside Museum	Short distance, framed view from busy vehicular and pedestrian route. Likely high level of perceptible change due to proximity and nature of the Proposed Development.
VL5 Kings Meadow Open Space	Short distance view from recreational space which has many users. Likely high level of perceptible change due to proximity and nature of the Proposed Development.

View Reference and Location	Reasonings & Comments
VL6 Thames Path National Trail and National Cycle Network	Omitted from visual assessment as VL5 represents a closer view of a similar composition, and to avoid repetition.
VL7 Balmore Park and National Cycle Network Route	Recognised medium distance, key view from elevated landform into the Forbury Retail Park townscape character area. Recreational route. The Proposed Development anticipated to be a just perceptible change to skyline.
VL8 Car Park of St James Roman Catholic Church on Forbury Road	Omitted as the location is a privately owned car park, and not in the public realm.
VL9 Forbury Road (west)	Requested by RBC. Justification on the same basis as VL1 to VL3.
VL10 Huntley Wharf	Requested by RBC. Takes into account the new public realm created within the Huntley Wharf development and route from the waterfront of the River Kennet. <i>Note: In March 2023 this location was an active construction site, therefore a publicly accessible location adjacent to the edge of the Huntley Wharf site was selected.</i>
VL11 Friar Street to St. Lawrence Church & Town Hall	Heritage consultant request. Key view B in the Reading Borough Council Tall Building Strategy. ZTV suggests no view from the street level.
VL12 Eastwards along Castle Street	Heritage consultant request. Key view M in the Reading Borough Council Tall Building Strategy. ZTV suggests no view from the street level.
VL13 Kenavon Drive towards reading Prison	Heritage consultant request. Key view O in the Reading Borough Council Tall Building Strategy.
VL14 A329 Adjacent to Gower Street	Heritage consultant request. View 10 in the Reading Borough Council Tall Building Strategy. ZTV suggests no view at street level.
VL15 Thames Path, East of Reading	Heritage consultant request. View 18, long-range view identified in the Reading Borough Council Tall Building Strategy.
VL16 Palmer Park	Heritage consultant request. View 19, mid-range view identified in the Reading Borough Council Tall Building Strategy. Partial ZTV coverage to park. Locate VL within ZTV area.
VL17 Reading Bridge	Heritage consultant request. Key view 21, mid-range view identified, mid-range view identified in the Reading Borough Council Tall Building Strategy.
VL18 A4155, Adjacent to Coley Hill	Heritage consultant request. View 23, mid-range view identified in the Reading Borough Council Tall Building Strategy. ZTV indicates no view at street level.
VL19 Coley Place towards Central Reading	Heritage consultant request. View 27, mid-range view identified in the Reading Borough Council Tall Building Strategy. ZTV indicates no view.

View Reference and Location	Reasonings & Comments
V20 Caversham Bridge	RBC request in Scoping Opinion. View 6, mid-range view identified in the Reading Borough Council Tall Building Strategy.
VL21 A4 London Road	RBC request in Scoping Opinion. View 17, long-range view identified in the Reading Borough Council Tall Building Strategy.

Zone of Theoretical Visibility

- 13.5.39 Following the preliminary selection of visual receptors and representative view locations, analysis of the worst-case theoretical visibility of the fixed scheme parameters for the Proposed Development was undertaken utilising Zone of Theoretical Visibility (ZTV) analysis tools. The ZTV analysis undertaken is presented on **Figure 13.2, Appendix M.2**.
- 13.5.40 The elevation data utilised for the ZTV analysis was Digital Surface Model (DSM). The DSM analysis identifies theoretical visibility accounting for existing built form and vegetation within the surrounding area. Additionally, the ZTV analysis identifies the percentage visibility of the Proposed Development. This considers visibility of all buildings of the Proposed Development.
- 13.5.41 This percentage ZTV demonstrates that the Proposed Development on the Site would have limited visibility within the 2km study area, with the greatest theoretical visibility of the Proposed Development being within 0.5km of the Site; this arising because of the low-lying landform and the form and height of the surrounding built environment.
- 13.5.42 The ZTV plans have been reviewed, and the selection of the proposed visual receptors as set out in Table 13.3 is considered reasonable and proportionate in terms of the theoretical visibility of the Proposed Development. No additional visual receptor view locations are considered necessary due to the ZTV results.

Value of People's Views and Visual Amenity

- 13.5.43 The value attached to the views experienced has regard to a number of factors, including recognition through the planning designation or heritage assets and the popularity of the view, level of importance and popularity of the view, and cultural associations. **Table 3.6, Appendix M.1 LTVIA Methodology** sets out the criteria for determining the value of views from low to high.
- 13.5.44 As part of the baseline review, an assessment of value has been made for the visual receptors which may be affected by the Proposed Development. These are set out in detail in **Appendix M.4 Visual Effects Table**.

Sensitivity of Townscape and Visual Receptors

- 13.5.45 The detailed townscape and visual impact assessments are set out in the **Townscape Effects Table** in **Appendix L.3** and the **Visual Effects Table** in **Appendix L.4**.
- 13.5.46 These impact assessments include judgements of receptors' susceptibility to change, which, combined with judgements on the baseline value attributed to receptors, provides an assessment of the overall sensitivity of each receptor. **Appendix M.1: TVIA Methodology, Section 3.5** sets out the typical scales of sensitivity and the criteria for determining susceptibility to change. A summary of overall sensitivity to change arising from the Proposed Development is set out below.

Sensitivity of Townscape Receptors

Table 13.4: Overall Sensitivity of Townscape Receptors

Townscape Receptors	Overall Sensitivity
TCA8: Forbury Gardens TCA23: King's Meadow Eldon Square Conservation Area Marketplace / London Street Conservation Area The Forbury Garden RPG (Grade II) Reading Abbey SM	High. This arises from a particularly distinctive sense of place and character, townscape designations, townscape sensitivity identified by RBC for townscape character areas, and attributes which are in good condition, and are highly valued townscape character and / or scenic quality or cultural heritage features. These receptors have low tolerance to change of the type proposed.
TCA9: Reading Prison TCA10: Forbury Retail Park TCA11: Napier Road	Medium. This arises from a clearly defined sense of place and character, with townscape attributes of a moderate condition, and some scenic quality and being valued locally, the townscape sensitivity identified by RBC for townscape character areas and receptors which have partial tolerance to change of the type proposed.
TCA2: Reading Station East TCA21: Forbury South TCA22: Vastern Road Character of the Site Townscape Element: Grain and Massing of the Site Townscape Element: Appearance of the Site Townscape Element: Legibility of the Site Townscape Element: Public Realm Townscape Features: Trees and Vegetation of the Site	Low. This arises from townscape character areas which have been identified as being of low townscape sensitivity by RBC, townscape attributes with no cultural interest or no particular scenic qualities, undesignated townscape and of an indifferent townscape character, and which are tolerant of substantial change of the type proposed.

Sensitivity of Visual Receptors

Table 13.5: Overall Sensitivity of Visual Receptors

View Reference and Location	Overall Sensitivity
VL2 Forbury Gardens VL3 Reading Abbey Ruins VL4 Kenavon Drive, adjacent to Riverside Museum (Residents)	High. This is for important views and arises from protected views, or views or visual compositions which include landmark

View Reference and Location	Overall Sensitivity
VL11 Friar Street to Lawrence Church & Town Hall VL12 Eastwards along Castle Street VL13 Kenavon Drive towards Reading Prison VL15 Thames Path, East of Reading	features, and/or have high amenity value, and/or contain elements of notable visual interest, and/or are enjoyed by many recreational users / visitors, and/or may be experienced by residents, and / or include views of Listed Buildings, Registered Parks and Gardens or Scheduled Monuments.
VL1 Forbury Road (South) VL4 Kenavon Drive, adjacent to Riverside Museum (Pedestrians and road users) VL5 Kings Meadow Open Space VL7 Balmore Park and National Cycle Network Route VL9 Forbury Road (west) VL10 Huntley Wharf VL14 A329 Adjacent to Gower Street VL16 Palmer Park VL17 Reading Bridge VL18 A4155, Adjacent to Coley Hill VL19 Coley Place towards Central Reading VL20 Caversham Bridge VL21 A4 London Road	Medium. This is for locally important views and arises from views or visual compositions which include features of value or interest, and/or have some amenity value and are incidental or intentional views, and/or are of generally attractive composition with little sign of neglect or degradation, include views of heritage assets but which are not best represented by the particular view, and/or are views from within local parks or open space, the public realm or local public rights of way.
--	Low. For views or visual compositions which don't include landmark features, and/or have low amenity value and/or have few or no visually attractive elements and have a weak or poor composition with discordant or incongruous features that contribute to a sense of degradation or poor quality, and/or are incidental to the viewer with little to no amenity value, and/or are fleeting to a viewer in motion.

Baseline Evolution

13.5.47 The baseline evolution of the Site would be a 'no development' scenario, and the baseline for the Site that has been described above would be maintained.

13.5.48 As is expected for an urban area, there are several developments that have been consented and which are under construction at the time of undertaking this TVIA. For this TVIA, it is reasonable to assume that where schemes are currently under construction, they would be in operation prior to the construction and completion of the Proposed Development; and therefore, those schemes form a future baseline scenario. This future baseline has been considered in the assessment of likely significant townscape and visual effects arising from the Proposed Development and as presented in this chapter. These future baseline developments are summarised below:

- Huntley Wharf

- Rivermead, Richfield Avenue (reference: 201734)

13.6 Mitigation

13.6.1 **Primary Mitigation (inherent):** Primary mitigation is an intrinsic part of the project design and developed through the iterative design process. Primary mitigation measures are outlined in **Chapter 3** of the ES. The relevant embedded mitigation measures upon which the TVIA has relied are described in the Design Code and Design and Access Statement which are provided with the application and summarised below:

- Creation of a high-density development, in a positive response to the Site Allocation.
- Provision of a new connection to and from the train station and main thoroughfare across Kenavon Drive and Forbury Road.
- Respect existing built context and emerging developments and stitching of the new streetscape into the existing wider urban grain.
- Provision of high quality and generous public realm.
- Provision of high quality and sustainable residential development that positively contributes to Reading Town Centre.
- Creation of 3 distinct development zones, with differing character areas to respond to specific site context and the creation of varied identity.
- Provide legibility through creation of new markers, wayfinding and opening up views of townscape features.
- A green street layout, which reveals glimpses of important features of adjacent properties with future connection opportunities to emerging developments, to enhance orientation and create a strong sense of place.
- Widths of streets provide clear legibility of the route hierarchy and provide adequate space for vehicle and pedestrian routes.
- Maximum development heights consider the top parapet height of proposed buildings; and lift overruns and rooftop plant to be minimised through use of perimeter or localised screening and well considered positioning, to minimise visual impact.
- Variety in building height from east to west across the Site in each development zone. Proposed building heights focussed to the north and central portions of the Site, gradually reducing in height towards the east and western ends. This is to minimise impacts on adjacent properties and maximise the daylight penetration into the key open spaces. Tapering of height to the south perimeter buildings to provide subtle refinement to plots fronting Plummery Gardens and Forbury Road.
- Massing and built form designed to ensure adequate sunlight to surrounding public spaces. Variation to be provided in rooflines, materials and facades to avoid a monotonous and overbearing development.
- Incorporation of step backs in top floors of buildings located along the south of the Site to reduce visual impact in views from Forbury Road and Kenavon Drive.
- Creation of active frontages adjacent to pedestrian and cycle routes
- Creation of a green infrastructure street frontage, Plummery Gardens, which includes informal medium to large size street trees and rain gardens.
- Other green infrastructure to be provided, including landscape planting to the rear of the site alongside the railway and access road maintaining a wildlife corridor; creation of green streets with biodiverse landscape features and visual natural amenity, green links which incorporate SUDs, new tree planting across the public realm in each character area of the development and to provide an increase in tree canopy cover. Predominantly

native species to be planted, and tree planting species to be diverse as the RBC Tree Strategy March 2021.

- The new development to respond to local vernacular of street materials and the wider landscape and townscape that form Reading's character.

13.6.2 Tertiary (inexorable - impossible to stop/prevent): Tertiary mitigation are actions that will be undertaken to meet existing legislative requirements or actions that are considered to be standard practices used to manage commonly occurring environmental effects. Tertiary mitigation measures considered in this TVIA pertain to the use of hoardings during the construction of the Proposed Development, a common practice in urban areas to help reduce visual effects during the construction period.

13.7 Assessment of Likely Significant Effects

13.7.1 The Townscape Effects Table in **Appendix M.3** and the Visual Effects Table in **Appendix M.4, Part 1** set out the detailed assessments of effects upon townscape and visual receptors as a result of the Proposed Development.

13.7.2 The Visual Effects Assessment has been informed by verified view wirelines (accurate visual representations) prepared by AVR London, which demonstrate both the maximum parameter scheme (blue outline) and the illustrative scheme (green outline) as seen in their townscape contexts from the visual receptor locations, and as a comparison with the baseline views. Taking the worst-case assessment approach in this TVIA, the Visual Effects Assessment considers the maximum parameter scheme (blue outline and blue chalk renders in the verified views). The illustrative scheme outline (green outline and green chalk renders in the verified views) is provided in the set of visualisations only to help the reader understand the potential development form within the maximum parameter scheme. The verified views are contained in **Part 2 of Appendix M.4**. The results of the effects assessments are summarised below.

Demolition and Construction Effects

13.7.3 Construction of the Proposed Development will lead to temporary and reversible changes in the townscape and to people's views and visual amenity. These changes are typically a source of adverse effects and therefore appropriate measures are required to avoid and reduce those effects. The construction operations are anticipated to include:

- Demolition works within the Site, to break down and remove the existing retail units, car park hardstandings and roads, removal of all existing vegetation within the Site, to facilitate the construction works;
- Ground works and changes of levels;
- Site access and haulage routes using roads within the townscape;
- Construction plant: cranes, excavators, lorries;
- Disposal of material;
- Stockpile and material storage / compounds;
- Welfare facilities;
- Security and safety lighting;
- Hoardings erected around construction areas; and

- The emergence of buildings and infrastructure, as they are built-out in phases across the Site.

Summary of Townscape Effects During Construction

- 13.7.4 The assessment identified direct and medium-term, temporary townscape effects during construction upon TCA10, the character of the Site, the Site's Scale, Grain and Massing, Appearance, Legibility, Public Realm and Trees and Vegetation of the Site, which are **adverse** and of a **moderate level of significance of effect**. These arise from the clearance of the existing Site and the associated infrastructure, engineering and building works to create the Proposed Development which would completely change the Site's character and townscape features. Additionally, indirect, medium-term and temporary **adverse** townscape effects of a **moderate level of significance of effect** were assessed for TCA8, TCA23, The Forbury Gardens RPG, Reading Abbey SM; these effects arising due to the combination of the receptors' high sensitivities and their intervisibility with the temporary demolition and / or construction works, even though the magnitude of change was assessed as Slight. For assessment purposes, these temporary construction effects are considered significant.
- 13.7.5 Townscape effects during the construction period that are **adverse**, direct or indirect, and temporary, but of a **minor** or **negligible level of significance of effect** and which are therefore **not significant**, were assessed upon TCA2, TCA9, TCA11, TCA21, TCA22, Eldon Square Conservation Area, and Marketplace / London Street Conservation Area.

Summary of Visual Effects During Construction

- 13.7.6 The assessment has identified temporary, direct and medium-term visual effects which are **adverse** and a **Moderate level of significance of effect** and thus **Significant**, for people's views from the following locations:
- VL1: Forbury Road
 - VL2: Forbury Gardens (RPG)
 - VL3: Reading Abbey Ruins (SM)
 - VL5: Kings Meadow Open Space
 - VL10 Huntley Wharf; and
 - VL13: Kenavon Drive looking towards Reading Prison (published local key view).
- 13.7.7 VL2, VL3, and VL13 have visual receptors that are of a high sensitivity due to heritage and local key view designations which when combined with a Slight magnitude of visual effect, result in the assessed moderate levels of significance of effects. Additionally, it is noted that VL1, VL2, VL3, VL5, VL10 and VL13 are all located within 0.23km or less from the Site.
- 13.7.8 **Adverse**, direct and short term (temporary) visual effects that are of a **minor** or **negligible level of significance of effect**, and therefore which are **not significant** effects, are assessed for the following visual receptor views during the construction period:
- VL4: Kenavon Drive, adjacent to the Riverside Museum
 - VL7: Balmore Park and National Cycle Network Route
 - VL9: Forbury Road (West);
 - VL17 Reading Bridge;

- VL20 Caversham Bridge; and
- VL21 A4 London Road.

13.7.9 The assessment has found that there would be **no change** to people's views at VL11 Friar Street, VL12 Eastwards Along Castle Street, VL14: A329 Adjacent to Gower Street, VL15 Thames Path, East of Reading, VL16 Palmer Park, VL18 A4155 Adjacent to Coley Hill, and VL19: Garnet Street, Coley. This is demonstrated by the verified visualisation wirelines at **Appendix M.4, Part 2**.

Operational Effects

13.7.10 The townscape and visual effects of the Proposed Development would persist for the duration of its operational life, and therefore are considered to be permanent effects.

Summary of Townscape Effects at Completion (Operation)

13.7.11 No Substantial or Major levels of significance of effect have been identified upon townscape receptors as a result of the Proposed Development.

13.7.12 **Beneficial**, direct and long-term townscape effects that are a **moderate level of significance of effect**, and therefore **Significant**, arise at completion of the Proposed Development upon TCA10 (within which the Site is located), the appearance and the public realm of the Site. These arise from the greater provision of public realm area, and new tree planting and additional urban greening, within the Proposed Development at the Site.

13.7.13 Indirect and **adverse** long-term townscape effects that are **minor** or **negligible levels of significance** and thus identified as **Not Significant** effects, are assessed for the following townscape receptors at completion of development:

- TCA8 Forbury Gardens
- TCA9 Reading Prison
- TCA23 Kings Meadow
- The Forbury Gardens RPG, and
- Reading Abbey SM.

13.7.14 The character, Scale, Grain and Massing, and Legibility of the Site were all assessed as receiving direct, **beneficial** townscape effects, but which are of **minor levels of significance** and **Not Significant**, arising on completion of the development.

13.7.15 At completion, **No Change** was assessed for TCA2 Reading Station East, TCA11 Napier Road, TCA21 Forbury South, TCA22 Vastern Road, Eldon Square Conservation Area, and Marketplace / London Street Conservation Area, as a result of very limited intervisibility with the Proposed Development, this reflecting that their key characteristics would not alter at completion.

Summary of Visual Effects at Completion (Operation)

13.7.16 At completion, long-term and permanent visual effects which are assessed as **beneficial**, and **Moderate levels of significance of effect**, which are **Significant**, are assessed for people's views and visual amenity at the following locations:

- VL1: Forbury Road

- VL2: Forbury Gardens
- VL10: Huntley Wharf; and
- VL13: Kenavon Drive towards Reading Prison (local Key View).

13.7.17 A long-term and permanent visual effect that is **adverse** and a **Moderate level of significance of effect**, which is **Significant**, is assessed for people's views at VL5 Kings Meadow Open Space. This arises because the new buildings would be clearly noticeable across the background of the view as new built form skyline features above trees in Kings Meadow. From this location, a small part of the westernmost new building would be seen in front of part of The Blade, drawing attention away from the landmark in the view. The visual change would alter the appreciation and composition of the view, and therefore is assessed as Moderate magnitude of visual effect. Combined with Medium sensitivity of the visual receptor, this results in the assessed Moderate level of significance of effect.

13.7.18 Other visual effects which are assessed as being long-term, permanent and of **Minor or Negligible levels of significance of effect**, and which are therefore **Not Significant** at completion, have been identified for people's views and visual amenity at the following locations:

- VL3 Reading Abbey Ruins SM
- VL4 Kenavon Drive, adjacent to Riverside Museum
- VL9 Forbury Road (West)
- VL17 Reading Bridge (local Key View); and
- VL21 A4 London Road.

13.7.19 At completion, **No Change** was assessed for people's views and visual amenity at: VL7 Balmore Park and National Cycle Network Route, and the following local key views which were identified in the Reading Tall Building Strategy: VL11 Friar Street, VL12 Eastwards along Castle Street, VL14 A329 Adjacent to Gower Street, VL15 Thames Path East of Reading, VL16 Palmer Park, VL18 A4155 Adjacent to Coley Hill and VL20 Caversham Bridge.

13.8 Secondary Mitigation and Enhancement

- 13.8.1 Secondary mitigation and enhancement proposals are also known as measures to address adverse effects which remain after the embedded mitigation (primary measures) have been incorporated into the scheme.
- 13.8.2 No further townscape and visual mitigation or enhancement measures have been identified as necessary because achievable mitigation within the Site has already been included in the embedded mitigation as an integral part of the Proposed Development.

13.9 Residual Effects

- 13.9.1 Residual effects are those that are predicted to remain after implementation of the described mitigation measures.
- 13.9.2 As the mitigation measures are embedded into the design of the Proposed Development, and as there are no further mitigation or enhancement requirements, the residual effects are as reported at paragraphs 13.7.3 to 13.7.21 of this Chapter.

13.10 Cumulative Effects Assessment

- 13.10.1 The list of committed developments that have been considered in this assessment are included in **Appendix A.6** with a plan of committed developments shown in **Appendix A.7**.
- 13.10.2 Where consented developments are under construction or discharging conditions at the time of the baseline, these are considered in the EIA to be part of the future baseline, and therefore are not assessed in this cumulative effects assessment.
- 13.10.3 From a review of the ZTV and verified views of the Proposed Development, against the locations of the committed developments within the surrounding urban area and the locations of the townscape and visual receptors in this TVIA that have been assessed as receiving significant townscape or visual effects, it has been determined that **none** of the committed developments in combination with, or in addition to, the Proposed Development would result in likely significant cumulative townscape or visual effects. This is because the Proposed Development and committed developments are within the existing urban area; the Proposed Development would not alter key characteristics of townscape character areas in the surrounding urban area; and that the committed developments are in locations which would experience no, or very limited, intervisibility with the Proposed Development. Therefore, all of the committed developments are therefore scoped out of the TVIA cumulative effects assessment.

13.11 Monitoring

- 13.11.1 The proposed embedded mitigation measures will be monitored to check they deliver the desired level of mitigation initially through the detailed design and planning approvals process. When the development is built out, checks would include ensuring that the public realm areas, open spaces and planting are implemented and managed appropriately. Landscape and Ecology Management Plans (LEMPs) would also have been produced for each Phase of the development and which would be used to manage and monitor habitat creation and planting establishment.

13.12 Summary

- 13.12.1 The Site is an existing retail park which is allocated in the Local Plan for regeneration, and is located within the urban area of Reading; situated between the mainline railway line and Forbury Road / roundabout / Kenavon Drive. The Site lies adjacent to an area designated for Tall Buildings.
- 13.12.2 There are no designations upon the Site. Conservation Areas are located within 1km of the Site; Reading Abbey Scheduled Monument and The Forbury Gardens listed on the Register of Parks and Gardens of Special Historic Interest are located to the southwest of the Site at circa 25m and 40m respectively. The Site is situated within National Character Area 115 Thames Valley, and townscape character area TCA10: Forbury Retail Park (Townscape Assessment, Reading Tall Building Strategy / Tall Building Strategy Update 2018). The Tall Building Strategy identified TCA10: Forbury Retail Park as being of medium townscape sensitivity to Tall Buildings. The Site does not lie within Reading's protected view cones with heritage interest. However, the Townscape Assessment of the Tall Building Strategy identifies other townscape key views, and there is Key View O is from Kenavon Drive to the wall of Reading Prison, this view being adjacent to the Site.
- 13.12.3 Most of the Site comprises large-scale but low-rise warehouse style retail buildings and hardstanding areas for footways and car parking. The fast-food chain KFC sits adjacent to the southern boundary; this being large scale but at a lower height than the retail buildings. On the Site there is a surface car park with 313 spaces; there is signage, and bollards align the frontage of the stores. Around the Site entrance and car park there are landscaped areas including semi-mature trees and mown grassland. Trees and scrub line the northern boundary

of the Site adjacent to the railway line. The Site's character is of an established, but outdated and run-down, urban, retail park of large block and large mass structures, with ground surface dominated by hard materials. Townscape receptors include the Site's scale, grain and massing; appearance; legibility; public realm; and trees and vegetation. Selected visual receptors for the TVIA include residents, workers, visitors, road and Public Rights of Way users and people using parks and open spaces; and the TVIA considers their views and visual amenity.

- 13.12.4 Embedded mitigation for the Proposed Development includes several design principles relevant for townscape and visual issues; including the creation of a high-density development as a positive response to the site allocation, provision of high quality public realm and sustainable development, incorporation of a green street layout, step backs to top floors of buildings located in the south of the Site, creation of a green infrastructure street frontage and new tree planting.
- 13.12.5 Temporary townscape effects during the construction stage were identified upon TCA10, the character of the Site, the Site's Scale, Grain and Massing, Appearance, Legibility, Public Realm and Trees and Vegetation of the Site, which are **adverse** and of a **moderate level of significance of effect**. These arise from the clearance of the existing Site and the associated infrastructure, engineering and building works to create the Proposed Development which would completely change the Site's character and townscape features. Additionally, indirect, medium-term and temporary **adverse** townscape effects of a **moderate level of significance of effect** were assessed for TCA8, TCA23, The Forbury Gardens RPG, Reading Abbey SM; these effects arising due to the combination of the receptors' high sensitivities and their intervisibility with the temporary demolition and / or construction works, even though the magnitude of change was assessed as Slight. For assessment purposes, these temporary construction effects are considered **Significant**. All other townscape effects during the construction period were identified as being of a **minor** or **negligible level of significance of effect** and which are therefore **Not Significant**.
- 13.12.6 Temporary visual effects were identified during construction **adverse** and a **moderate level of significance of effect** and thus **Significant**, for people's views from VL1 Forbury Road, VL2 Forbury Gardens, VL3 Reading Abbey Ruins, VL5 Kings Meadow Open Space, VL10 Huntley Wharf and VL13 Kenavon Drive looking towards Reading Prison. These effects arise from the higher sensitivity of the visual receptors and the proximity of the viewer being less than 0.23km from the Site. **No change** was identified for people's views at VL11 Friar Street, VL12 Eastwards Along Castle Street, VL14 A329, VL15 Thames Path, VL16 Palmer Park, VL18 A4155 and VL19 Garnet Street. All other visual effects during construction were identified as being of a **minor** or **negligible level of significance of effect** and which are therefore **Not Significant**.
- 13.12.7 At completion, **beneficial**, direct and long-term townscape effects that are a **moderate level of significance of effect**, and therefore **Significant**, were assessed upon TCA10 (within which the Site is located), the appearance, and the public realm of the Site. These arise from the greater provision of public realm area, and new tree planting and additional urban greening, within the Proposed Development at the Site. All other townscape receptors were either assessed as receiving **minor levels of significance of effect** at completion, which are **Not Significant**, or as **No change**.
- 13.12.8 At completion, long-term and permanent visual effects which are assessed as **beneficial**, and **Moderate levels of significance of effect**, which are **Significant**, are assessed for people's views and visual amenity at the following locations: VL1: Forbury Road; VL2 Forbury Gardens VL10: Huntley Wharf; and VL13: Kenavon Drive towards Reading Prison. All other visual receptors were either assessed as receiving **negligible** or **minor levels of significance of effect** at completion, which are **Not Significant**, or as **No change**.
- 13.12.9 The TVIA identified no cumulative effects arising as a result of the Proposed Development in addition to, or in combination with, committed developments. This is because the Proposed

Development and committed developments are within the existing urban area; the Proposed Development would not alter key characteristics of townscape character areas in the surrounding urban area; and that the committed developments are in locations which would experience no, or very limited, intervisibility with the Proposed Development.

13.13 References

13.13.1 References are set out below:

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14 Impact Interactions

14.1 Introduction

- 14.1.1 Significant environmental effects can result from incremental changes caused by the interactions between effects resulting from a development.
- 14.1.2 The direct and indirect effects of the Proposed Development have been assessed within the relevant topic chapters of this Environmental Statement (ES) prepared by technical specialists. Environmental effects are assessed relative to the topic under consideration. This approach can lead to effects on a receptor being reported in separate chapters but the collective effect on the same environmental resource(s) not being considered.
- 14.1.3 In response, this chapter, prepared by Stantec, summarises the principal findings of each topic chapter of the ES to enable assessment of the potential for impact interactions across environmental disciplines.
- 14.1.4 Some topics in this ES, such as Socio-economics (**Chapter 7**), inherently consider effects from other topics chapters on receptors that are assessed within their assessment. This has been taken into account in the impact interactions assessment presented below.

14.2 Methodology

- 14.2.1 The assessment methodology involves the identification of impact interactions associated with both the construction and operational phases of the Proposed Development upon one or more environmental resources. This assessment of impact interactions is undertaken using a qualitative appraisal process. Receptors have been grouped into 'Natural Environment' and 'People and Society' categories.
- 14.2.2 A summary of mitigation measures is provided in **Chapter 15** which has been used to help identify where there is a likelihood for potential significant adverse impact interactions to occur.

14.3 Construction Effects

- 14.3.1 As set out in **Chapter 4**, careful management of the construction works will reduce the adverse effects of construction. As a result, the majority of the construction effects identified in **Chapters 7 – 13** are not significant. The following sections discuss, in more detail, impact interactions and effects associated with the construction phase.

Natural Environment

- 14.3.2 With the implementation of the Demolition Construction Environmental Management Plan (DCEMP) which is proposed to be secured via planning condition, and use of best practice techniques, the majority of residual construction effects on the Natural Environment are considered to be not significant.
- 14.3.3 The Reading Abbey Ruins and Abbey Gate as well as Forbury Gardens has been identified to experience a moderate adverse townscape effect during construction but there are no other effects expected on these receptors during this phase of the development, therefore effects are as stated across Townscape and Visual chapter.

People and Society

- 14.3.4 Residential receptors on Kenavon Drive are identified to be impacted by noise and vibration with a temporary moderate adverse effect during demolition, and a temporary minor adverse effect during construction of Phase 3 of the Proposed Development. Moderate visual effects have also been identified for VL13 (Kenavon Drive looking towards Reading Prison). However, impacts are temporary across the construction period and will be managed through the implementation of the DCEMP and good standard construction practices, therefore it is not expected that effects would be over what has already been assessed in respective discipline chapters.
- 14.3.5 A temporary minor adverse effect is identified for noise and vibration on the Church of St James, as a place of worship, during demolition and construction. There are also minor to minor/moderate adverse effects on the Church of St James as a heritage receptor (Grade II). Construction effects will be managed through the implementation of a DCEMP and good construction practices.
- 14.3.6 Reading Gaol is identified as having minor to minor/moderate adverse heritage effects during demolition and construction of the Proposed Development, as well as moderate visual effects at view VL13 (Kenavon Drive looking towards Reading Prison). The impact interactions are temporary, occurring only across the construction period and will be managed by the implementation of the DCEMP and good construction practices.
- 14.3.7 Reading Abbey Ruins and Abbey Gate are identified as having a minor to minor/moderate adverse heritage effect as a result of demolition and construction, as well as a moderate adverse visual effect. These effects are temporary in nature, and no heritage effects are present against Reading Abbey Ruins and Abbey Gate once the Site is operational.
- 14.3.8 Forbury Gardens is expected to have minor to minor/moderate heritage impacts as a result of demolition and construction. However, no other effects are expected on this receptor during the construction stage and hence effects are as stated within the heritage chapter.

14.4 Operational Effects

- 14.4.1 As a result of implementing mitigation measures, the adverse effects of the Proposed Development will be reduced. As a result, the majority of operational effects identified in **Chapters 7 – 13** are not significant. The following sections discuss, in more detail, impact interactions and effects associated with the operational phase.

Natural Environment

- 14.4.2 There are no significant impact interactions on the Natural Environment as a result of the Proposed Development during the operational phase. Whilst there are minor to moderate townscape effects, including a moderate adverse effect on TCA23 Kings Meadow, the receptors are not impacted by any other effect. There are also numerous beneficial effects on townscape, which includes a moderate beneficial effect on TCA10 Forbury Retail Park and appearance and public realm of the Site.

People and Society

- 14.4.3 Kenavon Drive is identified as having a minor to negligible visual effect on the view VL4 (Kenavon Drive) as well as a beneficial moderate visual effect on VL13 (Kenavon Drive looking towards the prison). As the effect on VL4 is not significant and VL13 is beneficial, no significant adverse impact interactions are expected for this receptor.
- 14.4.4 The Church of St James has a minor/moderate neutral adverse heritage effect. The effect is managed through primary mitigation which is embedded into the design of the Proposed

Development such as graduating building heights down towards the south and western sides of the Site.

- 14.4.5 A minor neutral adverse heritage effect is identified on Reading Gaol, whilst a moderate, beneficial effect is identified for visual impact. As the heritage effect is not significant, and the visual impact effect is beneficial, there are no significant impact interactions for Reading Gaol.
- 14.4.6 There are moderate adverse effects on GP surgeries in the local area as they are reported as already operating over capacity, as well as major adverse effects on nursery education provision. However, the effects on GP surgeries are offset by financial contributions to RBC from the Applicant.
- 14.4.7 A moderate beneficial visual effect is identified at the view VL2 (Forbury Gardens RPG). A minor neutral heritage effect is also identified for Forbury Gardens. As the visual effect is beneficial and the heritage effect is not significant, no significant impact interactions are expected for Forbury Gardens. The effects are also reduced as the overall massing has been considered and adapted to reduce overall impacts to views and heritage.

15 Schedule of Mitigation

15.1 Introduction

- 15.1.1 This chapter provides a consolidated schedule of mitigation and enhancement measures proposed to avoid significant adverse effects and enhance beneficial effects from the Proposed Development. The chapter is provided to assist RBC with its obligation under the 2017 EIA Regulations to secure, as appropriate, mitigation measures and monitoring arrangements relating to significant adverse effects within any planning permission decision notice granted for the Proposed Development.

15.2 Proposed Mitigation

- 15.2.1 **Table 15.1** details all mitigation and enhancement measures committed to by the Applicant for the demolition and construction phase of the Proposed Development. **Table 15.2** details mitigation for the operational phases of the Proposed Development.
- 15.2.2 A summary of the nature of each measure and compliance mechanism is provided, together with a cross-reference to the relevant technical assessment section of this ES where further details of the required measure are set out. It is considered that most mitigation measures can be secured through planning conditions or legal agreement (e.g. section 106 of the Planning Act) attached to any planning permission granted for the Proposed Development or through the significant payment of CIL arising from the grant of planning permission.

15.3 Proposed Monitoring

- 15.3.1 Part 1(2) of the EIA Regulations defines a ‘monitoring measure’ as a “*provision requiring the monitoring of any significant adverse effects on the environment of Proposed Development including any measures contained in— (a) a condition imposed on the grant of planning permission; or (b) a planning obligation*”.
- 15.3.2 As required by the EIA Regulations, this chapter sets out any monitoring proposed during the demolition and construction (**Table 15.1**) and operation of the Proposed Development (**Table 15.2**), as identified in the relevant topic chapters.

Table 15.1: Summary of Proposed Mitigation and Proposed Monitoring During Demolition and Construction

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
Chapter 7: Socio-Economics	Implementation of a DCEMP. Provision of jobs within the assessed Labour Market Study Area.	No secondary mitigation is required.	No monitoring is required.	Planning Condition.
Chapter 8: Noise and Vibration	Implementation of a DCEMP. The following best practice construction measures will be used during demolition and construction: ■ A minimum 2.4 m high perimeter hoarding around the Site; ■ Ensure that construction plant is compliant with sounds and vibration levels detailed in BS5228; ■ Stationary construction plant will be positioned behind screens and away from sensitive receptors; ■ Hand-held tool swill be screened when used for prolonged periods; and ■ Piling rigs will be positioned at the perimeters as far as possible from the nearest sensitive receptors.	Establish a Section 61 agreement under the Control of Pollution Act. Adoption of Best Practicable Means (BPM) including limiting high impact activities to specific times, and locating stationary plant so noise effects are reduced. A Piling Method Statement will be provided. Piling techniques that are least likely to cause adverse vibration impact should be used (e.g. auger piling).	No monitoring is required.	Planning Condition.

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
Chapter 9: Air Quality	Implementation of a DCEMP (including detail on how all Non-Road Mobile Machinery (NRMM) will adhere to the relevant NRMM emission standards for NO₂ and PM₁₀). Standard mitigation measures from the Institute of Air Quality Management guidance will be included in the DCEMP, taking into account the outcomes of the construction dust risk assessment. This includes but is not limited to: ▪ Develop and implement a stakeholder communications plan; ▪ Implementation of a Dust Management Plan (DMP); ▪ Prepare and maintain the site so that machinery is located away from receptors and implement barriers around dusty activities; ▪ Prepare and maintain the site so that machinery is located away from receptors and implement barriers around dusty activities; ▪ Ensure that vehicles are switched off when not in use and avoid using diesel or petrol-powered generators; ▪ Impose a maximum speed limit of 15mph on surfaced and 10 mph on unsurfaced haul roads and work areas;	No secondary mitigation is required.	Undertake daily on-site and off-site inspections near receptor locations throughout the duration of construction to monitor dust and agree these locations with the local authority. Carry out regular site inspections to monitor compliance with Dust Management Plan (DMP). Increase the frequency of monitoring where necessary when undertaking activities with high potential for dust production.	Planning Condition.

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
	■ Production of a construction Logistics Plan to manage the sustainable delivery of goods and materials; ■ Implement a Travel Plan that encourages sustainable travel; ■ Cutting, grinding or sawing equipment will be fitted or used in conjunction with suitable dust suppression techniques.			
Chapter 10: Heritage	No primary or tertiary mitigation identified at construction stage.	No secondary mitigation is required.	No monitoring is required.	N/A
Chapter 11: Daylight, Sunlight and Solar Glare	No primary or tertiary mitigation identified at construction stage.	No secondary mitigation is required.	No monitoring is required	N/A
Chapter 12: Wind and microclimate	No primary or tertiary mitigation identified at construction stage.	No secondary mitigation is required.	No monitoring is required.	N/A
Chapter 13: Townscape and visual	Tertiary mitigation includes the use of hoardings to reduce visual effects during the construction period. This is considered a standard practice method.	No secondary mitigation is required.	No monitoring is required.	N/A.

Table 15.2: Summary of Proposed Mitigation and Proposed Monitoring During Operation

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
Chapter 7: Socio-Economics	Delivery of affordable housing. Several design features and embedded mitigation measures have been incorporated into the design of the Proposed Development to avoid, prevent or minimise significant adverse socioeconomic effects and to enhance beneficial effects. - Private residents' gardens and public open space throughout the Site to improve access to open space and nature; - Provision of 5,000 sqm Class E to reduce loss of employment from closure of Forbury Retail Park units being demolished.	Financial contribution to offset provision but only if justified through independent RBC review of Financial Viability Assessment and negotiation.	No monitoring is required.	Planning Obligation/Financial Contribution.
Chapter 8: Noise and Vibration	Appropriate façade sound insulation will be provided to Class E use buildings at the detailed design stage.	Building services plant will be designed to achieve the recommended limits in accordance with BS4142. To ensure that the building services noise criteria are achieved, measures such as low-noise equipment, in-duct attenuators and acoustic enclosures will be considered.	Vibration limits will be monitored through the DCEMP.	Planning Condition

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
Chapter 9: Air Quality	Implementation of an all-electric energy strategy, with no proposed combustion sources on the Site. Provision of both electric vehicle charging points at the residential and commercial parts of the Site, in line with Part S of the Building Regulations. A minimum of 10% of total car parking spaces will be allocated electric vehicle charging points. Implementation of a Travel Plan to minimise vehicle movement to the Site and facilitate active sustainable models of transport.	No secondary mitigation is required.	No monitoring is required.	No compliance mechanisms are required.
Chapter 10: Heritage	Form, separation distance, and maximum parament heights have been designed to reduce potential adverse impacts by breaking up the perceived mass of the Proposed Development. Specific materials have been chosen to reflect the local vernacular, and the mass of the development has been broken up through a hierarchical approach to design.	No secondary mitigation is required.	No monitoring is required.	No compliance mechanisms are required.
Chapter 11: Daylight, Sunlight, and Solar Glare.	Iterative design stage analysis on the illustrative massing configuration has been used to embed the relevant mitigation measures into the design of the Proposed Development. This ensures an optimised	The design of the façade at the detailed design stage will provide secondary mitigation. For example, reducing the	No monitoring is required.	Planning Condition.

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
	form and design for this location, resulting in the most appropriate balance of effects and scale and mass.	proportions of glazing to reduce reflections that occur or using a low reflectivity glass.		
Chapter 12: Wind and Microclimate	No primary or tertiary mitigation identified for the operational phase.	Measures to be assessed and considered at detail design: • The use of set-backs, colonnades and chamfered building corners will be considered; • A landscaping scheme comprising trees or screens will be considered to help break up south-westerly winds flowing along the building; • Entrance locations in areas suitable for walking will consider providing landscaping features on either side of entrances to locally shelter them; • Ground floor amenity provision should be focussed between the northern and southern blocks to provide shelter from prevailing south-westerly winds; • Ground floor level amenity located within walking areas would benefit from landscaping elements for shelter;	No monitoring would be required.	N/A

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
		If roof spaces are made accessible for occupant amenity, solid or porous balustrades (at least 1.6 m tall) and landscaping elements would provide shelter and break up winds.		
Chapter 13: Landscape and Visual	Mitigation measures embedded into the design of the Proposed Development, relevant to the TVIA, is as follows: - Provision of a new connection to and from train station and main throughfare across Kenavon Drive and Forbury Road; - Incorporation of a green street layout to reveal glimpses of important features of adjacent properties with future connection opportunities to emerging developments, to enhance orientation and create a strong sense of place; - Respect existing built context and emerging developments; - Provision of high quality generous public realm; - Provision of high quality and sustainable residential development	No secondary mitigation is required.	Embedded mitigation measures will be monitored to check they deliver desired level of mitigation and comply with the rules set in the design codes The Landscape and Ecology Management Plan (LEMP) will be produced and will manage and monitor habitat creation and planting establishment.	No compliance mechanisms are required.

Chapter Reference	Primary and Tertiary Mitigation	Secondary Mitigation	Proposed Monitoring	Potential Compliance Mechanism (s)
	that positively contributes to Reading Town Centre; ■ Stitching of new streetscape into the existing wider urban grain; ■ Widths of streets to provide clear legibility of the route hierarchy and provide adequate space for vehicle and pedestrian routes; ■ Proposed building heights focussed to the north and central portions of the Site, gradually reducing in height towards the east and western ends. This is to minimise impacts on adjacent properties and maximise the daylight penetration into the key open spaces; ■ Incorporation of step backs in top floors of buildings located along the south of the Site to reduce visual impact in views from Forbury Road and Kenavon Drive; ■ Creation of active frontages adjacent to pedestrian and cycle routes.			
