Stag Brewery, Mortlake

Environmental Statement Volume 1: Main Text

For Reselton Properties

February 2018

Environmental Statement, Volume 1: Main Text

Former Stag Brewery, Mortlake

February 2018

Waterman Infrastructure & Environment Limited
Pickfords Wharf, Clink Street, London SE1 9DG, United Kingdom

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This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

Issue	Date	Prepared by	Checked by	Approved by
01	February 2018	Ellen Smith Senior Consultant	Ros Boalch Principal Consultant	Kirsty Rimondi Technical Director

Comments

Comments

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Stag Brewery - Glossary of Terms

Term used within ES	Definition
A1 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for shops. For example, hairdressers, travel and ticket agencies, post offices and showrooms.
A2 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for financial and professional services (excluding Health and Medical Services). For example, banks, building societies, bureau de change, estate agents and employment agencies.
A3 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for restaurants and cafés, i.e. places where the primary purpose is the sale and consumption of food and light refreshments on the premises.
A4 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for drinking establishments, i.e. public houses, wine bars, or other drinking establishments where the primary purpose is the sale and consumption of alcoholic drinks on the premises.
AADF/T Annual Average Daily Flow/Total	A daily total traffic flow (24 hours), expressed as a mean daily flow across all 365 days of the year.
Above Ordnance Datum (AOD)	Land levels in the UK are measured relative to the average sea level at Newlyn in Cornwall. This average level is referred to as 'Ordnance Datum'. Benchmarks, spot heights and contours on Ordnance Survey maps of the UK show heights above Ordnance Datum in metres.
Acoustic Environment	Sound from all sound sources as modified by the environment.
Archaeology	The scientific study of ancient or historic physical remains of human activity, both above and below ground.
Archaeological interest	There will be archaeological interest in a heritage asset if it holds, or potentially may hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.
Applicant	Reselton Properties Limited.
Application A	Hybrid planning application for comprehensive mixed use redevelopment of the former Stag Brewery site consisting of: • Land to the east of Ship Lane applied for in detail; and • Land to the west of Ship Lane (excluding the school) applied for in outline.
Application B	Detailed planning application for the school (on land to the west of Ship Lane).
Application C	Detailed planning application for highways and landscape works at Chalkers Corner.
Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
Annual Mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March,

Term used within ES	Definition
	known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
Aquifer	A below ground, water-bearing layer of soil or rock.
B1 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for Offices (other than financial and professional services providing for the visiting members of the public).
Baseline	Existing environmental conditions present on, or near a site, against which future changes may be measured or predicted.
BS	British Standard
Building Luminance	Building Luminance can cause an increase in the brightness of the general area. This is measured in Cd/m2 (L) as an average over the building façade.
C2 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for residential premises such as nursing homes and assisted living apartments.
C3 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments, for dwelling houses.
Candela (cd)	SI unit of luminous intensity.
Conservation (for heritage policy)	The process of maintaining and managing change to a heritage asset in a way that sustains and, where appropriate, enhances its significance.
Conservation Area	An area designated under the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance.
Considerate Constructors Scheme	A UK certification scheme operated by the Construction Confederation to reduce the potential for adverse environmental impacts during the construction phase of projects. Widely used in major or sensitive schemes.
Contaminated Land	Defined by section 78A(2) Part IIA of the Environmental Protection Act 1990 as: "*any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that -* *a. significant harm is being caused or there is a significant possibility of such harm being caused; or* *b. pollution of controlled waters is being, or is likely to be caused;"*
Contamination	Contamination is the addition, or the result of addition, or presence of a material or materials to, or in, another substance to such a degree as to render it unfit for its intended purpose.
Cumulative Effects	Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions.
Curfew	The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by a LPA.
D1 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments for 'public' services. For example, medical or health services, educational facilities, nurseries, museums and libraries.

Term used within ES	Definition
D2 Use Class	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments for entertainment and leisure purposes. For example, cinemas, concert halls, gymnasiums.
Designated heritage asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Development	The proposals defined by the planning applications.
Directive	European Commission (EC) Directives impose legal obligations on European Member States. They are binding as to the results to be achieved, but allow individual states the right to decide the form and methods used to achieve the results.
Dust	Fine particles of solid materials ranging in size from 1 to 75 um diameter (see British Standard 3405) capable of being re-suspended in air and settling only slowly under the influence of gravity where it may cause nuisance.
Environmental Impact Assessment (EIA)	A technique for ensuring that the likely effects of new development on the environment are fully understood and taken into account before the development is allowed to go ahead. It provides a focus for public scrutiny of the project and enables the importance of the predicted effects, and the scope for modifying or mitigating them, to be properly evaluated by the decision-making authority.
EIA Regulations (2011)	Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended 2015).
EIA Regulations (2017)	Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
Environmental Statement (ES)	Document that reports the findings of an Environmental Impact Assessment.
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure.
Façade	Generally one side of the exterior of a building, especially the front, but also sometimes the sides and rear.
Flood plain	The area of land available for floodwaters to occupy.
Footprint	Perimeter of a building's ground floor plan.
Glare	The uncomfortable brightness of a light source when viewed against a dark background. This applies to each source in the obtrusive direction and is quantified as source intensity (I) (kcd).
Groundwater	Water associated with soil or rocks below the ground surface but is usually taken to mean water in the saturated zone.
Gross	The sum total, without deduction.
Habitat	The living place of an organism characterised by its physical or biotic properties.
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).
Heritage Significance	The value of a heritage asset to this and future generations because of its heritage interest. That interest may be

Term used within ES	Definition
	archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.
Historic Environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
Historic Environment Record	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
HSE Executive	Health and Safety Executive.
Illustrative Masterplan	An illustrative configuration of the layout of the Development based on the proposed buildings and uses, supporting infrastructure and Development plots.
In situ	In the natural, original or appropriate position.
$L_{A90,T}$	Generally used to describe the background sound level; A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T. measured using time weighting F and quoted to the nearest whole number of decibels.
$L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval T, has the same mean square sound pressure as a sound under consideration whose level varies with time.
Light Trespass	The spilling of light beyond the Site boundary. This is assessed using vertical illuminance in lux (EV) measured flat on the glazing at the centre of the window.
LINSIG	Industry standard software for assessing signalised junctions.
Listed Building	Statutorily listed buildings and other structures that are of special architectural or historic interest and are protected under the terms of the Planning (Listed Buildings and Conservation Areas) Act 1990.
Locally Listed Building	A building or structure identified as having local architectural and historic interest (as opposed to 'special' architectural and historic interest). Defined by LBRuT as 'Buildings of Townscape Merit'.
Lumen	SI unit of luminous flux (lm).
Luminance	Candela per meter squared (cd/m^2).
Mitigating factor	A matter to be taken into account as a benefit to offset any perceived or demonstrable harmful impact.
Mitigation (measure)	The measures put forward to prevent, reduce and where possible, offset any adverse effects on the environment.
National Planning Policy Statement	National Planning Policy Statement (NPPF) notes set out the Government's policies on different aspects of planning. Local planning authorities must take their content into account in preparing their development plans and the guidance may also be material to decisions on individual planning applications and appeals.
Net	After all deductions have been made.
Non-Technical Summary	A summary of the Environmental Statement in non-technical language providing a concise, yet comprehensive summary of the likely effects of the project on the environment.

Term used within ES	Definition
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.
Parameter Plan	A plan submitted for approval, which define the future development as part of the Application.
Particulate matter	Discrete particles in ambient air, sizes ranging between nanometres (nm, billionths of a metre) to tens of micrometres (µm, millionths of a metre).
Peak Particle Velocity	The instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position.
Permeability	The extent to which an environment allows a variety of access routes through it. A permeable environment is one where there is ease of movement and where people have a choice in the routes they may use.
Piling	Installation or removal of bored, driven and pressured-in piles and the effect of ground treatments by vibratory, dynamic or other methods of ground stabilisation.
Receptor (Sensitive)	A component of the natural, created or built environment such as human being, water, air, a building, or a plant that is affected by an impact.
Residual impacts	Those impacts of the development that cannot be mitigated following implementation of mitigation proposals.
Risk assessment	An assessment of the likelihood and severity of an occurrence.
Road link	A length of road which is considered to have the same flow of traffic along it. Usually, a link is the road from one junction to the next.
Schedule 2 (development)	Development project types under the EIA Regulations where EIA is not mandatory in all cases but may be required, depending on the size, nature and scale of the development and the potential for significant environmental effects to arise.
Scoping	An initial stage in determining the nature and potential scale of environmental impacts arising as a result of a development, and an assessment of what further studies are required to establish their significance.
Scoping Study	Preliminary study investigated the potential environmental impacts that could arise from the development, used to identify issues for further investigation in the EIA.
Setting of a heritage asset	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
Site	The land to which the Planning Applications relate.
Sky Glow	The brightening of the of the night sky over our towns, cities and countryside. This can be quantified by measuring the Upward Light Ratio (ULR). This is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky.
Sui Generis	Class of land use as set out in Town and Country Planning (Use Classes) Order 1987, and its subsequent amendments

Term used within ES	Definition
	for buildings that do not fall within particular use class (e.g. boathouse).
Sustainable Development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.
Topography	The natural or artificial features, level and surface form of the ground surface.
Wirelines	Diagrammatic representations showing the outline of the Development.
World Heritage Site	Places of Outstanding Universal Value, as set out in of the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention.

Stag Brewery – Abbreviations

Abbreviations	Definition
µg/m3	Micrograms per cubic metre
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
ADF	Average Daylight Factor
ADMS-Roads	Atmospheric Dispersion Modelling System for Roads
ADMS-5	Atmospheric Dispersion Modelling System for Point Sources
AGL	Above Ground Level
AOD	Above Ordinance Datum
APS	Annual Population Survey
APSH	Annual Probable Sunlight Hours
AQAL	Air Quality Assessment Level
AQFA	Air Quality Focus Area
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ATC	Automatic Traffic Count
AVRs	Accurate Visual Representations
BAP	Biodiversity Action Plan
BPM	Best Practicable Means
BEB	Building Emissions Benchmark
BRE	Building Research Establishment
BTM	Building of Townscape Merit
CANDELA	Unit of luminous intensity (cd)
CCCG	Clinical Care Commission Group
CEMP	Construction Environmental Management Plan
CFA	Continuous Fight Augur
CHP	Combined Heat and Power
CIBSE	Chartered Institute of Building Services Engineers
CIfA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Assessment
CLG	Community Liaison Group
CLP	Construction Logistics Plan
CLR11	The Model Procedures for the Management of Contaminated Land
CNEA	Clean Neighbourhoods and Environmental Act (2005)

CoPA	Control of Pollution Act 1974
COSHH	Control of Substances Hazardous to Human Health
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
C_{tr}	The traffic A-weighted spectrum which can be added to the weighted sound reduction index (Rw) to take account of low frequency traffic noise.
dB	Decibels
DBA	Desk Based Assessment
DAS	Design and Access Statement
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DfE	Department for Education
DMRB	Design Manual for Roads and Bridges
DoS	Degree of Saturation
DSP	Delivery and Servicing Plan
EA	Environment Agency
EAL	Environment Assessment Level
ESFA	Education and Skills Funding Authority
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
EQS	Environmental Quality Standard
ES	Environmental Statement
EU	European Union
EV	Vertical illuminance
FCMS	Framework Construction Management Statement
FFL	Finished Floor Levels
FRA	Flood Risk Assessment
FTE	Full Time Equivalent
GACs	Generic Assessment Criteria
GEA	Gross External Area
GQRA	Generic Quantitative Risk Assessment
GIA	Gross Internal Area
GIGL	Greenspace Information for Greater London
GIS	Geographical Information System
GLA	Greater London Authority

GLAAS	Greater London Archaeology Advisory Service
GLHER	Greater London Historic Environmental Record
GLVIA	Guidelines for Landscape and Visual Impact Assessment
Ha	Hectares
HAPs	Habitat Action Plans
HCA	Homes and Communities Agency
HE	Highways England
HER	Historic Environment Record
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Good Vehicles
HSCIC	Health and Social Care Information Centre
HMSO	Her Majesty's Stationery Office
HoPI	Habitats of Principal Importance
HSE	Health and Safety Executive
HUDU	Health Urban Development Unit
HV	High Voltage
IAQM	Institute of Air Quality Management
ICOMOS	International Council on Monuments and Sites
IEF	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
ILP	Institute of Lighting Professionals
JNCC	Joint Nature Conservation Committee
KCD	Kilocandela
LAQM	Local Air Quality Management
LB	London Borough
LBAP	London Biodiversity Action Plan
LBH	London Borough of Hounslow
LBRuT	London Borough of Richmond upon Thames
LCC	London County Council
LDF	Local Development Framework
LEAP	Locally Equipped Area for Play
LFMF	London View Management Framework
LLFAs	Lead Local Flood Authorities
LI	Landscape Institute
LIA	Local Impact Area
LGV	Light Goods Vehicle

LOAEL	Lowest Observed Adverse Effect Level
LPA	Local Planning Authority
LUMEN	SI unit of luminous flux (lm)
LV	Low Voltage
LVIA	Landscape and Visual Impact Assessment
MAGIC	Multi-Agency Geographic Information for the Countryside
MUGA	Multi Use Games Area
NAEI	National Atmospheric Emissions Inventory
NEAP	Neighbourhood Equipped Area for Play
NERC	Natural Environment and Rural Communities
NGR	National Grid Reference
NHLE	National Heritage List for England
NHS	National Health Service
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO2 + NO)
NOAEL	No Observed Adverse Effect Level
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NPSE	Noise Policy Statement for England
NRMM	Non-Road Mobile Machinery
NSC	No Sky Line Contour
NSR	Noise Sensitive Receptors
NTS	Non-Technical Summary
ODPM	Office of the Deputy Prime Minister
ONS	Office for National Statistics
OOLTI	Other Open Land of Townscape Importance
OS	Ordnance Survey
PAH	Polyaromatic hydrocarbons
PBA	Peter Brett Associates LLP
PEA	Preliminary Ecological Appraisal
PEM	Project Environmental Manager
PERA	Preliminary Environmental Risk Assessment
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PM_{10}	Small airborne particles less than 10 micrometres in aerodynamic diameter

POB	Process Office Building
PPC	Pollution Prevention and Control
PPE	Personal Protective Equipment
PPG	Planning Practice Guidance
PPS	Planning Policy Statement
PPV	Peak Particle Velocities
PROW	Public Rights of Way
PRS	Protected Species Report
PTAL	Public Transport Accessibility Rating
PV	Photovoltaic Panels
PVI	Private, independent and voluntary
R_w	Weighted sound reduction index
RBAP	London Borough of Richmond upon Thames Biodiversity Action Plan
RPV	Respiratory Protective Equipment
SAC	Special Areas of Conservation
SAP	Species Action Plans
SEL	Sound Exposure Level
SFRA	Strategic Flood Risk Assessment
SGV	Soil Guideline Values
SI	Site Investigation
SINC	Site of Importance for Nature Conservation
SMI	Site of Metropolitan Importance
SOAEL	Significant Observed Adverse Effect Level
SoLHAM	South London Highway Assignment Model
SoPI	Species of Principal Importance
SPA	Special Protected Area
SPD	Supplementary Planning Document
SPG	Supplementary Planning Guidance
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Urban Drainage System
SVOC	Semi-Volatile Organic Compounds
SWMP	Site Waste Management Plans
TCA	Townscape Character Area
TE2100	Thames Estuary 2100

TEB	Transport Emissions Benchmark
TfL	Transport for London
TLRN	Transport for London Road Network
TP	Travel Plan
TPH	Total Petroleum Hydrocarbons
TPO	Tree Preservation Order
TRAVL	Trip Rate Assessment Valid for London
ULR	Upward Light Ratio
UXO	Unexploded Ordnance
VDV	Vibration Dose Value
VOC	Volatile Organic Compounds
VSC	Vertical Sky Component
WAC	Waste Acceptance Criteria
WCA	Wildlife and Countryside Act
WFD	Water Framework Directive
WHO	World Health Organisation
WRA	Water Resources Act
ZoL	Zone of Influence

1. Introduction

Background Information

1.1. This Environmental Statement (ES) has been prepared by Waterman Infrastructure & Environment Limited ('Waterman IE'), on behalf of Reselton Properties Limited (the 'Applicant').

1.2. The ES is a document which reports the key findings of the Environmental Impact Assessment (EIA) process; a systematic means of understanding and assessing the likely significant environmental effects arising from a project. The process enables developers to respond iteratively to the prevailing environmental conditions, constraints and opportunities in relation to their proposals. This allows for the evolution of most practicable environmentally sustainable design and ensures that, if deemed necessary, all feasible measures are taken to prevent, reduce and where possible, offset any potentially adverse significant environmental effects.

1.3. The Applicant intends to redevelop land predominantly on the former Stag Brewery, along with predominantly highway land to the west. Such land is located in Mortlake, south west London within the administrative boundary of the London Borough of Richmond upon Thames (LBRuT) (refer to **Figure 1.1**). To facilitate redevelopment of the land, the Applicant is seeking planning permission for the following:

- **Application A:** a hybrid planning application for the demolition of the majority of buildings (with the exception of the Maltings and the façade of the Former Bottling building and Former Hotel) and structures within the entire Stag Brewery component of the Site) and the redevelopment of the majority of the former Stag Brewery (refer to **Figure 1.2**). To the east of Ship Lane, planning permission is sought in detail for the construction of 443 residential units, flexible use floorspace, office, cinema, hotel, gym and community use, flood defence works, towpath works, landscaping, amenity space play space, public open space, car and cycle parking, installation of plant, energy centres, new accesses and internal routes and various associated works (Development Area 1). To the west of Ship Lane, planning permission is sought in outline (with all matters reserved) for up to 224 residential units (including affordable housing), a nursing and care home, assisted living apartments and various associated works (Development Area 2).
- **Application B:** a detailed planning application for the construction of a six-form entry secondary school with associated sports pitch and play space, floodlighting, landscaping, car and cycle parking, new access routes and associated works to the west of Ship Lane in the area of the Stag Brewery component of the Site that is not covered by Application A (refer to **Figure 1.2**); and
- **Application C:** a detailed planning application, for highways and landscaping works at Chalkers Corner, situated to the west of the former Stag Brewery (refer to **Figure 1.2**).

1.4. The three Planning Applications are separate applications, but will be linked through a S106 agreement to ensure that the Application B (school) land is handed over at an appropriate time and that the Application C (Chalkers Corner) works are carried out at an appropriate stage in conjunction with either Application A or B. For the purposes of assessment, all three Planning applications are therefore considered together as one comprehensive redevelopment proposal. As such, for the purposes of the EIA and this ES, the proposals defined by the Planning Applications are collectively referred to as the 'Development'. Similarly, the collective parcels of

land associated with the Planning Applications are referred to as the 'Site' (refer to **Figure 1.3**) It therefore follows that due to the scale and nature, and potential of the Development to give rise to *"…significant environmental effects…"*, the Development is considered as Schedule 2, Category 10(b) (urban development projects) of the Town and Country Planning (Environmental Impact Assessment) Regulations, 2011 (as amended 2015)[1] (the '2011 EIA Regulations'). This ES reports the key findings of the EIA process undertaken for the Development and accompanies all three Planning Applications.

1.5. Justification as to the scope of this ES is summarised in **Chapter 2: EIA Methodology**. However, at this point it should be noted that as a request for an EIA Scoping Opinion was made to the LBRuT (refer to **Appendix 2.1**) on 30th March 2017, in accordance with the transitional arrangements set out in the Town and Country Planning (Environmental Impact Assessment) Regulations, 2017[2] which came into force on 16th May 2017, the EIA for the Development was undertaken in line with the 2011 EIA Regulations.

1.6. A detailed description of the Site is provided in **Chapter 3: Existing Land Uses and Activities** and a detailed description of the Development is provided in **Chapter 5: The Proposed Development**.

Site Context

1.7. As set out in **Figure 1.3**, the Site comprises:

- the former Stag Brewery, an approximately 9.25 hectare (ha) parcel of land, occupied by a mix of large scale industrial brewery structures and buildings, hardstanding and a playing field in the south west known as Watney's Sports Ground, and incorporating a section of the River Thames towpath within the north of the Site (referred to as 'the Stag Brewery component of the Site');
- Ship Lane, a public highway bisecting the abovementioned 9.25 ha parcel of land (included within the Stag Brewery component of the Site);
- Bulls Alley, a public highway within the east of the abovementioned 9.25 ha parcel of land (included within the Stag Brewery component of the Site); and
- Williams Lane, a highway within the west of the abovementioned 9.25 ha parcel of land (included within the Stag Brewery component of the Site);
- the junction with the A316 (Clifford Avenue), A3003 (Lower Richmond Road) and A205 (South Circular) (collectively known as 'Chalkers Corner') within the west of the Site (referred to as 'the Chalkers Corner component of the Site').

1.8. As shown in **Figure 1.2** the Stag Brewery component of the Site is the subject of Application A and Application B. The Chalkers Corner component of the Site is the subject of Application C.

1.9. The Site is located in a predominantly residential area with an area of public open space known as Mortlake Green located to the south of the Site. The River Thames is located immediately north of the Site. Further detail is provided in **Chapter 3: Existing Land Uses and Activities**.

1.10. The Stag Brewery component of the Site is identified in the Stag Brewery Planning Brief[3] and Mortlake Village Planning Guidance[4], which detail the key policy aims for redevelopment of the Stag Brewery component of the Site. LBRuT's draft Local Plan[5] identifies the Stag Brewery

component of the Site as an area for comprehensive redevelopment to provide a new village centre for Mortlake.

Structure of the Environmental Statement

1.11. This ES is divided into three Volumes and a Non-Technical Summary (NTS).

Environmental Statement Volume 1: Main Text

1.12. **ES Volume 1** (this document) provides a description of the approach to the EIA (**Chapter 2: EIA Methodology**); the Site, activities and its surroundings (**Chapter 3: Existing Land Uses and Activities**); the main alternatives that were reasonably considered by the Applicant (**Chapter 4: Alternatives**); the nature and extent of the Development (**Chapter 5: The Proposed Development**) and a summary description of the anticipated development programme, refurbishment, alteration, and construction works (the 'Works') (**Chapter 6: The Development Programme, Demolition, Alteration, Refurbishment and Construction**). **Chapters 7** to **19** inclusive present the findings of the EIA for the following disciplines 'scoped into' the ES:

- Socio-Economics;
- Transportation and Access;
- Noise and Vibration;
- Air Quality;
- Ground Conditions and Contamination;
- Surface Water Resources and Flood Risk;
- Ecology;
- Archaeology (Buried Heritage);
- Above Ground Built Heritage;
- Townscape and Visual Effects;
- Wind Microclimate;
- Daylight, Sunlight, Overshadowing and Light Pollution; and
- Cumulative Effects.

1.13. A summary of all the likely residual effects and mitigation measures is set out in **Chapter 20: Summary of Mitigation Measures and Likely Residual Effects**. Further detail on the structure of the technical chapters is provided in **Chapter 2: EIA Methodology**.

Environmental Statement Volume 2: Figures

1.14. **ES Volume 2** comprises figures, illustrations, Parameter Plans and a selection of Planning Application Drawings which should be read together with **ES Volume 1.**

Environmental Statement Volume 3: Appendices

1.15. **ES Volume 3** comprises appendices (such as data, reports and correspondence) which are relevant evidence bases to the assessments reported within **ES Volume 1**.

Non-Technical Summary

1.16. The **Non-Technical Summary** (**NTS)** comprises a summary of the whole ES (**Volumes 1, 2** and **3**) in 'non-technical language' as required under the 2011 EIA Regulations. Its objective is to provide a concise and balanced summary of the ES without excessive technical detail or scientific language so as to be readily and quickly understood by non-technical experts and members of the public not familiar with EIA terminology. The **NTS** is produced as a separate document to facilitate wider public distribution.

Project Team

1.17. The EIA has been co-ordinated by Waterman IE. Waterman IE has also prepared the ES in conjunction with the Applicant and their professional team as listed within **Table 1.1**.

Table 1.1: Professional Team

Organisation	Expertise / EIA Input
Reselton Properties Limited	Applicant
Dartmouth Capital Advisors Ltd	Applicant's Development Advisors
Squire & Partners	Architect
Gillespies LLP	Landscape Architect
Gerald Eve	Planning Consultant
Dentons UKMEA LLP	Planning Lawyer
Gardiner and Theobald	Cost Consultants
AECOM	Construction Advisors
Waterman Structures Ltd	Structural Engineer
Waterman IE	Lead EIA Consultant, Air Quality, Noise and Vibration, Ground Conditions and Contamination, Ecology, Built Heritage, Drainage, Townscape and Visual
Hoare Lea	Mechanical and Electrical Engineer
Peter Brett Associates	Transport Planning
Hydrologic	Flood Risk Consultant
Regeneris Consulting	Socio-Economics Consultant
CgMs (part of RPS Group Plc)	Archaeology Consultant
eB7	Daylight, Sunlight, Overshadowing and Light Pollution Consultant
RWDI	Wind Microclimate Consultant
Soundings	Public Consultation Consultant

ES Availability and Comments

1.18. The ES is available for viewing by the public on LBRuT's website: http://www2.richmond.gov.uk/PlanData2/Planning_Search.aspx.

1.19. Copies of the ES are also available for viewing by the public during normal office hours in the planning department of LBRuT at the address below. Comments on the planning application should be forwarded to the planning case officer at the address given below:

London Borough of Richmond upon Thames
Civic Centre
44 York Street
Twickenham
TW1 3BZ
020 8891 1411

1.20. Copies of the NTS are available free of charge. Copies of the full ES are available for purchase. For copies of these documents, please contact:

Waterman IE
Pickford's Wharf
Clink Street
London
SE1 9DG
Tel: 020 7928 7888
Email: ie@watermangroup.com

References

1 HMSO (2015) Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended 2015).

2 HMSO (2017); Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

3 London Borough of Richmond upon Thames (2011). Stag Brewery, Mortlake, SW14 Planning Brief, Supplementary Planning Document. LBRuT: Richmond.

4 London Borough of Richmond upon Thames (2015). Mortlake Village Planning Guidance, Supplementary Planning Document. LBRuT: Richmond.

5 London Borough of Richmond upon Thames (2017): Local Plan, Publication version of consultation, 4 January - 15 February 2017.

2 EIA Methodology

Introduction

2.1 This Chapter sets out the general approach to, and methodology adopted for, the Environmental Impact Assessment (EIA). Consideration is given to the legislative framework within which the EIA has been undertaken and to the process of scoping the EIA. The general significance criteria adopted to assess the likely environmental effects identified and the resulting likely residual effects are also set out. Finally, this Chapter sets out the general structure of the technical Chapters of this Environmental Statement (ES).

2.2 Specific assessment methodologies and significance criteria relating to each technical assessment are provided in the relevant technical chapters of this ES.

2.3 As already noted in **Chapter 1: Introduction**, since a request for an EIA Scoping Opinion was made to the LBRuT on 30th March 2017 (refer to **Appendix 2.1**), in accordance with the transitional arrangements set out in the Town and Country Planning (Environmental Impact Assessment) Regulations, 2017[1] which came into force on 16th May 2017, the EIA for the Development has been prepared to comply with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended) (the '2011 EIA Regulations')[2] which implement Council Directive no. 2011/92/EU[3].

General Approach

2.4 As described in **Chapter 1: Introduction**, the Applicant intends to submit three separate planning applications (the 'Planning Applications') for the Site. However, as also set out in **Chapter 1: Introduction** the Planning Applications would not be implemented separately from one another or in any combination that would not bring forward the Planning Applications together as one comprehensive redevelopment proposal. As such, for the purposes of the EIA and this ES, the proposals defined by Planning Applications are collectively referred to as the 'Development'. It therefore follows that this ES reports the key findings of the EIA process undertaken for the Development.

2.5 The assessments undertaken as part of the EIA process and reported within this ES have addressed both the likely beneficial and adverse effects of the Development during the demolition, refurbishment, alteration and construction works (the 'Works') required to facilitate the Development and once the Development is complete, occupied and operational. In line with legislative and best practice requirements, direct, indirect, cumulative, short, medium, long-term, temporary, beneficial and adverse effects have been addressed, where applicable.

2.6 Detailed technical studies have been undertaken on an on-going basis throughout the design process, providing information about environmental issues and constraints that may affect the Development. The Applicant and the design team have taken these environmental issues and constraints into account during the design evolution and sought to 'design out' potential adverse effects, wherever possible. Further details are provided in **Chapter 4: Alternatives**.

2.7 Following the findings of the various studies contributing to the EIA process, and where likely significant effects of the Development cannot be designed out, methods of avoiding, reducing, or off-setting significant adverse effects (collectively known as 'mitigation measures') were identified. Such mitigation measures are set out in each relevant technical Chapter.

2.8 The 2011 EIA Regulations (Part 1 of Schedule 4) state that certain information must be included in an ES. **Table 2.1** sets out these information requirements and notes the location(s) where this information is presented within the ES.

Table 2.1: Location within the ES of Information Required by Schedule 4, Part I of the EIA Regulations

Specified Information			Location within ES
1	Description of the development, including in particular:		
	a)	a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases.	Chapter 3: Existing Land Uses and Activities; Chapter 5: The Proposed Development; and Chapter 6: Development Programme, Demolition, Refurbishment and Construction.
	b)	a description of the main characteristics of the production processes, for instance, nature and quantity of materials used.	Chapter 5: The Proposed Development; Chapter 6: The Development Programme, Demolition, Alteration, Refurbishment and Construction.
	c)	an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.	Chapter 8: Transport and Access; Chapter 9: Noise and Vibration; Chapter 10: Air Quality; Chapter 11: Ground Conditions and Contamination; Chapter 12: Surface Water Drainage and Flood Risk; Chapter 19: Cumulative Effects.
2	An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.		Chapter 4: Alternatives.
3	A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and inter-relationship between the above factors.		Chapter 3: Existing Land Uses and Activities; Chapter 6: The Development Programme, Demolition, Alteration, Refurbishment and Construction; all Technical Chapters (7 to 18); and Chapter 19: Cumulative Effects.
4	A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:		
	a)	the existence of the development;	All Technical Chapters (7 to 18); Chapter 19: Cumulative Effects; and Chapter 20: Summary of Mitigation Measures and Likely Residual Effects.
	b)	the use of natural resources;	Chapter 6: Development Programme, Demolition, Refurbishment and Construction.

Specified Information		Location within ES
	c) the emission of pollutants, the creation of nuisances and the elimination of waste.	Chapter 6: The Development Programme, Demolition, Alteration, Refurbishment and Construction; Chapter 8: Transport and Access; Chapter 9: Noise and Vibration; Chapter 10: Air Quality; Chapter 11: Ground Conditions and Contamination; Chapter 12: Surface Water Drainage and Flood Risk; Chapter 13: Ecology; Chapter 17: Wind Microclimate; Chapter 18: Daylight, Sunlight, Overshadowing and Light Pollution; Chapter 19: Cumulative Effects; and Chapter 20: Summary of Mitigation Measures and Likely Residual Effects.
5	A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.	All Technical Chapters (7 to 18) and Chapter 20: Summary of Mitigation Measures and Likely Residual Effects.
6	A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.	Non-Technical Summary (NTS) (separate document).
7	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	Chapter 2: EIA Methodology; and where appropriate Technical Chapters (7 to 18).

Scoping the EIA

2.9 The 'scoping' stage of the EIA process involves focusing the study (and hence the ES) on those issues of greatest likely significance. The 2011 EIA Regulations provide applicants with the opportunity to ask the relevant Local Planning Authority (LPA) to state in writing the information that they believe ought to be provided in an ES, i.e. a 'Scoping Opinion'. However, it should be noted that seeking a Scoping Opinion from an LPA is not mandatory. The Applicant commissioned Waterman Infrastructure & Environment (Waterman IE) to undertake an EIA Scoping Study and seek a Scoping Opinion from the London Borough of Richmond upon Thames (LBRuT).

2.10 The key issues to be addressed by the EIA were identified through a review of the emerging Development design, the consideration of available baseline information, consultation with various statutory consultees, and the application of professional judgement and relevant experience.

2.11 The findings of this exercise were presented within an EIA Scoping Report (refer to **Appendix 2.1**), submitted to LBRuT on 30th March 2017, to provide LBRuT and the relevant statutory consultees with an opportunity to comment on the content and broad EIA methodology.

2.12 Following consultation with the relevant consultees, LBRuT issued a draft EIA Scoping Opinion on 25th May 2017 (refer to **Appendix 2.2**). Following receipt of LBRuT's draft EIA Scoping Opinion, Waterman IE and the Applicant's Planning Lawyer (Dentons) prepared and issued scoping clarification responses to LBRuT on 26th June 2017 (refer to **Appendix 2.3**). LBRuT's subsequently issued a formal EIA Scoping Opinion on 30th June 2017 (refer to **Appendix 2.4**). Dentons provided a final response on the formal EIA Scoping Opinion on 19th July 2017 (refer to **Appendix 2.5**).

2.13 A summary of the key responses and comments received during the EIA scoping process and where they are addressed within the ES is presented in **Appendix 2.6**.

Potentially Significant Issues

2.14 Based on the EIA Scoping process as identified above it was concluded that the Development would have the potential to give rise to a number of significant environmental effects that would need to be considered and assessed as part of the overall EIA process. These were categorised within key topic areas as listed below, and are presented according to the Volume (and where relevant, Chapter) in which they are considered within this ES:

- Socio-Economics (**ES Volume 1, Chapter 7**);
- Transport and Access (**ES Volume 1, Chapter 8**);
- Noise and Vibration (**ES Volume 1, Chapter 9**);
- Air Quality (**ES Volume 1, Chapter 10**);
- Ground Conditions and Contamination (**ES Volume 1, Chapter 11)**;
- Surface Water Drainage and Flood Risk (**ES Volume 1, Chapter 12**);
- Ecology (**ES Volume 1, Chapter 13**);
- Archaeology (**ES Volume 1, Chapter 14**);
- Built Heritage (**ES Volume 1, Chapter 15**);
- Townscape and Visual (**ES Volume 1, Chapter 16**);
- Wind Microclimate (**ES Volume 1, Chapter 17**);
- Daylight, Sunlight, Overshadowing and Light Pollution (**ES Volume 1, Chapter 18**); and
- Cumulative Effects (**ES Volume 1, Chapter 19**).

Insignificant Issues

2.15 As part of the EIA scoping process, it was agreed that the following issues would not be likely to experience, or materially affect the significance of environmental effects as a result of the Development. Accordingly, such issues have been considered as 'insignificant issues' which have not been considered within the full EIA process and have been scoped out of this ES (further detail can be found within **Appendix 2.1**):

- **Waste:** It is inevitable that waste would be generated during the Works required to facilitate and implement the Development. This would be the case for any redevelopment project and the critical aspect is how waste is managed. For this reason, a Site Waste Management Plan (SWMP) and a Construction Environmental Management Plan (CEMP) would be prepared prior to commencement of the Works commencing to ensure good Site management practice would lead to a minimisation of waste creation and the reuse or recycling of waste materials where practicable. Summary information regarding the generation and management of waste arising from the Works is provided in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**. The implications of the transportation of waste materials associated with the Works are considered within **Chapter 8: Transport and Access**. The likely indirect effects of these vehicular trips on noise levels and ambient air quality are considered in **Chapter 9: Noise and Vibration** and **Chapter 10: Air Quality**. Once

operational, a quantity of domestic and commercial waste would result from the Development. However, again, the critical aspect is how the waste is managed. The Development will be designed to optimise good operational waste management practices, such as the segregation of waste to minimise effects from waste disposal. A Framework Construction Management Statement and Waste Management Plan, submitted as standalone documents with the Planning Applications, cover waste management during the Works. An Operational Waste Management Plan will also be submitted with the Planning Applications once the Development is completed and operational. In addition, all waste management proposals of the Development are described within **Chapter 5: The Proposed Development**. Whilst various Chapters of this ES consider the implications of waste generation and demonstrate the appropriate management of waste during all stages of the Development, a separate ES chapter is not considered necessary to deal with such matters.

- **Solar Glare:** A number of buildings present on the Site would be retained, altered and refurbished, which are of non-reflective brick construction. The common material of the new buildings would also be brick. This is to complement the architectural style of the retained buildings, although other materials such as stone and metal cladding would be incorporated into the design of the new buildings. Despite this, the proportion of reflective materials to be used within the Development is considered low and would not materially affect the significance of solar glare issues. As such, the topic of solar glare has been scoped out of the ES.
- **Vibration (associated with the completed and operational Development):** Following a Site walkover survey and desk-based appraisal of the immediate vicinity of the Site it was confirmed there are no significant vibration generating sources (e.g. London Underground Limited, or Mainline Rail Lines) within approximately 195m of the Site. Furthermore, no significant sources of vibration would be introduced as part of the Development.
- **Archaeology (associated with the completed and operational Development):** Any likely effects to archaeology would result from intrusive ground works only. These would be limited to the Works only. Accordingly, there would be no archaeological effects associated with the completed and operational Development.
- **Odour:** Any ventilation extracts associated with the café and restaurant uses within the Development would be designed in accordance with best practice design and appropriate regulations. This would be secured by a suitably worded planning condition. As such, it is not anticipated that odours generated by café and restaurant uses within the Development would materially affect the significance of environmental effects.
- **Telecommunications:** Analogue television broadcast has now been phased out and replaced by digital television, which is largely unaffected by atmospheric conditions that rendered analogue television unwatchable, and does not suffer reflection effects and ghosted image generation. Given the switch to digital television broadcast, the Development would be unlikely to materially affect the significance of effects on digital television.
- **Type 2 cumulative effects (the combined effects arising from the Development together with other reasonably foreseeable schemes):** Waterman IE together with Gerald Eve, undertook a thorough search of valid planning permissions within 1 km of the Site (refer to **Appendix 2.3**). As requested by LBRuT within their draft EIA Scoping Opinion (**Appendix 2.2**), major schemes within LBRuT and the LB of Hounslow (LBH), and below the cumulative criteria threshold set out in the EIA Scoping Report (**Appendix 2.1**) (any new residential development; schemes over 1000 m^2; and decisions issued since January 2014), were

reviewed. It was concluded that from this exercise, there are no other schemes within 1 km of the Site that would materially affect the significance of environmental effects owing to their small scale and location within established residential areas.

Nature of the Planning Applications and EIA Approach

2.16 As described earlier in this Chapter and summarised within **Chapter 1: Introduction**, the Development comprises three separate planning applications, as set out below.

Application A: The Hybrid Planning Application

2.17 The hybrid planning application seeks demolition of the majority of buildings and structures within the entire Stag Brewery component of the Site (with the exception of the Maltings and the façades of the former Hotel and Bottling building) and the redevelopment of the majority of the former Stag Brewery component of the Site as follows.

The Outline Component of the Hybrid Planning Application

2.18 For the outline component of the hybrid planning application, within the west part of the Stag Brewery component of the Site, all matters are reserved for future determination (access, appearance, landscaping, layout and scale). This means that the principles (but not the details) of the outline component of the hybrid planning application are sought for approval by way of:

- maximum and minimum spatial parameters (height, width and length) for each proposed building;
- design principles;
- maximum floor areas, cycle parking spaces and car parking spaces;
- maximum accommodation schedules;
- key access points; and
- a number of spatial and non-spatial descriptive parameters.

2.19 Such information is provided by way of:

- Parameter Plans;
- a maximum floorspace schedule;
- a maximum accommodation schedule; and
- a Design Code.

2.20 All relevant information pertaining to the above is provided in **Chapter 5: The Proposed Development**.

The Detailed Component of the Hybrid Planning Application

2.21 For the detailed component of the hybrid planning application, within the east part of the Stag Brewery Component of the Site, full details of building massing, siting, layout, articulation and architectural details are sought for approval, together with detailed floor area schedules, accommodation schedules, cycle parking numbers, car parking numbers and a landscape masterplan. Such information is provided by way of:

- detailed planning application drawings;
- a schedule of proposed land uses;
- a schedule of residential accommodation; and
- landscape proposals.

2.22 All relevant information pertaining to the above is provided in **Chapter 5: The Proposed Development**.

Application B: The School Planning Application

2.23 As per the detailed component of the hybrid application, the detailed planning application for the six-form entry secondary school seeks approval for the details of building massing, siting, layout, articulation and architectural details, together with detailed floor area schedules, cycle parking numbers, car parking numbers and a landscape masterplan. Such information is provided by way of:

- detailed planning application drawings; and
- a landscape masterplan.

2.24 In addition, as it is likely the six-form entry secondary school would be constructed and implemented as an early phase of Development (after demolition of the majority of buildings and structures on the entire Stag Brewery Component of the Site as sought for approval via Application A), the detailed planning application also seeks approval for temporary access routes and other interim works that would be implemented and exist until such time that future reserved matters applications associated with an approved Application A are approved and implemented.

2.25 All relevant information pertaining to the above is provided in **Chapter 5: The Proposed Development**.

Application C: Chalkers Corner Planning Application

2.26 The detailed planning application for Chalkers Corner seeks detailed approval for highway and landscaping works to the Chalkers Corner highway junction, which forms the most western part of the Site. Such information is provided by way of detailed planning application drawings showing the proposed highway and landscaping works at this location. All relevant information regarding these proposals is provided in **Chapter 5: The Proposed Development**.

EIA Approach

2.27 As noted above and within **Chapter 1: Introduction**, the Planning Applications would not be implemented separately from one another or in any combination that would not bring forward the Planning Applications together as one comprehensive redevelopment proposal. As such, for the purposes of the EIA and this ES, the proposals defined by Planning Applications are collectively referred to as the 'Development'. The assessments which have been undertaken to inform this ES therefore identify the likely significant environmental effects of the Development based upon:

- Parameter Plans (for the outline component of the hybrid planning application (Application A));
- a maximum floorspace schedule (for the outline component of the hybrid planning application (Application A));

- a maximum accommodation schedule (for the outline component of the hybrid planning application (Application A));
- a Design Code (for the outline component of the hybrid planning application (Application A));
- detailed planning application drawings (for the detailed component of the hybrid planning application (Application A), the school planning application (Application B) and the Chalkers Corner application (Application C));
- a schedule of proposed land uses (for the detailed component of the hybrid planning application (Application A) and the school planning application (Application B);
- a schedule of residential accommodation (for the detailed component of the hybrid planning application (Application A);
- landscape proposals (for the detailed component of the hybrid planning application (Application A) and the school planning application (Application B)); and
- information pertaining to Works as outlined within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**.

2.28 With regard to the level of flexibility sought for approval within the outline component of the hybrid planning application (Application A), each technical assessment scoped into this ES has assessed the 'worst-case scenario' that could result from this element of the Development. Where relevant, details are provided within each technical Chapter of this ES (**Chapters 7** to **18**).

2.29 With regards to the flexible use living accommodation for either assisted living or residential use within Buildings 13, 16 and 17 (see **Chapter 5: The Proposed Development** for more detail), multiple scenarios have been assessed for the socio-economic assessment (**Chapter 7: Socio-Economics**). In addition the level of affordable housing provision has not yet been determined, however for the purposes of the EIA, it is assumed that up to 35% of residential units could be affordable. In order to provide a robust worst-case scenario, both 35% and 0% affordable housing has also been assessed for the socio-economic assessment. This has resulted in four different scenarios for the socio-economic assessment as follows:

- Scenario 1a: The Development with assisted living and 35% affordable housing.
- Scenario 1b: The Development with assisted living and 0% affordable housing.
- Scenario 2a: The Development with no assisted living and 35% affordable housing.
- Scenario 2b: The Development with no assisted living and 0% affordable housing.

2.30 Similarly, and as described within **Chapter 5: The Proposed Development**, the detailed component of the hybrid planning application seeks approval for a quantum of 'flexible' non-residential land uses. Again, each technical assessment scoped into this ES has assessed the 'worst-case scenario' that could result from the various permutations of 'flexible' land uses that could result. Once again, where relevant, details are provided within each technical Chapter of this ES (**Chapters 7** to **18**).

Means of Assessment

2.31 Taking account of the relevant baseline conditions described in each technical chapter of this ES, the Development, as summarised in **Chapter 5: The Proposed Development**, and the likely timescale and phasing of demolition, alteration, refurbishment and construction (refer to **Chapter**

6: Development Programme, Demolition, Alternation, Refurbishment and Construction), the likely significant environmental effects were predicted using models and reference to relevant standards and legislation, where available. Where it was not possible to precisely quantify effects, qualitative assessments were carried out, based on available knowledge and professional judgement. Any uncertainty as to the validity of an assessment is noted in the relevant technical Chapter. An evaluation of the likely duration, magnitude and significance of the predicted likely effects on potential sensitive receptors is also set out.

2.32 Detailed methodologies for the assessment of each of the environmental topic areas scoped into this ES are provided within each technical Chapter of this ES (**Chapters 7** to **18**). However, in general terms, the content and extent of the ES is based upon the following:

- review of the current baseline situation, using various sources of existing information, data and reports;
- desktop studies;
- Site surveys;
- consideration of relevant legislation and planning policies (national, regional and local);
- identification of likely environmental effects and an evaluation of their likely duration, magnitude and significance;
- consideration of potentially sensitive receptors;
- expert opinion;
- use of technical guidance and best practice; and
- specific consultations with appropriate organisations.

Evaluation of Significance and Significance Criteria

2.33 The EIA process aims to provide LBRuT with sufficient information with respect to the 'likely significant environmental effects' of the Development in order to aid the planning decision making process.

2.34 Likely significant environmental effects associated with the Development have been assessed with reference to definitive standards and legislation, where available. Where it was not possible to quantify the likely significant effects, qualitative assessments were carried out, based on available knowledge and professional judgement. Where professional judgement was used, or where uncertainty exists, this is noted in the relevant Chapter.

2.35 Environmental effects associated with the Development have been assessed with reference to definitive standards and legislation, where available. Where it was not possible to quantify the likely significant effects, qualitative assessments were carried out, based on available knowledge and professional judgement. Where professional judgement was used, or where uncertainty exists, this is noted in the relevant Chapter.

2.36 The significance of the predicted likely significant effects has been determined with reference to assessment criteria for each environmental topic considered. These criteria apply a common EIA approach of classifying effects according to whether they are major, moderate, minor or insignificant and whether the effects are considered to be adverse or beneficial.

2.37 Specific criteria for each environmental topic was developed, giving due regard to the following factors:

- extent and magnitude of the effect;
- duration of the effect (whether short, medium or long-term);
- nature of the effect (whether direct or indirect, reversible or irreversible);
- likelihood of the effect to occur;
- whether the effect occurs in isolation, is cumulative or interactive;
- performance against environmental quality standards or other relevant pollution control thresholds;
- sensitivity of the receptor; and
- compatibility with environmental policies.

2.38 In order to provide a consistent approach to expressing the outcomes of the various assessments undertaken as part of the EIA, the following terminology has been used throughout the ES. Effects have been expressed as either:

- **beneficial effect** of **major significance**;
- **beneficial effect** of **moderate significance**;
- **beneficial effect** of **minor significance**;
- **insignificant effect:** No significant effect (either adverse or beneficial) to an environmental resource or receptor;
- **adverse effect of minor significance**;
- **adverse effect of moderate significance**; and
- **adverse effect of major significance**.

2.39 In the ES the following terminology is used to define the temporal and spatial scale of the effects:

- **'short'** to **'medium-term'** effects are considered to be those associated with the Works;
- **'long-term'** effects are those associated with the completed and operational Development;
- **'local'** effects are those affecting neighbouring receptors;
- **'district'** effects are those which are likely to occur to receptors within the wider Borough of the London Borough of Richmond upon Thames (LBRuT);
- **'sub-regional'** effects are those affecting Boroughs adjacent to LBRuT;
- **'regional'** effects are those affecting receptors across Greater London; and
- **'national'** effects are those that affecting receptors within the UK.

2.40 Each of the technical Chapters outlines the criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this is based upon quantitative and accepted criteria together with the use of value judgements and expert interpretations, where necessary, to establish to what extent an effect is environmentally significant.

Reporting Structure of Volume 1 Technical Chapters

2.41 Each key environmental topic considered in the EIA has been assigned a separate chapter within the **ES Volume 1** (**Chapter 7** to **Chapter 18** inclusive). Within each of the ES Volume 1 technical chapters the assessments are presented and reported in the following format:

Introduction

2.42 This provides a brief introduction to the assessment and the issues considered in the chapter. It confirms the author and highlights relevant appendices which accompany the chapter

Assessment Methodology and Significance Criteria

2.43 This section of each assessment sets out the methods used in undertaking the technical study, together with an explanation of the approach to defining the significance of likely environmental effects with reference to published standard guidelines, best practise and defined significance criteria. The limitations and assumptions of the assessment are also defined, together with any specific consultation undertaken to agree upon the scope or methodology in the assessment.

Baseline Conditions

2.44 In order to assess the likely significant effects of the Development, it is necessary to establish the environmental conditions that currently exist on and surrounding the Site, in the absence of the Development. These are known as baseline conditions. The baseline conditions relevant to each environmental issue are set out in this section. As outlined earlier in this chapter, for the purposes of the EIA, the baseline conditions have been taken as the existing conditions when surveys were undertaken or when latest relevant baseline data were available, as described in each assessment.

Likely Significant Effects

2.45 This section of each chapter presents the assessment of the likely significant effects of the Development during demolition, refurbishment and construction, and once the Development is completed and operational. The assessments were carried out in relation to the relevant baseline conditions. An evaluation of the significance of the likely effect is given in accordance with relevant criteria as defined earlier in the assessment.

Mitigation Measures and Likely Residual Effects

2.46 One of the principal aims of the EIA is to identify, and so assist in developing, mitigation measures to prevent, reduce and where possible, offset significant adverse effects of a development. An iterative approach was adopted towards the design of the Development, which evolved in parallel with the EIA process. This enabled many mitigation measures to be effectively designed into the Development, thereby reducing the need for further mitigation.

Cumulative Effects

2.47 In line with the EIA Regulations, an EIA must consider the cumulative effects or interaction of effects of a development. Cumulative effects are those which result from incremental changes

caused by other reasonably foreseeable projects in the local area, in combination with the Development.

2.48 As set out earlier in this Chapter, a review of schemes within the 1km of the Site was undertaken to determine whether there were any other developments within the area that could have the potential to materially affect the significance of cumulative effects in combination with the Development on potential receptors. No cumulative schemes were identified and therefore the cumulative assessment will only assess in-combination cumulative effects. In-combination cumulative effects are the combined effects of individual effects resultant from the Development up a set of defined receptors, for example noise, dust and visual intrusion. In-combination cumulative effects will be qualitatively assessed in line with the construction programme and taking account of all assessments scoped into the ES (refer to **Chapter 19: Cumulative Effects**).

Assumptions and Limitations

2.49 The principal assumptions that have been made, and any limitations that have been identified in undertaking the EIA, are set out as follows:

- information received from third parties is accurate, complete and up to date;
- all assessments are based upon the Parameter Plans, detailed planning application drawings, floorspace schedules, accommodation schedules, Design Code, and landscape proposals submitted for approval;
- the assessment of likely significant effects associated with the Works is based upon the indicative demolition and construction timetable and methodologies as provided by the project team and agreed by the Applicant (refer to **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**);
- the relevant baseline conditions have been established from a variety of sources, including surveys, historical data and best available information at the time of undertaking the EIA;
- the design, construction and completed Development would satisfy environmental standards consistent with contemporary legislation, practice and knowledge as a minimum, but would also strive to achieve best practice at the time of the works;
- a Site-specific Construction Environmental Management Plan (CEMP) to control construction activities would be agreed with LBRuT after the planning application is determined. This CEMP would be enforced and monitored during all key stages of construction.

2.50 Where relevant, assumptions specifically relevant to each topic area included within the ES are noted in **Chapters 7 to 18** inclusive of this ES.

References

1 HMSO (2017); Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

2 HMSO, 2011, Statutory Instrument 2011 No. 1824 - Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended).

3 European Commission (2011); Council Directive no. 2011/92/EU.

3. Existing Land Uses and Activities

Introduction

3.1 This Chapter provides a summary of the existing land uses and activities on and immediately surrounding the Site. This includes a summary of designations and key environmental characteristics existing at and near to the Site, thereby identifying potential sensitive receptors that could be affected by the Development.

3.2 A full description of the baseline conditions and sensitive receptors relevant to each assessment undertaken as part of the Environmental Impact Assessment (EIA) is provided within each technical Chapter (**Chapters 7** to **18)** of this Environmental Statement (ES).

Site Location and Setting

3.3 The Site comprises two components as follows:

- the Stag Brewery – an approximately 9.25 hectare (ha) parcel of land predominantly occupied by the former Stag Brewery; and
- Chalkers Corner – an approximately 1.4 ha of highway and associated landscaping referred to as Chalkers Corner junction which includes the junction with the A316 (Clifford Avenue, A3003 (Lower Richmond Road) and A205 (South Circular).

3.4 The Site is approximately centred on National Grid Reference (NGR) 520380, 176003 and is located in Mortlake within the administrative boundary of the London Borough of Richmond upon Thames (LBRuT). The location of the Site is shown in **Figure 1.1**. The Site boundary is shown on **Figure 1.2**.

3.5 The Site is bounded by a mix of uses and areas, with the River Thames bounding the north east of the Stag Brewery component of the Site and Fulham (North Sheen) Cemetery bounding the north of the Chalkers Corner component of the Site. The Site boundary is shown in **Figure 1.3**.

A Summary of Existing Land Uses and Activities

Existing Land Uses at the Site

3.6 The majority of the Site comprises the former Stag Brewery estate. This includes 16 industrial buildings surrounded largely by hard-standing, which was used for vehicle movements and parking, and a 3 m Above Ground Level (AGL) brick wall perimeter. The Stag Brewery ceased operations in late 2015 and decommissioning of brewery infrastructure was undertaken following cessation of brewery activities. Most recently, works on-Site have been undertaken in respect of removal of brewery fixtures and fittings. An area of approximately 2.07 ha within the Stag Brewery component of the Site is occupied by the private playing fields. The layout of the existing buildings within the Site is shown in **Figure 3.1**. **Table 3.1** presents details regarding the heights and Gross Internal Area (GEA) of existing floorspace within the Site.

Table 3.1: Existing Buildings Heights and Floor Areas

Building ID (refer to Figure 3.1)	Building Name	Number of Storeys	Gross Internal Area (GIA m^2)
1	P.O.B (office)	5	2,221
2	Brewhouse	6	4,645
3	Process Building	8	3,705
4	Chip Cellar	6	2,923
5	Finishing Cellar	4	2,153
6	Power House	4	2,627
7	Powder Store	1	168
8	Effluent Treatment	2	330
9	Maltings	9	1083
10	(Former) Hotel	4	3,085
11	(Former) Bottling Building	3	70
12	Packaging	2	9,440
13	Stable Court	4	2,110
14	Sports Club	2	549
15	East Gatehouse	1	24
16	West Gatehouse	1	72
17	CO2 Block	2	196
Total		**-**	**35,402**

3.7 The majority of the buildings within the Site are twentieth century industrial structures. However, the Maltings, the (former) Hotel and the (former) Bottling Building date from the late 19th and early 20th centuries. Furthermore, the perimeter wall dates from the 1860s, however, some areas have been repaired, demolished and replaced in the intervening years. A disused wharf is situated within the north east of the Stag Brewery component of the Site with limited access via Bulls Alley.

3.8 As noted earlier in this Chapter, the Chalkers Corner component of the Site centres on Chalkers Corner Junction and comprises highway along Lower Richmond Road, South Circular and Clifford Avenue. The Chalkers Corner component of the Site also includes landscaping on the north side of Lower Richmond Road adjacent to Chertsey Court.

3.9 A selection of photographs showing the existing Site are provided in **Figure 3.3**.

Existing Land Uses Surrounding the Site

3.10 As indicated by **Figure 3.2**, the land uses surrounding the Site are varied and include:

- residential properties located immediately north and west of the Site at Thames View and Williams Lane and those to the south and east of the Site at Lower Richmond Road and Mortlake High Street (a further list of surrounding residential receptors is provided in **Table 3.2**);
- retail and town centre uses located to the east of the Site along Mortlake High Street, and to the south west of the Site along Lower Richmond Road. A number of public houses are in proximity to the Site, including the Ship Inn at Thames Bank adjacent to the Stag Brewery component of the Site's northern boundary, the Jolly Gardeners adjacent to the Stag Brewery component of the Site's southern boundary, and The Tapestry to the south of the Site across Lower Richmond Road. Existing retail uses are also located in East Sheen District Centre, located approximately 160 m south of the Site, and White Hart Lane, a parade of local importance located approximately 600 m east of the Stag Site;
- office premises are located adjacent to the Site's southern boundary and to the east of the Site along Mortlake High Street. A scrap metal merchant is located to the south of the Site, to the south of Lower Richmond Road;
- The Richmond Training and Development Centre at the Old Bakery is located south west of the Site to the south of Lower Richmond Road. The centre provides community facilities including those for the Mortlake Community Association and pre-school child day care. Little Paradise Nursery is located to the south of Lower Richmond Road directly opposite the Site's southern boundary;
- Fulham (North Sheen) Cemetery, located north west of the Site.
- the nearest school to the Site is that of Thomson House School located adjacent to the southern boundary of the Site on Sheen Lane;
- open and amenity space, including the River Thames towpath located immediately adjacent to the Site's northern boundary, and Mortlake Green located beyond Lower Richmond Road / Mortlake High Street to the south of the Site; and
- railway infrastructure including Mortlake Train Station located to the south of the Site beyond Mortlake Green.

3.11 A selection of photographs of uses surrounding the Site are presented in **Figure 3.4**.

A Summary of Key Environmental Characteristics

Socio-Economics

3.12 The Stag Brewery ceased operations in late 2015 and decommissioning of brewery infrastructure was undertaken following cessation of brewery activities. Most recently, works on-Site have been undertaken in respect of removal of brewery fixtures and fittings. Prior to the reduction of brewery activities at the Site in 2015, the Site supported approximately 200 employees. Staff numbers reduced to approximately 100 at the beginning of 2015. Security personal currently work at the Site.

3.13 Watney's Sports Ground playing fields is located within the Stag Brewery component of the Site. The existing playing fields were originally owned and used by workers of the Stag Brewery. The pitches continue to be in private use with no authorised access by the general public. Since the

Applicant's purchase of the Stag Brewery in 2015, the Applicant has permitted access to the playing fields for a local football club and local schools.

3.14 Further details regarding socio-economic matters are provided in **Chapter 7: Socio-Economics**.

Transport and Access

3.15 The Transport for London (TfL) online Public Transport Accessibility Level (PTAL) calculation tool[1] has been used to calculate the PTAL of the Site. The Site at present has a PTAL rating of predominantly 2 with a PTAL rating of 1 at the western corner of the Stag Brewery component of the Site, which represents a 'poor' and 'very poor' level of accessibility to public transport services, respectively. However, PTAL does tend to underestimate the accessibility of the Site by public transport since the nearby Mortlake Rail station provides access to the wider strategic public transport network serving London and the South East Region.

3.16 Mortlake Station is located to the south of Mortlake Green and west of Sheen Lane, to the south of the Site (refer to **Figure 3.1**), connects and provides access to South Western Railways services between Waterloo and Twickenham, continuing either via Hounslow and Chiswick on the Hounslow Loop or Kingston and Wimbledon on the Kingston Loop, back to Waterloo.

3.17 The closest bus stops to the Site are situated on Lower Richmond Road and Mortlake High Street. With destinations routes 419, 969, N22 and 209 serving:

- 419 - Richmond, Hammersmith, West Brompton, Kew and Hampton;
- 969 - Whitton, Barnes and Roehampton;
- N22 - Fullwell, Richmond, Putney and Piccadilly Circus; and
- 209 - Barnes and Hammersmith.

3.18 Pedestrian footways are provided on both sides of all roads in the area surrounding the Site. Footways are absent from Ship Lane, Thames Bank and Williams Lane. A signalised pedestrian crossing is situated on Lower Richmond Road, adjacent to Ship Lane. Two pedestrian crossings are provided over Lower Richmond Road to the south of the Stag Brewery Component of the Site. A number of pedestrian crossings surround Chalkers Corner junction.

3.19 The Thames Path (also referred to as the towpath) is located within the northern boundary of the Site alongside the River Thames. This section of the Thames Path is unlit and the footway is a mixture of unpaved and cobbled surfaces used by walkers and cyclists. A small boat landing stage fronts on to the River Thames at the top of Ship Lane adjacent to the northern boundary of the Stag Brewery component of the Site.

3.20 Within the immediate vicinity of the Site, the cycle facilities include an advisory cycle route along Mortlake High Street from the east of the Site towards Barnes Bridge; and a signed on street route connecting the cycle facilities on Chiswick Bridge with the Lower Richmond Road.

3.21 Further details are provided in **Chapter 8: Transport and Access**.

Noise and Air Quality

3.22 The noise climate at the Site is dominated by vehicular movements on the Lower Richmond Road, Mortlake High Street and Clifford Avenue (the A316), which are busy thoroughfares

experiencing high vehicular flows. Although intermittent in comparison, noise from low flying aircraft movements in to Heathrow Airport (located approximately 12 km to the west of the Site) are significant, with approximately one plane every minute going over the Site. Contributory noise from domestic and commercial services in the area also influence the local noise climate.

3.23 LBRuT have declared the entire Borough as an Air Quality Management Area (AQMA) owing to the Borough-wide levels of nitrogen dioxide (NO_2) and fine particulate matter (PM_{10}) which do not meet the Air Quality Strategy Objectives[2]. Consequently, LBRuT have prepared an Air Quality Action Plan[3], setting out the policies and measures to be implemented to improve air quality in the LBRuT. It is considered that concentrations in the area surrounding the Site are highly influenced by vehicle emissions.

3.24 Further details are provided in **Chapter 9: Noise and Vibration** and **Chapter 10: Air Quality**.

Ground Conditions

3.25 A review of geological maps, borehole records and the findings of previous Site Investigations found that the Site is underlain by Made Ground, with superficial deposits comprising Alluvium and River Terrace Gravels beneath. London Clay Formation underlies these strata, followed by the Lambeth Group, Thanet Sands Formation and the Chalk Group at depth.

3.26 Information from the Environment Agency (EA) indicates the Alluvium and River Terrace Gravels are a Secondary A aquifer. This groundwater is likely to also be in hydraulic continuity with the adjacent River Thames. The London Clay Formation is an unproductive stratum, and the Lambeth Group and Thanet Sands Formation below are Secondary A aquifers. The Chalk Group at depth is a Principal aquifer.

3.27 A review of historical Ordnance Survey (OS) maps at the Site found that in the past, the area surrounding the Site has primarily been residential, however some industrial uses including a coal wharf, smithy, works and garages, incinerator, electrical substations have also been noted.

3.28 Further details are provided in **Chapter 11: Ground Conditions and Contamination** and **Appendix 11.1**.

Surface Water Drainage and Flood Risk

3.29 According to the EA's Flood Map for Planning[4] the majority of the Site is located within defended Flood Zones 2 and 3 (with a small section of the Chalkers Corner component of the Site located within Flood Zone 1, denoting a low risk of tidal flooding). This indicates that despite being located within an area at a high probability of tidal flooding, the majority of the Site would be protected up to the 1 in 1000 year standard by the River Thames defences. The Thames Estuary 2100 Plan (TE2100)[5], would ensure that the defences are not overtopped for the lifetime of any redevelopment on the Site.

3.30 Despite the Site being defended from tidal flooding, the EA require assessment of the residual risk of flooding to the Site should the defences fail (breach). The EA have provided their breach modelling maps and levels which show that some parts of the Site could be affected if the defences were to fail. EA modelling indicates that in this scenario the Site could be subject to a future peak flood level of 6.03m AOD by the year 2100.

3.31 Review of LBRuT's Surface Water map[6] indicates that the majority of the Site is at a 'very low' risk of surface water flooding. However, there are some areas, generally in the south west corner of the Stag Brewery component of the Site, that are shown to be at a 'low' risk of surface water flooding.

3.32 Further details are provided in **Chapter 12: Surface Water Drainage and Flood Risk** and **Appendix 12.1**.

Ecology

3.33 The Site does not comprise any statutory or non-statutory sites designated for their nature conservation value. However, the non-statutory River Thames and Tidal Tributaries Site of Metropolitan Importance (SMI) for Nature Conservation is located directly adjacent to the northern boundary of the Stag Brewery component of the Site. Fulham (North Sheen) Cemetery, to the north west of the Site, is locally designated as an 'Other Site of Nature Importance'.

3.34 The Site comprises habitat to be of value within the boundary of the Site only (buildings, ornamental planting, hedge, tall ruderal and trees) and of negligible value (amenity grassland, bare ground, ephemeral vegetation, hardstanding and walls). Bat surveys undertaken on the Site in 2017 assessed that no roosting bats are present and the Site is used on a sporadic basis by urban bat species typically associated to be non-light sensitive. The results of the bat activity and automated survey has demonstrated that bat activity is low at and adjacent to the northern Site boundary adjacent to the River Thames and it is more readily used for commuting. Overall the Site is of limited orthinological value and no black redstarts (a nationally protected bird species under Schedule 1 of the Wildlife and Countryside Act[7]) were recorded on or adjacent to the Site.

3.35 Further details are provided in **Chapter 13: Ecology, Appendix 13.1** and **Appendix 13.2**.

Archaeology (Buried Heritage)

3.36 The Site and surrounding area is located in an Archaeological Priority Area, as defined by LBRuT. The Stag Brewery Supplementary Planning Document (SPD)[8] indicates that the Stag Brewery component of the Site is likely to be of archaeological significance on account of location of the Bishops Palace, Cromwell House and various earlier brewery buildings. Further details are provided in **Chapter 14: Archaeology** and **Appendix 14.1**.

Above Ground Built Heritage

3.37 There are no listed buildings or structures within the Site, however there are a cluster of seven listed structures in proximity to the north of the Stag Brewery component of the Site and there are 21 listed buildings in total within 500 m of the Site.

3.38 Three of the buildings within the Site are locally designated, but not statutorily designated, as Buildings of Townscape Merit (BTMs):

- the Maltings;
- the (former) Bottling Building; and
- the (former) Hotel.

3.39 Other elements of historic interest within the Stag Brewery component of the Site include the boundary walls to the north and south, the boundary wall between Reid Court in Williams Lane, the memorial plaques along Lower Richmond Road to the south, and railway tracks and river moorings / granite paving along the towpath to the north. The other buildings and structures within the Site are of no heritage significance.

3.40 The Mortlake Conservation Area encompasses the Maltings, the (former) Hotel and the (former) Bottling buildings located within the Stag Brewery component of the Site, while the Mortlake Green Conservation Area slightly overlaps the southern part of the Stag Brewery component of the Site along Lower Richmond Road.

3.41 Further details are provided in **Chapter 15: Built Heritage** and **Appendix 15.1.**

Townscape and Visual

3.42 As indicated previously part of the Stag Brewery component of the Site is located within the Mortlake Conservation Area which encompasses the Maltings, the (former) Hotel and the (former) Bottling buildings. In addition, the Mortlake Green Conservation Area bounds the Stag Brewery component of the Site to the south. The Watney's Sports Ground playing fields within the Stag Brewery component of the Site and part of the Chalkers Corner component of the Site are locally designated as Other Open Land of Townscape Importance (OOLTI), as per Policy LP14 of LBRuT's draft Local Plan[9]. The OOLTI designation is to safeguard open land which contributes to local character and open land which is valued by residents in the context of a built-up area.

3.43 The context and quality of the Site and the local townscape comprises a broad combination of buildings and uses, reflecting the range of eras of the area's development. The Site comprises BTMs, and is set amongst a number of Listed Buildings and other BTMs. As such, the existing large modern structures of the Stag Brewery estate within the Site appear incongruous within the wider vernacular aesthetic and close urban grain.

3.44 In terms of views, the Site is not affected by any statutorily protected viewing corridors outlined in the London View Management Framework[10]. Nevertheless, there are locally important vistas, and the Maltings is identified as a landmark within the Mortlake Village Planning Guidance SPD[11].

3.45 Further details are provided in **Chapter 16: Townscape and Visual Effects**.

Potentially Sensitive Receptors

3.46 A review and appraisal has been undertaken to identify properties, buildings, people and any other features which are considered as being potentially sensitive to the Site preparation, alteration, refurbishment, and construction works (the 'Works') and the operation of the completed Development. These are outlined in **Table 3.2**.

Table 3.2: Potentially Sensitive Receptors

Topic / Type of Receptor	Sensitive Receptor/ Land Uses
Residential	Existing residential properties surrounding the Site, including those located along:

Topic / Type of Receptor	Sensitive Receptor/ Land Uses
	• South Circular Road, Kingsway and Shalstone Road, south of the Chalkers Corner component of the Site; • Clifford Avenue, north east of Chalkers Corner component of the Site; • Chertsey Court, between Chalkers Corner and the Stag Brewery components of the Site; • Thames Bank and Varsity Row to the north west of the Stag Brewery component of the Site; • Williams Lane and Wadham Mews to the west of the Stag Brewery component of the Site; • South of Lower Richmond Road to the south of the Site, including Hanson Close, Langdon Place, Rosemary Lane and Rosemary Gardens, Waldeck Road, Cromwell Place; and • Along Mortlake High Street and Vineyard Path to the south east of the of the Site. Future residents of the Development.
Visitors/ Commercial Occupants	Existing commercial properties surrounding the Site including the Jolly Gardeners public house, the Ship public house, and those on the Lower Richmond Road and Mortlake High Street. Existing commercial properties within East Sheen District Centre, located over 400 m south of the Site, and White Hart Lane, a parade of local importance located approximately 600 m east of the Site. Demolition, alteration, refurbishment and construction workers associated with the Development. Visitors and occupants of the Development once completed.
Community / Amenity and Educational	Existing schools, nurseries and health facilities surrounding the Site including: • Thomson House School; • St. Mary Magdalen's Catholic Primary; • Working Mums and Pre-School (one located near Lower Richmond Road, another located by South Circular Road); • The New Stepping Stones Playgroup; • Parkway Nursery School; • Top of the Class Nursery; • The Richmond Dutch School; • The Little School Mortlake; • Mortlake Hall; • Tower House School (approx. 1 km from the Site); • Tower House Preparatory School (approx. 1 km from the Site); • Sheen Lane Health Centre; and • Barnes Hospital (approx. 1 km from the Site).

Topic / Type of Receptor	Sensitive Receptor/ Land Uses
	Future employees and students of the proposed school. Existing users of the Watney Sports Ground playing fields, Mortlake Green, the River Thames tow path, and North Sheen Recreation Ground (approximately 1 km from the Site). Users of the River Thames.
Conservation Areas	Mortlake Green Conservation Area, directly south of the Stag Brewery component of the Site. Mortlake Conservation Area, directly north and within the south eastern part of the Stag Brewery component of the Site. Sheen Lane Conservation Area, located over 500 m south of the Site.
Ground Conditions and Water Resources	Groundwater present within the Chalk Group Aquifer at depth. The River Thames.

Topic / Type of Receptor	Sensitive Receptor/ Land Uses
Townscape, Visual and Heritage	Buildings of Townscape Merit (BTM) within the Site (to be retained), including: • the Maltings; • former Hotel; and • former Bottling building. Surrounding Buildings of Townscape Merit, including: • The Ship Public House, Thames Bank, immediately adjacent to the north boundary of the Stag Brewery Component of the Site; • The Old Stables, Thames Bank, approximately 10 m north west of the Stag Brewery Component of the Site; • 6 and 7 Thames Bank, approximately 30 m north west of the Stag Brewery Component of the Site; • 1-14 Parliament Mews, adjacent to the north west boundary of the Stag Brewery Component of the Site; and • The Jolly Gardeners Public House, Lower Richmond Road, located immediately south of the Stag Brewery Component of the Site. Locally designated OOLTIs (including part of Chalkers Corner within the Chalkers Corner component of the Site, Watney's Sports Ground playing fields within the Stag Brewery component of the Site and Mortlake Green, adjacent to the southern boundary of the Stag Brewery component of the Site). Listed buildings in proximity to the Site including: • Gateway, formally to Cromwell House (Grade II) approximately 15m to the west of the Site; • Thames Cottage (Grade II) approximately 30 m north of the Site; • Leyden House (Grade II) approximately 40 m north of the Site; • Thames Bank House (Grade II) approximately 40 m north of the Site; • Tudor Lodge (Grade II) approximately 40 m north of the Site; • Riverside House (Grade II) approximately 50 m to the north of the Site, together with associated garden wall to east of numbers 1 to 8 Riverside House and extending behind numbers 1 to 24 Reid Court to the north of the Site; • Chiswick Bridge and attached balustrades (Grade II), approximately 100m northwest of the Site; • 44 and 46 Victoria Road (Grade II) approximately 80 m south east of the Site; • Parish Church of St Mary (Grade II*) approximately 190 m east of the Site; • Mausoleum of Sir Richard and Lady Burton (Grade II*) approximately 270 m south east of the Site;

Topic / Type of Receptor	Sensitive Receptor/ Land Uses
	• Acacia House (Grade II) approximately 220 m east of the Site; • 117 The High Street (Grade II) approximately 230 m east of the Site; • Suthrey House and Railings (Grade II) approximately 260 m east of the Site; and • Limes House (Grade II*) approximately 470 m east of the Site. Other historic elements (non-designated heritage assets) of the Site including: • the boundary wall between Reid Court in Williams Lane; • the Site boundary walls to the north and south of the Stag Brewery component of the Site; • the railway tracks and river moorings / granite paving; and • the memorial plaques. Non-statutorily designated locally important vistas to and from the Site and Local views (as agreed with LBRuT) including: • view from Lower Richmond Road; • view from Thames Bank / Thames Path; • view from southern end of Chiswick Bridge; • view from northern end of Chiswick Bridge; • view from Thames Path / Dan Mason Drive, across the river; • view from Thames Path / car parking area on Dan Mason Drive opposite the entrance to Dukes Meadows Golf Club; • view from Thames Path near seating area outside The White Hart public house; • view from Mortlake High Street; • view from Sheen Lane; • view from Mortlake Green; • view from road bridge over railway, South Circular Road; and • view from Lower Richmond Road adjacent to the Jolly Gardeners public house.
Archaeology	Possible archaeological remains within the Archaeological Priority Area beneath the Site.
Ecology	River Thames and Tidal Tributaries Site of Metropolitan Importance (SMI) and other ecological resources within and adjacent to the Site.
Transport	Existing car users, pedestrians and cyclist around the Site and future car users, pedestrians and cyclists in and around the Site. Users of the River Thames towpath.

Topic / Type of Receptor	Sensitive Receptor/ Land Uses
	Local cycle paths, including those on the Thames Bank, Ship Lane, South Worpole Way, White Hart Lane, Sheen Lane, cycleway via Mortlake green, cycleway via Clifford Avenue. Footway along Thames Bank, Ship Lane. Users of public transport, including those using local bus stops servicing the 419, 969, N22 and 209 bus routes and Mortlake Train Station, located south of Mortlake Green and west of Sheen Lane, to the south of the Stag Brewery component of the Site.

3.47 Further detail regarding potentially sensitive receptors and how these would likely be affected by the Works required to facilitate the Development and the operation of the completed Development are provided within **Chapters 7 to 19** inclusive of this ES.

References

1 Transport of London (TfL) www.webptals.org.uk

2 Department for Environment, Food and Rural Affairs (2007); The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. HMSO; Norwich

3 London Borough of Richmond Upon Thames (2016); Air Quality Action Plan 2014. [Online] Available from: http://www.richmond.gov.uk/lbrut_air_quality_action_plan_2014.pdf

4 Environment Agency (2017); 'Flood risk from rivers or the sea, long term flood risk information' [Online] Available from: https://flood-warning-information.service.gov.uk/long-term-flood-risk/

5 Environment Agency (2011); 'Thames Estuary 2100 (TE2100)'.

6 London Borough of Richmond Upon Thames (2016); 'Figure G of Strategic Flood Risk Assessment Level 1', prepared by Metis Consultants Limited.

7 HMSO, 1981 'The Wildlife and Countryside Act' (WCA) (as amended)

8 London Borough of Richmond Upon Thames (2011) Stag Brewery Supplementary Planning Document (SPD) adopted July 2011

9 London Borough of Richmond upon Thames (2017): Local Plan, Publication version of consultation, 4 January - 15 February 2017.

10 Mayor of London (2012). London View Management Framework (Supplementary Planning Guidance). Greater London Authority: London.

11 London Borough of Richmond Upon Thames (2015); Mortlake Village Planning Guidance Supplementary Planning Guidance (SPD).

4. Alternatives

Introduction

4.1 The EIA Regulations require the Environmental Statement (ES) to include a description of the main alternatives reasonably studied by the Applicant. An indication of the main reasons for the choices made to achieve the final design (i.e. the Development) should also be provided, taking into account the likely significant environmental effects. Accordingly, this Chapter, prepared by Waterman Infrastructure & Environment Limited (Waterman IE) in conjunction with the Applicant's architects (Squire and Partners) and transport consultants (Peter Brett Associates) sets out such information.

4.2 Having regard to policy objectives for the redevelopment of the Site, the adopted planning brief and the site specific policy development allocation, the Applicant has not considered any alternative locations for the Development. This Chapter therefore focuses upon alternative design options considered within the Site.

4.3 The final design of the Development is described in **Chapter 5: The Proposed Development**.

Key Principles of the Development

4.4 As noted in **Chapter 1: Introduction**, the Stag Brewery component of the Site is identified in the emerging London Borough of Richmond upon Thames (LBRuT) Local Plan[1] as an area for comprehensive redevelopment to provide a new village centre for Mortlake.

4.5 To further define the key design principals of comprehensive redevelopment, LBRuT have prepared Supplementary Planning Documents (SPD) specific to Stag Brewery and Mortlake, namely the Stag Brewery Planning Brief[2], which details the key design principals for the redevelopment of the Stag Brewery component of the Site, and Mortlake Village Planning Guidance[3].

4.6 The Planning Brief refers only to the Stag Brewery component of the Site. The Chalkers Corner component of the Site is not referred to specifically. However, the Planning Brief acknowledges that the redevelopment must take account of existing traffic issues including congestion.

4.7 The Planning Brief was adopted in 2011 following consultation with the public and statutory stakeholders. Its vision is for the Stag Brewery component of the Site is to provide of a new village heart for Mortlake based upon buildings and open public realm, whilst respecting the character and history of the area. To achieve the vision, the Planning Brief sets out indicative design principals for redevelopment which are based upon the constraints and opportunities of the Stag Brewery component of the Site. In summary, the key uses, layout and design principals for the Site, as set out in the Planning Brief include:

- a mixed-use approach across the Stag Brewery component of the Site, including support of a residential led mix used development;
- provision of new employment opportunities, including office and retail uses;
- the inclusion of small scale sports and leisure uses;
- provision of education and community uses;
- inclusion of new green space, including a link between Mortlake Green and the River Thames, a waterside open space close to the Maltings and an amenity area along the riverside;

- integration of the existing Buildings of Townscape Merit within proposed development;
- development to protect and interpret the remains of Mortlake's industrial heritage and riverside infrastructure, as well as the setting and character of heritage assets and Conservation Areas;
- provision of car parking in line with LBRuT requirements;
- consideration of existing traffic issues including congestion and minimising adverse effects on the surrounding area and the amenity of nearby residents;
- improve linkages, including pedestrian and cycle routes, to the River Thames from and through the Stag Brewery component of the Site and linking to existing routes in the area; and
- Plan 1 of Appendix 1 of the Planning Brief is an indicative vision plan showing how land uses, open space and transport linkages could be organised within the Site. Plan 1 also identifies indicative heights, ranging from 3 to 7 storeys to the west of Ship Lane, and up to 7 storeys to the east of Ship Lane.

Alternatives to the Development

The 'Do Nothing' Scenario

4.8 Guidance on the preparation of an ES stipulates that it is good practice to consider the evolution of a site in the absence of specific proposals, i.e. the 'No Development' Scenario. Although not an 'alternative', the 'No Development' Scenario is based on leaving the Site in its current state.

4.9 As indicated within the Planning Brief, the Stag Brewery component of the Site is not a viable option for modern brewing activities due to the space constraints on-Site which limit the scope for consolidation of operations. As such, brewing operations ceased in 2015 and decommissioning of brewery infrastructure was undertaken following cessation of brewery activities, this process was completed in October 2017. There would be a significant number of missed opportunities and the specific objectives of the Planning Brief would not be realised if the Stag Brewery Component of the Site (and the Chalkers Corner Component of the Site) were to be left in its current state and a new village heart for Mortlake would not be provided. Furthermore, as indicated within the National Planning Policy Framework[4], there is a presumption in favour of sustainable development and encouragement of the effective use of land by reusing land that has been previously developed which would not be realised were the Site to be left in its current state.

4.10 On the basis that the Stag Brewery component of the Site is identified by planning policy as a key site for redevelopment and brewing operations are no longer viable, the Applicant has not considered the option of not redeveloping the Stag Brewery component of the Site.

Alternative Designs and Uses

4.11 The Applicant has not considered fundamentally different alternative uses or mix of uses for the Site, which are beyond those identified in the Planning Brief. However, in response to consultation with LBRuT, statutory consultees and during the public consultation process, various alternative building heights and layouts have been considered during the masterplanning process and the key alternatives described below. Furthermore, and as described within the following sections, a degree of design evolution has occurred in response to environmental constraints and opportunities, and these changes are reflected in the final Development for which planning permission is sought.

4.12 As indicated within **Chapter 2: EIA Methodology**, consultation in respect of environmental design and assessment was undertaken as part of Environmental Impact Assessment (EIA) Scoping and throughout the evolution of the design.

4.13 In respect of public consultation, a series of meetings were held with a Community Liaison Group (CLG) to inform the group of the evolving proposals and rational for design decisions, and two public exhibition events were held, the first in March 2017 and a second in July 2017.

4.14 Further details of the design process and consultation are provided in the Design and Access Statement and the Statement of Community Involvement which are submitted as standalone documents accompanying the planning applications.

Building Height, Massing and Footprint

4.15 The masterplan presented at the public consultation event in March 2017 set out a proposed range of building heights (refer to **Figure 4.1**) within the Stag Brewery component of the Site. This included buildings of up to 5 storeys within the west, buildings of up to 6 storeys fronting the River Thames within the east, and a 14 storey marker building adjacent to the (former) Hotel.

4.16 Consultation with LBRuT, feedback from the CLG and public consultation attendees raised concerns with the overall density of the proposals, the width and location of the proposed green link between Mortlake Green and the River Thames, and the inclusion of the marker building. These three elements of the proposals were reconsidered and the changes noted below taken forward as the design of the Development.

4.17 The masterplan presented at the July 2017 public consultation (refer to **Figure 4.2**) indicated the green link between Mortlake Green and the River Thames was increased from approximately 22 m to 26 m, to 30 m and then again, to 38 m. This widening of the green link was provided to increase amenity, functionality, minimise overlooking issues associated with residential units located either side of the green link and to provide the pre-eminent route to the river and the heart of the scheme.

4.18 To create an uninterrupted pedestrian and cycle linkage from Mortlake Station (south of the Stag Brewery component of the Site) via Mortlake Green / Sheen Lane to the green link directly opposite the north-eastern corner of Mortlake Green, the positioning of the pedestrian and cycle crossing at this location would have required the removal of several mature trees from Mortlake Green to ensure adequate visibility to the River Thames and for drivers using the Lower Richmond Road. A crossing at this location, close to the Sheen Lane mini roundabout, would also have had a detrimental effect on the operation of that junction. As such, the location of the green link and the proposed pedestrian and cycle crossing were moved further west (refer to **Figure 4.2**) to achieve a safe pedestrian and cycle crossing, whilst retaining all the trees within Mortlake Green. The new location of the green link also provided an area for a new public square at the principle entrance to the scheme which would be visible from the Lower Richmond Road.

4.19 The masterplan presented at the July 2017 public consultation (refer to **Figure 4.2**) reduced the height of buildings within the west of the Stag Brewery component of the Site to 3 storeys. To retain a viable scheme within the east of the Stag Brewery component of the Site, as a result of the widening of the green link, the reduction of the marker building from 14 storeys and the loss of a building fronting Lower Richmond Road, in order to retain commercial viability, it was necessary to increase the height of the buildings adjacent to the River Thames up to 7 and 8 storeys depending on the individual building. This also resulted in changes to the building footprints.

4.20 A comparison of the River Thames front elevations between the proposals in March 2017 and July 2017 are presented by **Figure 4.3** and **Figure 4.4** demonstrating the widened green link and loss of the 14-storey marker building.

4.21 The height and massing of the Development considered the relationship with the Buildings of Townscape Merit (BTM) within the Site, specifically to ensure they are not dominated by new buildings and that the Maltings, in particular, maintains its dominance in views from the River. The massing of new buildings diminishes to the east and west of the Site and it is clear that the massing generally rises to the centre of the Site from the River, whilst maintaining variety in height on the River. Further detail is provided in **Chapter 16: Townscape and Visual**.

4.22 Whilst not part of the EIA, daylight and sunlight within the proposed Development itself, and rights of light issues were considered throughout the design process. Careful consideration was undertaken in regard to window design and position of balconies to ensure reasonable daylight levels for future residents. Following daylight and sunlight advice during the design process, residential units at ground floor level within the eastern part of the Stag brewery component of the Site were pushed forward by 1.5 m to form a continuous block rather than having recessed entrances. Play space has also been distributed in landscaped areas that receive greater amounts of light.

4.23 Initial wind advice was given regarding the proposed 14 storey marker building which would have required canopies and screens to reduce wind speeds from downdraught. Other initial wind advice included the recommendation for soft landscaping such as trees along the High Street and between the health centre and extra building to decelerate local winds. The scheme was subsequently revised and the 14 storey marker building removed, with further wind advice provided to the design team. Further detail on the type of soft landscaping and / or porous screening were recommended, such as planting evergreen trees or deciduous trees maintaining dense branches when bare. Following the wind tunnel test, it was recommended that solid balustrades to a height of at least 1.5m are provided on certain balconies to achieve sitting conditions during the summer. As set out in **Chapter 17: Wind Microclimate**, it is recommended that during the reserved matters application for Building 16, the west facing façade should either exclude a building entrance at this location, recess the building entrance, or plant trees or screens either side of any potential entrance.

Land Uses

4.24 As indicated previously, fundamentally different alternative uses of the Site, or the mix of uses of the Site, beyond those identified in the Planning Brief were not considered. However, the type and location of education land uses, residential accommodation and to some extent commercial land use quantum were further considered, as discussed below.

Education Uses and Location of the School

4.25 Although the Planning Brief indicates a primary school should be provided as part of the proposals, the LBRuT Council's Cabinet decision in October 2015 was that instead, a secondary school with a sixth form would be required as part of the redevelopment of the Site. As such, this has necessitated a departure from the Planning Brief to accommodate the school and associated sports facilities.

4.26 Owing to the requirement of the secondary school with sixth form to achieve the requirements set out in the within the Education and Skills Funding Authority (ESFA) Building Bulletin 103: Area Guidelines for Mainstream Schools[5] and LBRuT capacity requirements, together with the preference of the Planning Brief to include education uses within the west of the Site, a

comprehensive exercise was carried out by the Applicant's design team to identify the optimal location for the new school requirement. Various locations for the school were considered, and the ESFA confirmed that, for any option, the existing grass playing fields would not be suitable to provide the necessary school play and sports provision. Eventually, the preferred location was selected with the school to the east of the planning field, and a new full size 3G football pitch provided. The Open Spaces and Playing Pitches Assessment (OSPPA), prepared by project planning consultant Gerald Eve, contains a full assessment of all location considered as follows:

- to the south of the of the existing Watney's Sports Ground playing fields, adjacent to Lower Richmond Road, with a 3G playing field situated to the north, surrounded by residential units. This option was discounted as the residential units and new school buildings would block views into the area once occupied by the existing sport pitch which is designated as Other Open Land of Townscape Importance (OOLTI) (refer to C**hapter 3: Existing Land Uses and Activities** for further details);
- within the far west of the existing Watney's Sports Ground playing fields, adjacent to Williams Lane, with the newly provisioned 3G playing field to the east (as indicated in **Figure 4.1**). This option was also discounted due to an undesirable continuous built form opposite the existing Williams Lane properties;
- to the north of the existing Watney's Sports Ground playing fields, refined to include a Multi Use Games Area (MUGA) to the west of the building adjacent to Williams Lane, newly provisioned 3G playing field and community park to the south (as indicated in **Figure 4.2**). A play area would be situated above the school building. This option was discounted following further discussions with LBRuT and ESFA as the option for the school to be located to the east was preferred as it was LBRuT's view that this is the closest representation of the Planning Brief (in that it limits the amount of new-build on the footprint of the existing playing field).
- to the east of the existing Watney's Sports playing fields, with the newly provisioned 3G playing field to the west and the MUGA and community park to the south. This option was taken forward as it resulted in increased school play space and open space of the existing playing field would be retained in its current position. The proposed school footprint would also not encroach as far into the existing playing field area as with the above options. This option is described in **Chapter 5: The Proposed Development** and indicated in planning application drawing C645_MP_P_00_001.

Residential Land Uses

4.27 As set out within planning policy, the Stag Brewery component of the Site is indicated as appropriate for a residential-led mixed use scheme. As such, residential land uses are allocated across this area of the Site. However, as indicated within **Chapter 3: Existing Land Uses and Activities**, the Site lies within Flood Zone 3 and is at a high probability of tidal flooding. This necessitates that the design consider the implications should the flood defences fail (the flood breach level). Accordingly, the design of the Development has ensured that all residential units as a minimum would be located at least 300mm above the breach flood level, and basements are only utilised for car parking and building services plant.

4.28 The masterplan presented at the public consultation event in March 2017 proposed approximately 980 residential units across the Site including affordable housing and 190 extra care (assisted living) units. During the design process, the number of residential units reduced owing to the reduction in massing; the July 2017 public consultation presented 730 residential units, with 126 assisted living units and the introduction of a nursing home. The number of proposed residential

units further reduced to a final number of up to 667, plus up to 150 units either for residential or assisted living use. The final quantum of residential units is described within **Chapter 5: The Proposed Development**.

Commercial Land Uses

4.29 The Development proposes a range of flexible uses at the lower floors of the majority of the buildings to the east of Ship Lane, around the proposed new High Street. It is unknown at this stage the exact demand for the various uses and hence flexibility is required to respond to market demand and scheme evolution. The intention is for a range of types of uses to be provided across the eastern side, but at the same time, ensure that no one particular use class dominates the spaces, thus ensuring a truly mixed-use development. As such, flexible use within the detailed component of the Development is sought for retail, financial and professional services, café / restaurants, drinking establishments, offices, community and boathouse use.

4.30 Following feedback from LBRuT in June 2017, it was raised that the Site should not be a retail destination. The maximum 3,000 m^2 of retail floorspace proposed within the overall flexible use space of 6,118 m^2 was considered too much and that office floorspace should be increased. As a result, changes were made to the Development, including building layouts on the east side of the Development and consequently a change in floor areas. The final overall maximum flexible floorspace has been reduced to 4,664 m^2, with maximum retail floorspace reduced to 2,500 m^2 and maximum office floorspace increased to 2,000 m^2. However, it should be noted that it is sought to ensure that the High Street Zone contains a suitable mix of high street uses and therefore a significant proportion of retail use. It is therefore sought through planning condition that 50% of the flexible use floorspace is occupied for retail purposes.

Architectural Style and Treatment

4.31 Three different building styles were considered for the detailed component of the Development within the east of the Stag Brewery component of the Site, a warehouse typology, a mansion block typology and standalone building typology (in addition to the converted heritage buildings). The design of the building form was refined through an iterative design process:

- drawing on the historic industrial context of the Site, the warehouse typology buildings are located mostly along the southern part of the Site adjacent to Mortlake High Street;
- drawing on a number of prominent examples common to other locations along the River from Mortlake to Chelsea, the mansion block typology buildings are located adjacent to the River, opening directly to the river frontage with varied heights and articulation of massing. These buildings were refined by the introduction of distinctive features, including corner elements and varied red tone brick colours; and
- a stand-alone cinema building typology was developed for the cinema fronting Mortlake High Street and Mortlake Green on account of its public significance, prominent position and specific internal use requirements, located at the corner of the green link.

4.32 Further detail on these building typologies is described in **Chapter 5: The Proposed Development**.

4.33 Following consultation with LBRuT, the white rendered façade of the school was changed to brick to ensure consistency with the wider Development**.**

4.34 To reference the historic industrial context of the Site, Building 16 (now referred to as Building 9 within the Development) adjacent to Bulls Alley within the far east of the Stag Brewery component of the Site was altered from a mansion typology to a warehouse typology. The reason for this

change is when viewed from across the River Thames this creates a definitive Site boundary, that was once a brewery between the Maltings and Building 16 (as demonstrated by **Figure 4.4** in comparison to **Figure 4.3**).

4.35 Built heritage advice was also taken into account regarding the façade treatment of the Maltings (a BTM) and its historic context within the Site. Given its historical prominence facing the River Thames, the Maltings building would be retained in its entirety. The treatment of the northern elevation of the Maltings, in particular the recessed brickwork, was considered in light of the conversion of the building to accommodate residential and cultural uses and sensitive design alterations made. Given that the Former Hotel Building and the Former Bottling Building within the Site are also BTMs, the façade of these buildings would be retained. Further detail is provided in **Chapter 15: Built Heritage**.

Transport Infrastructure

Parking

4.36 As set out within the Planning Brief, LBRuT guidance indicates that at least one car parking space is required per residential unit. This allocation was therefore incorporated into earlier design iterations. However, concerns were raised at the public consultation events with the overall density of the emerging scheme and number of new residents, all of whom may own a car. A lower car parking ratio was also welcomed by TfL following an initial meeting in August 2016 given the scale of the Development, the short walk to Mortlake Station and traffic conditions on surrounding roads. In response, and in consultation with LBRuT the car parking provision was reduced to approximately 0.7 of a space per residential unit. This reduction in the number of car parking spaces, including reductions for both residential and non-residential spaces, minimised the size of the basements required.

Chalkers Corner

4.37 As previously noted, whilst the Planning Brief does not refer specifically to the Chalkers Corner component of the Site, it does indicate that redevelopment must consider existing traffic issues including congestion. Furthermore, the Planning Brief identifies that redevelopment of the Stag Brewery component of the Site should minimise adverse effects to the surrounding area and the amenity of nearby residents. On this basis and following a review of existing traffic conditions, together with comprehensive consultation, it was identified that the operation of the junction with the A316 (Clifford Avenue) and Lower Richmond Road at the Chalkers Corner junction and, in particular, congestion and delay on Lower Richmond Road was a key design consideration. Furthermore, TfL have since confirmed that an increase in capacity at Chalkers Corner is necessary to facilitate the Development.

4.38 Although the version of the proposed highways and landscaping design at Chalkers Corner (refer to **Figure 4.5**) presented at the March 2017 public consultation event would have mitigated over and above the additional traffic generated by emerging scheme and would have provided additional off-street car parking, together with the provision of cycle lanes along Lower Richmond Road, the design was modified owing to the following matters which were raised at the March 2017 public consultation, from the CLG and LBRuT:

- a preference for landscaping rather than additional car parking within the existing area of off-street car parking;
- loss of existing mature trees and landscaping including perimeter wall and fencing at Chertsey Court;

- the encroachment of the green space fronting Chertsey Court;
- the increased proximity of Lower Richmond Road to Chertsey Court through the introduction of an addition lane of traffic travelling from east to west (three in total), and to accommodate one from west to east
- the concern that the additional capacity would attract a greater amount of through traffic into Mortlake; and
- loss of on-street car parking along Lower Richmond Road

4.39 To address the matters listed above, the design for Chalkers Corner presented at the July 2017 public consultation, the design was refined as follows (refer to **Figure 4.6**):

- retention of the existing off-street car parking area, with the creation of a pocket park at the pedestrian road crossing intersection at Lower Richmond Road;
- provision of compensatory semi-mature tree planting adjacent to Chertsey Court, Clifford Avenue and Lower Richmond Road;
- provision of wider islands to accommodate cycle crossing across Clifford Avenue and Lower Richmond Road, together with the introduction of advanced stop lines on the A316 Lower Richmond Road approach arms;
- the introduction of a cycle feeder lane from east to west along Lower Richmond Road;
- the introduction of a wider 4 m to 4.5 m pavement around the corner between Lower Richmond Road and A316 to enable shared use between pedestrians and cycles; and
- A reduction fin the length of the additional westbound lane on Lower Richmond Road to two.

4.40 This option taken forward and is described in more detail within **Chapter 5: The Proposed Development**.

River Thames Transportation

4.41 As indicated in **Chapter 3: Existing Land Uses and Activities**, a disused wharf is situated within the north east of the Stag Brewery component of the Site with limited access via Bulls Alley. On account of the aforementioned traffic congestion issues in proximity to the Site, and the promotion of a variety of transport options set out in the Planning Brief, consideration was given to the use of the River Thames for removal of demolition and excavation waste, the delivery of construction materials, and provision of public transport to and from the Site. However, owing to the following reasons this was discounted at this stage of the planning process:

- due to the variance in tidal range, at low water the foreshore is exposed and therefore water craft can only move to and from the wharf either side of high water. Similarly, the draft of the water craft would need to be appropriate for the depth of water at these times. As such, loading and unloading of freight and passengers, together with maintenance, would be affected by tidal movements;
- likely closure of the tow path (part of the Thames Path National Trail Walking Route) during the demolition and construction work (the Works) and subsequent re-routing of pedestrian and cycles;
- the costs required to repair and upgrade the wharf to ensure safe access for freight and passengers;
- distance to a suitability facility to load and unload the various materials associated with the Works, including prefabricated building materials and plant at other locations along the River

Thames. Suitable locations include the stretch of River Thames between Greenwich to Tilbury, and locations west of Mortlake in proximity to the M25. In both cases, these would have a river journey time in the order of 5 - 6 hours, considerably longer than by road. Furthermore, it is anticipated that some transportation by road would still be inevitable;

- navigational conflicts with other river users such as rowers; and
- existing River Bus services currently terminate at Putney Pier and provide a commuter service to Blackfriars at an approximate half hourly frequency on weekday mornings and evenings with a journey time of around 45 minutes. The Stag Brewery component of the Site is approximately 6.2km from Putney Pier. As such, the overall journey time to Blackfriars would be approximately 1hr 15 minutes. Given that train services from Mortlake to central London (e.g. London Waterloo) can be approximately 30 minutes in length, river travel was not considered feasible.

References

1 London Borough of Richmond upon Thames (2017): Local Plan, Publication version of consultation, 4 January – 15 February 2017.

2 London Borough of Richmond upon Thames (2011). Stag Brewery, Mortlake, SW14 Planning Brief, Supplementary Planning Document. LBRuT: Richmond

3 London Borough of Richmond upon Thames (2015). Mortlake Village Planning Guidance, Supplementary Planning Document. LBRuT: Richmond

4 Department for Communities and Local Government (2012). National Planning Policy Framework, March 2012.

5 Education Schools Funding Association (2014). Building Bulletin 103: Area guidelines for mainstream schools.

5. The Proposed Development

Introduction

5.1 This Chapter, prepared by Waterman Infrastructure and Environment (Waterman IE), provides a factual description of the Development as defined by the Planning Applications. Reference is made to the planning application forms, detailed planning application drawings, Parameter Plans, relevant floor area schedules and accommodation schedules together with the Design and Access Statements (DAS) and Design Code. It should be noted that the Parameter Plans and Design Code are relevant to the outline component of the hybrid planning application only. A selection of relevant planning application drawings and Parameter Plans, together with some illustrative images of the Development are presented in **Volume 2: Figures**. It should be noted that the illustrative images have not been assessed within the Environmental Impact Assessment (EIA) process, or within this Environmental Statement (ES). However, their inclusion is a helpful visual aid to the reader of this ES.

5.2 A description of the anticipated demolition, alteration, refurbishment and construction programme, is outlined separately within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**.

Overview of the Development

5.3 As noted in **Chapter 1: Introduction**, the Applicant is seeking planning permission for three Planning Applications which collectively comprise one comprehensive redevelopment proposal. As such, the content of all Planning Applications comprises the Development for the purposes of the EIA. An overview of the Development, as defined by the planning applications forms is provided as follows.

Application A: The Hybrid Planning Application

5.4 As described in **Chapter 1: Introduction**, Application A is a hybrid application for the demolition of the majority of buildings and structures within the entire Stag Brewery component of the Site (with the exception of the Maltings and the façades of the former Hotel and Bottling building) and the redevelopment of the majority of the former Stag Brewery. This is described in the planning application form for Application A as follows:

"*Hybrid application to include the demolition of existing buildings to allow for the comprehensive phased redevelopment of the site:*

Planning permission is sought in detail for works to the east side of Ship Lane which comprise:

a) Demolition of existing buildings (except The Maltings and the façade of the Bottling Plant and former Hotel), walls, associated structures, site clearance and groundworks;

b) Alterations and extensions to existing buildings and erection of buildings varying in height from 3 to 8 storeys plus a single storey basement

c) 443 residential apartments

d) *Flexible use floorspace for:*

   i. *Retail, financial and professional services, café/restaurant and drinking establishment uses*

   ii. *Offices*

   iii. *Non-residential institutions and community use*

   iv. *Boathouse*

e) *Hotel / public house with accommodation*

f) *Cinema*

g) *Gym*

h) *Offices*

i) *New pedestrian, vehicle and cycle accesses and internal routes, and associated highway works*

j) *Provision of on-site cycle, vehicle and service parking at surface and basement level:*

k) *Provision of public open space, amenity and play space and landscaping.*

l) *Flood defence and towpath works*

m) *Installation of plant and energy centres*

Planning permission is sought in outline with all matters reserved for works to the west of Ship Lane which comprise:

a) *The erection of a single storey basement and buildings varying in height from 3 to 7 storeys*

b) *Residential development of up to 224 units*

c) *Nursing and care home (up to 80 ensuite rooms) with associated communal and staff facilities*

d) *Up to 150 units of flexible use living accommodation for either assisted living or residential use*

e) *Provision of on-site cycle, vehicle and service parking*

f) *Provision of public open space, amenity and play space and landscaping*

g) *New pedestrian, vehicle and cycle accesses and internal routes, and associated highway works."*

Application B: School Planning Application

5.5 Application B is a detailed planning application for the construction of a six-form entry secondary school, located to the west of Ship Lane in the area of the Stag Brewery component of the Site that is not covered by Application A with the exception of roads to the north and east of the school building which forms both part of Applications A and B. It is described in the relevant planning application form as follows:

a) *"The erection of a three storey building to provide a new secondary school with sixth form;*

b) *sports pitch with floodlighting, external MUGA and play space; and*

c) *associated external works including, landscaping, car and cycle parking, new access routes and associated works."*

Application C: The Chalkers Corner Planning Application

5.6 Application C is a detailed planning application, to be secured by a Section 106 (s. 106) agreement, for highways and landscaping works at Chalkers Corner, situated to the west of the former Stag Brewery component of the Site. It is described in the planning application form as follows:

"Reconfiguration of Chalkers Corner traffic junction, to include existing public highway and existing landscaped and informal parking area associated to Chertsey Court, to facilitate alterations to lane configuration, a new cycle lane, works to existing pedestrian and cycle crossing, soft landscaping and replacement boundary treatment to Chertsey Court."

Detailed Planning Application Drawings and Parameter Plans

5.7 The full list of planning application drawings submitted for approval is set out in the Planning Statements, however a selection of detailed planning application drawings and Parameter Plans are presented in **Volume 2: Figures**. Such materials are listed in **Table 5.1** and **Table 5.2**, respectively.

Table 5.1: Detailed Planning Application Drawings Included in the ES

Relevant Application	Building	Reference	Title
A	1	C645_B01_P_00_001	Building 01 - Proposed Ground Floor Plan.
A	2	C645_B02_P_00_001	Building 02 - Proposed Ground Floor Plan.
A	3	C645_B03_P_00_001	Building 03 - Proposed Ground Floor Plan.
A	4	C645_B04_P_00_001	Building 04 - Proposed Ground Floor Plan.

Relevant Application	Building	Reference	Title
A	5	C645_B05_P_LG_001	Building 05 - Proposed Lower Ground Floor Plan.
A	5	C645_B05_P_00_001	Building 05 - Proposed Ground Floor Plan.
A	5	C645_B05_P_01_001	Building 05 - Proposed First Floor Plan.
A	6	C645_B06_P_00_001	Building 06 - Proposed Ground Floor Plan.
A	7	C645_B07_P_00_001	Building 07 - Proposed Ground Floor Plan.
A	7	C645_B07_P_TY_001	Building 07 - Proposed Typical Floor Plan.
A	8	C645_B08_P_00_001	Building 08 - Proposed Ground Floor Plan.
A	9	C645_B09_P_00_001	Building 09 - Proposed Ground Floor Plan.
A	10	C645_B10_P_00_001	Building 10 - Proposed Ground Floor Plan.
A	11	C645_B11_P_00_001	Building 11 - Proposed Ground Floor Plan.
A	12	C645_B12_P_00_001	Building 12 - Proposed Ground Floor Plan.
A	1	C645_B01_E_E_001	Building 01 - Proposed East Elevation.
A	4	C645_B04_E_N_001	Building 04 - Proposed North Elevation.
A	5	C645_B05_E_S_001	Building 05 - Proposed South Elevation.
A	6	C645_B06_E_N_001	Building 06 - Proposed North Elevation.
A	7	C645_B07_E_E_001	Building 07 - Proposed East Elevation.
A	9	C645_B09_E_E_001	Building 09 - Proposed East Elevation.
A	1-12	G100_Z0_S_CC	Proposed Site Section CC
A	1-12	G100_P1_S_002	Phase 01 - Basement Sections 02 (indicative).

Relevant Application	Building	Reference	Title
A	1-12	C645_Z1_P_B1_001	Proposed Development Area 01 Basement Plan.
A	River Wall	P10736-00-001-106	River Terrace Boundary Wall Treatment Plan.
A	River Wall	WIE-10667-SA-04-1006	Thames River Wall Concept Design
C	Chalkers Corner	10667-WIE-ZZ-XX-DR-L-7703	Tree Removal and Protection Plan (Sheet 1 of 2).
A	Site wide	10667-WIE-ZZ-XX-DR-L-7704	Tree Removal and Protection Plan (Sheet 2 of 2).
A	Site wide	P10736-00-001-105	Landscape Level Plan.
A	Site wide	P10736-00-001-107	Circulation – Vehicular
A	Site wide	P10736-00-001-108	Circulation – Cycle
A	Site wide	P10736-00-001-109	Circulation – Pedestrian
B	School	C645_Z3_P_AL_001	Z3 School - Proposed Site Plan
B	School	C645_Z3_P_00_001	Z3 School - Proposed Ground Floor Plan.
B	School	C645_Z3_P_01_001	Z3 School - Proposed First Floor Plan.
B	School	C645_Z3_P_02_001	Z3 School - Proposed Second Floor Plan.
B	School	C645_Z3_P_RF_001	Z3 School - Proposed Roof Plan.
B	School	C645_Z3_E_AL_001	Z3 School – Elevations.
B	School	P10736-00-001-130	School Rendered Masterplan (Interim)
B	School	P10736-00-001-131	School Rendered Masterplan (Final)
C	Chalkers Corner	38262/5501/051	Stag Brewery, Mortlake, Clifford Avenue/ Lower Richmond Rd, Proposed Highway Layout
A	Highway	38262/5501/058	Stag Brewery, Mortlake, Lower Richmond Road and Mortlake High Street, Possible Highway Layout.

Table 5.2: Parameter Plans Included in the ES (relevant to Application A)

Building	Reference	Title
13 - 21	C645_Z2_P_PR_001	Block Footprint and Horizontal Lines of Deviation Ground to Second Floor.
13 - 21	C645_Z2_P_PR_002	Block Footprint and Horizontal Lines of Deviation Third Floor.
13 - 21	C645_ Z2_P_PR_003	Block Footprint and Horizontal Lines of Deviation Fourth Floor.
13 - 21	C645_ Z2_P_PR_004	Block Footprint and Horizontal Lines of Deviation Fifth Floor.
13 - 21	C645_ Z2_P_PR_005	Block Footprint and Horizontal Lines of Deviation Sixth Floor
13 - 21	C645_ Z2_P_PR_006	Proposed Block Heights and Vertical Lines of Deviation.
Site wide	C645_ Z2_P_PR_007	Proposed Building Levels - Ground Floor.
13 - 21	C645_ Z2_P_PR_008	Proposed Land Use Distribution Ground and Upper Levels.
13 - 21	C645_ Z2_P_PR_09	Proposed Land Use Distribution - Basement.
13 - 21	C645_ Z2_P_PR_010	Proposed Basement Maximum Depth and Extent.
Site wide	C645_ Z2_P_PR_011	Demolition and Retention Plan.
13-21	P10736-00-001-120	Outline Application Hard and Soft Landscape Plan.
13-21	P10736-00-001-121	Outline Application Open Space.
13-21	P10736-00-001-122	Outline Application –Landscape Principles
13-21	P10736-00-001-125	Outline Application Circulation Plan - Cycle
13-21	P10736-00-001-126	Outline Application Circulation Plan - Pedestrian

Illustrative Images

5.8 As noted earlier in this Chapter, **Volume 2: Figures** presents some illustrative images of the Development, as set out within **Table 5.3**.

Table 5.3: Illustrative Images of the Development Included in the ES

Building	Reference	Title
Site wide	C645_MP_P_00_001	Proposed Masterplan Ground Floor Level
Site Wide	C645_MP_P_TY_001	Proposed Masterplan Typical Floor Level
Site wide	P10736-00-001-100	Ground Floor Landscape GA.

Building	Reference	Title
Chalkers Corner	P10736-00-001-111	Chalkers Corner Landscape GA Plan.

5.9 To re-iterate, the illustrative images have not been assessed within EIA process, or within this Environmental Statement (ES).

Structures to be Demolished and Structures to be Retained and Altered or Relocated within the Site

5.10 As indicated by Parameter Plan C645_ Z2_P_PR_011, Application A seeks planning approval to demolish the majority of buildings, equipment and structures within the Site, with the exception of the Maltings, and the façades of the former Hotel and former Bottling buildings which would be altered and refurbished to suit modern building standards. The Maltings building acts as part of the flood defence wall, which would be modified as required. The existing Site boundary walls would be removed and / or modified as required and new flood defence walls would be provided. Modifications to the river wall include lowering the wall and inclusion of hand rails and an up to 1.1 m high glass balustrade on the top of the wall. The memorial plaques and brewery gates to the south of the Brewery Site would be re-located on-Site.

5.11 **Table 5.4** sets out the structures to be demolished or retained and altered. **Table 5.4** should be read in conjunction with **Figure 3.1**.

Table 5.4: Structures to be Demolished and Structures to be Retained and Altered

Structures to be Demolished	Structures to be Retained and Altered or Relocated within the Site
P.O.B (office).	Maltings.
Brewhouse.	(Former) Hotel (façades).
Process Building.	(Former) Bottling Building (façades).
Chip Cellar.	Railway tracks, paving and moorings.
Finishing Cellar.	Memorial plaques.
Power House.	Memorial plaques.
Powder Store.	The brewery gates.
Effluent Treatment.	Historic walls.
Packaging.	
Stable Court.	
Sports Club.	
East Gatehouse.	
West Gatehouse.	
Chimney Stack.	

Elements of the existing flood defence wall.

5.12 Further detail regarding the structures to be retained and altered or relocated are provided later in this Chapter.

Floor Areas and Accommodation Schedules

Application A: The Hybrid Planning Application

5.13 The proposed floorspace of the detailed component of Application A (east of Ship Lane within the Stag Brewery component of the Site, also referred to as 'Development Area 1') is set out in **Table 5.5**.

Table 5.5: Proposed Floorspace of the Detailed Component of Application A

Land Use	Floorspace Area (m^2)	
	Gross External Area (GEA)	Gross Internal Area (GIA)
Residential	57,245	50,115
Office (including Site management office)	2,674	2,457
Cinema	2,565	2,120
Gym	912	740
Flexible Uses - Restaurant / bar / retail / community / boathouse	5,308	4,664
Hotel	1,858	1,668
Plant and storage.	2,481	2,362
Car parking spaces.	15,351 (413 spaces and 42 motorbike spaces)	14,883 (413 spaces and 42 motorbike spaces)
Cycle parking spaces.	1,148 (1,014 spaces)	1,040 (1,014 spaces)
Basement residential access / circulation.	1,205	1,186
Private amenity space.	955	Not applicable
Public amenity space (including play space).	10,822	Not applicable

5.14 Regarding the flexible uses outlined in **Table 5.5**, the maximum floorspace per land use within the overall flexible use space (5,308 GEA m^2 / 4,664 m^2 GIA) would not exceed the following:

- Retail: 2,500 m^2;
- Financial and Professional services: 200 m^2;
- Cafes/restaurants: 2,200 m^2;

- Drinking establishments: 1,600 m^2;
- Offices: 2,000 m^2;
- Community Use: 1,148 m^2; and
- Boathouse: 351 m^2.

5.15 The proposed maximum floorspace of the outline component of Application A (west of Ship Lane within the Stag Brewery component of the Site, also referred to as 'Development Area 2') is set out in **Table 5.6**.

Table 5.6: Proposed Maximum Floorspace of the Outline Component of Application A

Land Use	Floorspace Area (m^2)	
	Up to Gross External Area (GEA)	Up to Gross Internal Area (GIA)
Residential	27,394	25,004
Assisted Living	16,246	14,738
Nursing and Care Home	10,293	9,472
Plant and storage.	2,055	1,882
Car parking spaces.	9,139 (Up to 280 spaces)	8,874 (Up to 280 spaces)
Cycle parking spaces.	658 (Up to 513 spaces)	587 (Up to 513 spaces)
Private amenity space.	4,957	Not applicable
Public amenity space (including play space).	13,977	Not applicable

5.16 The residential provision of the detailed component of Application A is set out in **Table 5.7**. The Applicant proposes that affordable housing would be delivered within the outline component of the Development. The affordable element and unit mix of the outline component of Application A has not yet been determined, however for the purposes of the EIA, it is assumed that up to 35% of habitable rooms could be affordable. In order to provide a robust worst-case scenario, both 35 % and 0% affordable housing has also been assessed within the socio-economic assessment (as described in **Chapter 2: EIA Methodology** and **Chapter 7: Socio-Economics**).

Table 5.7: Residential Provision of the Detailed Component of Application A

Tenure	Number of Units				
	1-bed	2-bed	3-bed	4-bed	Total
Private	65	232	138	8	443
Total Residential Units	**65**	**232**	**138**	**8**	**443**

5.17 In addition, the outline component of Application A proposes 150 flexible accommodation units to be used for either residential or assisted living use and a nursing and care home with 80 ensuite

rooms. The EIA assumes that the unit mix for the flexible use accommodation would have the same unit mix as the unit mix provided for the detailed component of Application A.

Application B: The School Planning Application

5.18 The floorspace proposed by Application B is set out in **Table 5.8**.

Table 5.8: Proposed Floorspace of Application B

Land Use	Floorspace Area (m^2)	
	Gross External Area (GEA)	Gross Internal Area (GIA)
School.	11,430	9,319 (including 249m^2 plant and storage)
Car parking.	15 spaces)	15 spaces)
Cycle parking spaces.	84 spaces	84 spaces
Private amenity space.	0	Not applicable
Public amenity space (including school play space i.e. roof top play and sports hall).	14,467	Not applicable

Application C: The Chalkers Corner Planning Application

5.19 As noted earlier in this Chapter, the proposals associated with Application C relate to highways and landscaping works only. As such, no occupiable land uses are proposed. Details regarding the Chalkers Corner part of the Development are provided later in this Chapter.

Application A + Application B + Application C (The Development)

5.20 The consolidated maximum amount of floorspace and residential provision proposed by the Development (Application A, B and C combined) is set out within **Table 5.9** and **Table 5.10** respectively.

Table 5.9: Proposed Floorspace of the Development

Land Use	Floorspace Area (m^2)	
	Gross External Area (GEA)	Gross Internal Area (GIA)
Residential	Up to 84,639 (Up to 667 units)	Up to 75,119 (Up to 667 units)
Office (including Site management office)	2,674	2,457
Cinema	2,565	2,120
Gym	912	740

Flexible Uses - Restaurant / bar / retail / community / boathouse	5,308*	4,664*
Hotel	1,858	1,668
Assisted Living	Up to 16,246	Up to 14,738
Nursing and Care Home	Up to 10,293	Up to 9,472
School	11,430	9,319
Plant and storage.	Up to 4,536 (+ plant and storage included in school)	Up to 4,244 (+ 249 included in school)
Car parking spaces.	Up to 708 spaces	Up to 708 spaces
Cycle parking spaces.	Up to 1,611 spaces	Up to 1,611 spaces
Basement residential access / circulation	1,868	1,810
Private amenity space.	Up to 5,912	Not applicable
Public amenity space (including external and internal play space for residents and school play space).	Up to 38,943	Not applicable
Play space (including external and internal play space for residents and school play space).	Up to 14,353	Not applicable

Notes:

* Refer to paragraph 5.14 in respect of the flexible floorspace strategy for the detailed component of Application A.

Arrangement of Buildings

5.21 The ground floor layout of all buildings proposed can be identified on detailed application drawings C645_B01_P_00_001, C645_B02_P_00_001, C645_B03_P_00_001, C645_B04_P_00_001, C645_B05_P_00_001, C645_B06_P_00_001, C645_B07_P_00_001, C645_B08_P_00_001, C645_B09_P_00_001, C645_B10_P_00_001, C645_B11_P_00_001, , and C645_B12_P_00_001 for Buildings 1-12, and detailed application drawing C645_Z3_P_00_001 for the school. Drawing C645__MP_P_00_001 is an Indicative Masterplan drawing from which the layout and siting of the proposed buildings across the Site at ground floor level can be identified.

5.22 The Development would comprise a total of 22 buildings (including the proposed school building), as shown of **Figure 5.1**.Accordingly, the buildings would be located as follows (refer to **Figure 5.1**):

- Buildings 1 - 12 would be located to the east of Ship Lane in the Stag Brewery component of the Site (Development Area 1);

- Buildings 13 - 21 would be located to the west of Ship Lane in the Stag Brewery component of the Site (Development Area 2); and
- the secondary school building and playing field would be located west of Ship Lane in the south west part of the Stag Brewery component of the Site.

Above Ground Massing

5.23 The height and massing of the proposed buildings have responded to planning guidance, consultation with the London Borough of Richmond upon Thames (LBRuT) and other statutory bodies including the GLA, feedback from the Community Liaison Group (CLG) and public consultation attendees (refer to **Chapter 4: Alternatives**).

5.24 Such factors have resulted in a low to mid-rise massing of proposed buildings ranging from 2 to 7 storeys. The height and number of storeys for each proposed building is set out in **Table 5.10**. The maximum heights for buildings 13 - 21 (West of Ship Lane within the Stag Brewery component of the Site, Development Area 2) are shown on parameter plan C645_ Z2_P_PR_006. A typical section drawing for buildings 1 - 12 (East of Ship Lane within the Stag Brewery component of the Site, Development Area 1) is shown on drawing G100_Z0_S_CC.

Table 5.10: Buildings Heights

Building	Relevant Application	Maximum Height* (m AOD)	Maximum Number of Storeys
1 (Cinema)	Application A (detailed component)	22	4
2	Application A (detailed component)	36.53	7-8
3	Application A (detailed component)	28.03	6
4 (Maltings)	Application A (detailed component)	As existing (32.85)	8
5 (former Bottling Building)	Application A (detailed component)	18.47	3
6	Application A (detailed component)	21.68	4
7	Application A (detailed component)	36.53	7-8
8	Application A (detailed component)	36.53	6-8
9	Application A (detailed component)	24.98	4-5
10	Application A (detailed component)	24.98	4-5
11	Application A (detailed component)	31.33	7
12	Application A (detailed component)	31.33	6-7
13	Application A (outline component)	22	4-6
14	Application A (outline component)	19	4-5
15	Application A (outline component)	22	6

Building	Relevant Application	Maximum Height* (m AOD)	Maximum Number of Storeys
16	Application A (outline component)	22	5-6
17	Application A (outline component)	26	5-7
18	Application A (outline component)	22	4-6
19	Application A (outline component)	16	4
20	Application A (outline component)	12	3
21	Application A (outline component)	12	3
School	Application B	16.805 (to parapet of building) 19.67 (to top of play area enclosures).	3

Notes:

* Height to the top of the roof parapet.

Below Ground Structures

5.25 A single storey basement is proposed underneath the majority of the Stag Brewery detailed component of the Site, east of Ship Lane (Development Area 1). The bottom of the proposed basement slab within the east part of the Stag Brewery component of the Site (east of Ship Lane, Development Area 1) would be set at 0.76m AOD (with the basement Finished Floor Level (FFL) set at 1.76 m AOD)), as shown on indicative detailed drawing G100_P1_S_002.

5.26 A single storey basement is proposed west of Ship Lane in Development Area 2, located in the north east section of this part of the Site. The maximum extent of the proposed basement within the west part of the Stag Brewery component of the Site (west of Ship Lane), would be set at 2.45m AOD, as shown on Parameter Plan C645_ Z2_P_PR_010.

Distribution of Land Uses Across the Stag Brewery Component of the Site

East of Ship Lane (Application A, Detailed Component)

5.27 To the east side of Ship Lane within the Stag Brewery component of the Site, the Development would be characterised by a mix of land uses. This would be the most commercial part of the Development.

5.28 The existing Maltings building (Building 4) would be retained and refurbished to provide flexible use (including community use) at ground floor (refer to drawing C645_B04_P_00_001). The new buildings along the riverside (Buildings 7, 8, 11 and 12) would incorporate ground floor flexible uses, allowing for a combination of shops and retail outlets, professional services, food and drink, drinking establishments, and community uses with residential use above(refer to **Table 5.5** and detailed planning application drawings C645_B07_P_00_001, C645_B08_P_00_001, C645_B11_P_00_001, and C645_B12_P_00_001). The ground floor of Building 9 would provide flexible use space including the potential for use as a boathouse with club room, training and

office uses (as shown on detailed planning application drawing C645_B09_P_00_001) with residential use above.

5.29 A new high street (named Thames Street) is proposed on the east part of the Site (east of Ship Lane, Development Area 1) and would be surrounded by a mixture of restaurants, cafés, retail, community, boathouse and convenience spaces, as shown on detailed planning application drawings C645_B02_P_00_0012, C645_B06_P_00_001 and C645_B07_P_00_001. The new high street would be pedestrianised, except for servicing and emergency access.

5.30 To the south of the new high street, the former Bottling and hotel building (Buildings 5 and 6) would be redeveloped behind a retained façade to provide offices, a gym, flexible commercial space and a small hotel (up to 16 bedrooms), as shown on detailed planning application drawings C645_B05_P_LG_001, C645_B05_P_00_001 and C645_B05_P_01_001.

5.31 A new 4 screen cinema would be located within Building 1 (refer to detailed planning application drawing C645_B01_P_00_001 to view the ground floor layout), adjacent to the proposed public open space and new green link.

5.32 To the east of Ship Lane in Development Area 1, the Development would provide 443 residential units which would generally be delivered in mixed use buildings, aside from Building 3 which is residential only.

5.33 As noted previously, a single storey basement would be provided beneath the majority of the Stag Brewery component of the Site in Development Area 1 which is East of Ship Lane. This would offer car and cycle parking for the residential and non-residential together with refuse storage space and plant.

West of Ship Lane (Application A, Outline Component and Application B)

5.34 To the west of Ship Lane in Development Area 2, a nursing and care home within Buildings 14 and 15 and flexible use living accommodation for either assisted living units or residential use within Buildings 13, 16 and 17 (refer to Parameter Plan C645_ Z2_P_PR_008).

5.35 A total of up to 224 residential units would be provided to the west of Ship Lane within the Stag Brewery component of the Site in Development Area 2, within Buildings 18 to 21. Up to 24 of these residential units would be townhouses with private gardens (Buildings 20 and 21).

5.36 In addition to the above, a new six form entry secondary school with sixth form would be provided to the west of Ship Lane in the Stag Brewery component of the Site (refer to detailed planning application drawing C645_Z3_P_AL_001). This would accommodate approximately 1,200 students. Associated play facilities would be provided which include roof play facilities, an indoor sports hall, an external Multi Use Games Area (MUGA) and a full sized outdoor artificial 3G playing pitch and associated spectator spaces (refer to the detailed planning application drawing C645__MP_P_00_001). To the south of the school and sports pitch, north of Lower Richmond Road, it is proposed to provide a new public community park.

5.37 As already noted, a single storey basement would be provided beneath part of the Stag Brewery component of the Site which is west of Ship Lane in Development Area 2. This would offer car and cycle parking for the residential land uses and nursing and care home associated with the outline component of Application A, alongside refuse storage space and plant.

Distribution of Land Uses Across the Chalkers Corner Component of the Site

5.38 As noted earlier in this Chapter, the proposals associated with Application C relate to highways and landscaping works only. As such, no occupiable land uses are proposed. Details regarding the Chalkers Corner part of the Development are provided later in this Chapter.

Retention and Alteration

5.39 As shown in elevation drawings C645_B05_E_S_001 and C645_B06_E_N_001, Building 5 (the former Hotel and Bottling building) would have retained façades, with some alterations. The Maltings (Building 4) would be retained in its entirety with some external and internal alterations proposed (refer to elevation drawing C645_B04_E_N_001 and below for further details). Historic structures on-Site, including the Brewery Gates and memorial plaques would be retained and re-located on-Site. The historic boundary walls of the Stag Brewery component of the Site would be retained and modified as required. Further detail on the alterations to retained structures and buildings on-Site are set out below.

The Maltings

5.40 The proposed works to the Maltings building relate to the conversion of the building to residential apartments and flexible use / community space. The proposals involve the removal of the cast iron columns, horizontal I-beams and the original stairs to the interior of the building. New staircases would be inserted within the floorspace to provide access to the apartments.

5.41 New floors would also be inserted, to create seven floor levels within the building. These would largely be consistent with the floor levels that existed historically, albeit that two of the floors would be double height. The upper floors would be partitioned to create apartments.

5.42 Externally, the overall appearance of the building would be largely retained. Existing windows would be replaced on a like-for-like basis and some new windows inserted in existing blind openings. Several existing windows are proposed to be elongated on the north, east and west elevations and a new large glazed opening is proposed to the east elevation. In addition, external features that contribute to the aesthetic value of the locally listed building would be retained, such as the cast iron tie-rod pattress plates and decorative brick bands.

Former Hotel

5.43 The Development would reinstate the historic hotel use of the former Hotel building (Building 5). A restaurant / bar and reception area would be provided on the ground floor, with en-suite hotel bedrooms on the upper levels. Only the façade of the building would be retained (no floorspace) and a new building would be constructed behind the retained façade.

5.44 Externally, the appearance of the former Hotel building would remain largely unaltered and the character of the curved façade would overall be retained. The existing windows would be replaced on a like-for-like basis, with a new doorway inserted on the south elevation at ground floor level to replace an existing window. An extension is proposed at second floor / roof level.

5.45 The Development would involve the insertion of new doors and windows to the east elevation. It is proposed to remove the modern lean-to structure on the north elevation. A new glazed link would be attached to this elevation.

Former Bottling Building

5.46 The former Bottling building (Building 5) would include a gym within the lower ground level, flexible use at ground floor level and office space on the ground and upper floors. Only the façade of the building would be retained (no floorspace) and a new building would be constructed behind the retained façade.

5.47 The Development involves the addition of a glazed extension at roof level. In addition, it is proposed to insert new windows, as well as enlarge the windows at the existing second floor level. It is also proposed to add an extension to the building on the north side of its eastern end, to accommodate the retail and office space. New windows and doors are proposed to the north and east elevations.

Other structures to be retained

5.48 It is proposed to retain the existing railway tracks and granite paving within the north east corner of the Stag Brewery component of the Site. The existing granite setts would be cleaned and any new granite setts in this location would be to match the existing. The railway tracks would also be retained and refurbished and a section of the historic boundary wall would be retained adjacent to these structures.

5.49 As part of the Development, the memorial plaques within the southern boundary wall would be retained and relocated within the Site.

5.50 The cast metal historic Watney's Brewery gates are proposed to be retained and relocated as part of the Development.

Public Realm and Amenity Space

5.51 A maximum of 38,943 m^2 GEA of public amenity space would be provided throughout the Development. A new 'green link' would dissect the Stag Brewery component of the Site east of Ship Lane (Development Area 1) and provide a large public open space which would link Mortlake Green to the riverside.

5.52 The green link would culminate at a new large public square (east of Building 4, the Maltings) and steps, which has been designed to connect to the surrounding buildings, the green link and the riverside.

5.53 It is also proposed to provide a new riverside walk (protected from flooding by the new flood defence wall) within the Stag Brewery component of the Site east of Ship Lane (Development Area 1) which would reach from the public square adjacent to Building to Bulls Alley, in addition to upgrading the existing towpath on the other side of the new proposed river wall (refer to later in this Chapter).

5.54 A new pedestrian high street (Thames Street) running east to west is proposed within the Stag Brewery component of the Site east of Ship Lane (Development Area 1). As described earlier, the

high street would provide a mixture of restaurants, cafés, retail, community and convenience spaces and it is expected that some of these uses would provide outdoor seating areas. The new high street would link to the new secondary public space enclosed by the former Bottling building (Building 5).

5.55 As shown on Parameter Plan P10736-00-001-123, large areas of public realm would be provided between buildings to the west of Ship Lane in the Stag Brewery component of the Site. A new public community park would be provided to the south of the new school and north of Lower Richmond Road within the Stag Brewery component of the Site west of Ship Lane.

5.56 In addition to the above, the Chalkers Corner component of the Site would include a small pocket park with new trees on the south side of Lower Richmond Road.

Private Realm and Amenity Space

5.57 Private amenity space would be provided in the form of ground floor communal court yards and private gardens, and private balconies and terraces on upper floors. Terraces would be provided on Buildings 2, 3, 7, 8, 11 and 12 (the Mansion blocks) at certain places on the upper two floors whilst Buildings 6, 9 and 10 (the warehouse blocks) would have terraces on the top floor. A maximum of 5,912 m^2 GEA of private amenity space is proposed.

5.58 Communal courtyards enclosed with 1.5m high hedge planting would be provided for residential units on the ground floor within the Stag Brewery component of the Site east of Ship Lane (Development Area 1). As shown on a typical elevation drawing and floor plan (for example, drawings C645_B07_E_E_001 and C645_B07_P_TY_001 for Building 7), private balconies and communal terraces would be provided for residential units above the ground floor.

5.59 The majority of residential units in the Stag Brewery component of the Site west of Ship Lane would have communal amenity areas, which include areas for children's play space (described further below). Communal courtyards would be provided for Buildings 13, 14, 15, 16, 17, 18 and 19 whilst the townhouses in Buildings 20 and 21 would have their own private gardens (refer to Parameter Plan P10736-00-001-120-121).

Play Space

5.60 Up to 4,084 m^2 GEA would be children's play space for future residents and 10,305 m^2 GEA including the sports hall and roof top play space which would be provided as part of the proposed school, but would also be available to the for use by the community outside of school hours. Play facilities for different age groups are positioned within residential courtyards, parks, plazas and open space areas throughout the Development, to achieve the required areas of play and the distribution related to residential units, as set out below:

- up to 1,846 m^2 GEA of Doorstep Play (0-4 years) within 100 m of residential units;
- up to 1,612 m^2 GEA of Local Play space (5-11 years) 400 m of residential units;
- up to 626 m^2 GEA of Neighbourhood Space (12+ years) 800 m of residential units;
- Play on the way (all ages).

5.61 Play elements and facilities are provided in a range of forms within the public and private realms of the Development, including designated and fenced playgrounds, unfenced but contained play

spaces with a range of play elements and carer seating, topographic variation and play opportunities in the landscape (within planting areas) and 'play on the way' elements within circulation spaces and public realm areas. Refer to Parameter Plan P10736-00-001-123 for the location of play space provision in the outline component of the Development and the Design and Access Statement for the detailed component of the Development.

5.62 The proposed school would provide 1,030m^2 of semi enclosed play space at roof level (refer to planning applications drawing C645_Z3_P_RF_001), an indoor sports hall and activity studio on the first floor (refer to planning application drawing C645_Z3_P_01_001), external play space surrounding the school on ground level, an external MUGA to the south of the school building and a full sized artificial all weather playing pitch with spectator facilities to the west of the school building (refer to planning applications drawing C645_Z3_P_00_001).

5.63 The Applicant (and the Education and Skills Funding Authority (ESFA) who would deliver the Planning Application C as referred to within **Chapter 1: The Introduction**) have committed to a Community Use Agreement which would enable local groups, teams, clubs, organisations and bodies the opportunity to use the external play pitch, indoor sports hall, activity studio and MUGA of the school out of school hours.

5.64 In addition, the Development would provide access to river based activities such as rowing or canoeing.

Highway Improvements

5.65 As set out earlier in this Chapter, highway works are proposed at Chalkers Corner as part of Application C. In summary, the works include amendments and reconfiguration to the Chalkers Corner junction to alleviate the transport and traffic implications associated with the operation of the Development within the Stag Brewery component of the Site. The reconfiguration of the Chalkers Corner junction is shown on detailed planning application drawing 38262/5501/051. This shows that the alignment of the Lower Richmond Road arm would be moved approximately 12 m to the north east to allow:

- the provision of a short additional left turn lane (flare) from Lower Richmond Road into the junction (26 m long or about 5 car lengths);
- provision of an extended queuing reservoir between the main junction of Lower Richmond Road (this would accommodate about 9 extra cars south westbound) and would also provide extra storage for north east bound vehicles including those waiting to turn right into Lower Richmond Road); and
- provision of a wider pedestrian island within the Lower Richmond Road arm to 4 m wide to sufficiently cater for cyclists crossing as well as pedestrians, including new "toucan" crossing facilities.

5.66 An extended, dedicated lane for traffic turning left from Clifford Avenue into Lower Richmond Road would also be provided.

5.67 The existing informal car park on the corner of Lower Richmond Road would be retained. No existing car parking spaces would be lost within Chertsey Court, which are located to the north of Lower Richmond Road and adjacent to Chalkers Corner junction and there would be no loss of on-street parking along Lower Richmond Road. Improvements to cycle lanes and facilities would

also be made within the Chalkers Corner component of the Site, which is described further on in this Chapter.

5.68 In addition to the improvement works proposed for the Chalkers Corner junction as part of Application C, further highways works are proposed as part of the applications and via Section 278 where offsite to facilitate the Development via Applications A. These include:

- Improvements to Ship Lane, which would continue as a public highway but would be enhanced as a pedestrian route through the provision of a wider footway on the west side and a new footway (3 m) on the east side;
- A new pelican crossing at the southern end of the Green Link along Lower Richmond Road directly north of Mortlake Green; and
- A new crossing provided just to the west of the new access road to the school to improve access for pupils needing to cross Lower Richmond Road. This is currently shown as a zebra crossing but could potentially be upgraded to a pelican crossing.

5.69 Full details are provided within the Transport Assessment, which summarises further highways works associated with the Development that would be secured through a section 278 agreement. In addition, some of the bus stops and bus stands on Mortlake High Street would be relocated to allow for the new access points and the new crossing.

Pedestrian, Cycle and Vehicular Access, Circulation, Parking and Servicing

5.70 Pedestrian and cycle access routes would be created throughout the Stag Brewery component of the Site, which would link the eastern part of the Site to the western part of the Stag Brewery component of the Site (and beyond), Mortlake Green, the Thames Path and from Mortlake, as shown in Parameter Plan P10736-00-001-125, Parameter Plan P10736-00-001-126, and hybrid planning application drawings P10736-00-001-108 and P10736-00-001-109. Primary pedestrian and cycle access routes would be via the existing three access points to the Stag Brewery component of the Site along Lower Richmond Road and Mortlake High Street as well as new access points along Ship Lane (centre of the Stag Brewery component of the Site) and Williams Lane (west of the Stag Brewery component of the Site, north of the proposed school). As discussed in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, a temporary access route is proposed whilst the school is operational and the remaining phases of Application A are being built. Once the buildings in the outline component of Application A are in operation, this road to north of the school would become a controlled access only route.

5.71 A total of up to 708 car parking spaces and up to 1,611 cycle spaces are proposed for the Development. 402 car parking spaces would be provided in the basement to the east part of the Stag Brewery component of the Site, of which 331 would be for residents and 77 for commercial, as shown on detailed planning application drawing C645_Z1_P_B1_001. In addition, there would also be 42 motorbike space with this basement. Vehicular access and egress to the eastern basement would be via Ship Lane (as shown on detailed planning application drawing C645_B03_P_00_001 showing the ground floor layout of Building 3) and Mortlake High Street (as shown on detailed planning application drawing C645_B10_P_00_001 for the ground floor layout of Building 10).

5.72 A total of up to 256 car parking spaces would be provided in the basement to the west of Ship Lane in the Stag Brewery component of the Site. Vehicular access to the west basement would be via Ship Lane as shown in Parameter Plan P10736-00-001-124. A total of up to 24 spaces for the proposed townhouses (Buildings 20 and 21) would also be provided at ground level on the north-western part of the Stag Brewery component of the Site.

5.73 No basement car park is proposed to be connected to the school. A total of 15 car parking and secure cycle parking would be provided at ground level to the east of the school building along with hard and soft landscaping. Three bus parking spaces and a parent drop off / pick up area will also be provided for the school on a new road to the east of the proposed school. A new vehicular access route is proposed to be created from Lower Richmond Road, as shown in detailed planning application drawing C645_Z3_P_AL_001.

5.74 A total of 1,014 cycle spaces would be provided in the eastern part of the Stag Brewery component of the Site, which would be made up of 914 secure long stay spaces within the basement and 100 short stay spaces at ground level within eye sight of building entrances. The main cycle access to the basement parking would be via the main car park ramps, with provision to use at least one of the lifts. This would be the same across both basement car parks.

5.75 Up to 513 cycle spaces would be provided in the western part of the Stag Brewery component of the Site, which would be made up of 493 long stay secure spaces within or immediately adjacent to buildings and 20 short stay spaces to be provided at ground level within eye sight of building entrances.

5.76 A new cycle feeder lane would be provided on the Lower Richmond Road approach arm to link with Transport for London's proposed Quiet Way cycle scheme along the A306 corridor, as part of Application C (Chalkers Corner). The highway improvements at Chalkers Corner would benefit cyclists and help TfL to achieve their Quiet Way cycle proposals for the A316 corridor by creating:

- advance cycle stop lines at the main junction;
- wider islands to make them suitable for cycle use; and
- improved cycle links into Lower Richmond Road.

Servicing and Deliveries

5.77 The central Site management office and delivery room for the Development would be located within the south east part of the ground floor of Building 5 (refer to detailed planning application drawing C645_B05_P_00_001).

5.78 An Outline Delivery and Servicing Plan (DSP) has been submitted as part of the Transport Assessment. The Development has been designed to ensure that delivery and servicing activity can take place safely, efficiently and away from the public highway. The on-Site facilities management team would be responsible for ensuring that the agreed delivery and servicing regime is implemented.

5.79 For the detailed component of Application A (east of Ship Lane in Development Area 1), the majority of service vehicles would enter the Site from Mortlake High Street onto the new high street via a controlled access. The new high street would be one-way (east to west) and would

have restricted access controlled by bollards. Four off-street loading zones would be located along this road to provide delivery and servicing bays to the various land uses.

5.80 A Delivery Management System (DMS) would be used to manage the loading bays. This would encourage suppliers to forward plan and pre-book deliveries with the estate management company as much as possible. This would ensure the number of delivery slots are controlled and allocated, and where necessary limited by vehicle dwell time and turn over to avoid conflicts occurring.

5.81 Provision has been made for parking coaches associated with the proposed school (Application B) within the west part of the Stag Brewery component of the Site.

5.82 Residents would be encouraged to consider the use of services such as Click and Collect and local collection points when ordering goods for home delivery. This would be achieved through promoting such services through the DSP and the Travel Plans. This can help reduce the number of missed deliveries (particularly during the day) and subsequently reduce delivery vehicle trips.

5.83 A concierge service would potentially be available to residents 24/7, and located within each building. The concierge would be able to take receipt of deliveries on behalf of residents and store them in the delivery storage.

5.84 The commercial uses at the Site would receive some deliveries out of hours; where possible suppliers would be encouraged to deliver out of hours to help avoid network peaks.

Flood Defence

5.85 The existing Site boundary walls would be removed and / or modified as required and new flood defence walls would be provided. The new river wall would tie in with the corner of the Maltings building, which acts as part of the flood defence wall. As shown on detailed planning application drawing P10736-00-001-106, sections of the boundary wall along the northern part of the Stag Brewery component of the Site would be lowered to a minimum finished level of 6.70 m AOD, with a 0.42 m high balustrade on top in some areas to allow for the addition of a handrail. In parts, the wall would be lowered to 6.13 m AOD but would be topped by a 1.1 m high glass balustrade.

5.86 The new river wall would be formed of a sheet pile wall behind the existing river wall with an in-situ reinforced concrete capping beam. The toe level of the sheet pile wall would be set at -1 m AOD, as shown on detailed planning application drawing WIE-10667-SA-04-1006.

Landscaping and Ecological Enhancement

The Stag Brewery Component of the Site

5.87 A mixture of soft and hard landscaping is proposed throughout the Development. A mix of approximately 200 evergreen and deciduous trees are proposed across the Stag Brewery component of the Site, which includes approximately 160 new trees and up to 51 retained trees. All residential courtyards on ground level would be enclosed with 1.5 m high hedge planting.

5.88 The existing tow path along the northern boundary of the Stag Brewery component of the Site would be enhanced, including additional seating and pruning of understorey vegetation to open key views. At Bulls Alley, within the north east corner of the Site, it is proposed to provide new

granite setts paving with the existing granite setts cleaned and retained. The historic railway tracks along the towpath within this location would be rediscovered and form part of the landscaping. Steps would be provided to link the proposed river terrace walk behind the improved flood defence walls to the existing towpath.

5.89 The Development would provide the following ecological enhancements:

- a minimum of 10 bat boxes would be incorporated in the Development located east of Ship Lane (note, number of bat boxes within the outline component of the Site would be determined following the reserved matters application);
- provision of 10 bird nesting boxes, including 3 bird boxes suitable for black redstarts in the Development located east of Ship Lane in Development Area 1 (note, number of bird boxes within the outline component of the Site would be determined following the reserved matters application);
- use of native species, or species of benefit to wildlife throughout the Development. This would include littoral plant species in areas close to the river edge responding to existing riverside vegetation and fruit / berry and nut bearing trees located in the community park south of the proposed school;
- incorporation of deadwood features within landscape areas, to provide opportunities for a range of invertebrates; and
- of biodiversity roofs, including a mix of green and brown roofs. Green roofs would include a wildflower and native grasses mix whilst brown roofs would incorporate photovoltaic (PV) panels in some areas and would be seeded with plant species collected from the Site or nearby, including log piles, slabs and twigs gathered from the local area. Where possible, the substrate depth would be varied to provide opportunities for small pools of water to collect on the roof.

The Chalkers Corner Component of the Site

5.90 Public realm and landscaping works are also proposed at Chalkers Corner, including the provision of a new pocket park, trees and new paving. As set out in **Chapter 6: The Development Programme, Demolition, Alteration, Refurbishment and Construction**, the Works at Chalkers Corner would involve retaining 28 trees and the removal of 22 trees along Lower Richmond Road, Clifford Avenue and within Chertsey Gardens. It is proposed to add a total of 33 new trees, Resulting in an overall increase in 10 trees at Chalkers Corner. A mix of evergreen and deciduous semi-mature trees at 6 m height (4+ years old) are proposed within Chertsey Court to supplement existing trees and visually screen the existing building with greenery and assist in air pollution absorption. The proposed pocket park with additional trees would be located on the opposite side of Lower Richmond Road intersection. The landscaping scheme also proposes to replace the existing wall and fence on the revised alignment with a 2 m high brick wall.

Materials, Façade Treatment and Finishes

5.91 The design of buildings across the Development would conform to three typologies:

- cinema;
- warehouse; and

- mansion block.

5.92 As discussed earlier in the Chapter, Building 5 (the former Bottling building and the former Hotel) would have retained façades, with some alterations whilst Building 4 (the Maltings) would be retained in its entirety with some internal and external works proposed.

Cinema Typology

5.93 Building 1 (the cinema) would comprise a standalone building type to reflect its different use and prominent position within the Development (refer to elevation drawing C645_B01_E_E_001). The cinema typology draws on the heritage of cinema design and in particular the art-deco era in the 1930s. As such, this building comprises a grand entrance and horizontal canopy. The canopy is continued around the whole of the building and above there is a generally solid wall with distinctive scalloped bays, breaking up the massing of the building. The massing is further broken up by the inclusion of window elements in the scalloped bays and below the canopy line.

Warehouse Typology

5.94 The warehouse typology uses reference to the historic industrial context of the Site. Drawing C645_B09_E_E_001 is an elevation for Building 9 (the Boat House) which shows a typical elevation for the warehouse typology. These buildings are mostly located along the southern part of the Stag Brewery component of the Site by Mortlake High Street.

5.95 The warehouse typology draws on the heritage buildings on the Site as well as a more typical warehouse façade. This typology comprises vertical stacks of wider windows with solid brickwork walls between, punctuated by punched-hole windows with a vertical orientation.

Mansion Block Typology

5.96 The mansion block buildings are a contemporary interpretation of the traditional mansion block, common to other riverside locations in the wider area. This building typology would exhibit characteristic features such as bay windows with balconies between, gables, dormers and chimneys at roof level with predominantly brick facades. Detailed planning application drawing C645_B07_E_E_001 is an elevation drawing for Building 7 which shows a typical elevation for the mansion block typology.

5.97 These building would be located to the north of the detailed element of the Stag brewery component of the Site, adjacent to the river frontage and the three courts which open up to the river. Each set of buildings located around a landscaped court would have a different brick colour while all remaining in a red tone. Each would have a corresponding different colouring to metalwork and window frames and each would have different detailing to feature brickwork panels and decorative balustrades. This would give each court a clear identity while remaining within the overall mansion block typology.

Landscape Materials

5.98 The principle landscape materials would include:

- powder coated mild steel;
- Corten steel;

- stainless steel;
- Natural York Stone;
- Natural granite;
- precast concrete paving slabs and furniture elements;
- Dutch / London brick – wall facings and paving; and
- Fair-faced insitu concrete – for low walls and seating elements.

5.99 The surrounding landscape features would be largely comprised of stone paving and rendered wall, with ironwork fences and detailed cast elements in addition to the elements of vegetation and green open space. The proposed sports pitch would be made of 3G turf (artificial grass).

Lighting Strategy

5.100 The Lighting Strategy has been prepared for planning and specifically developed to ensure that the environmental effects of artificial light are minimised. The Institute of Lighting Professionals (ILP) Guidance to Light Pollution[1] has been adopted and would be adhered to. This includes reducing light pollution, minimising energy and mitigating effects on ecology.

5.101 Lighting has been configured according to use after dark, with emphasis placed on elements that contribute most in terms of wayfinding and added character to spaces and buildings. More focus and feature lighting would be placed in the proposed commercial areas, whilst residential areas would have calmer lighting to allow for privacy for residents.

5.102 Ambient (warm white) light would be used to provide a safe and secure environment and to provide general illumination to the various routes and spaces using bespoke lighting columns. Lighting would be optically controlled to prevent light spill into adjacent properties and glare shields would be used to ensure that all lamp sources are hidden from view.

5.103 Accent lighting would highlight surrounding architectural structures, play areas and key landscape features, including strategic routes such as the Linear Park, Maltings Plaza and the River Terrace. This would be achieved through a combination of bespoke lighting columns, architectural lighting and uplighting. The River Terrace would incorporate low level lighting by either bollards or luminaires recessed within the retaining river wall. A small amount of light would be provided to the steps that lead down to the towpath for safety reasons and would be carefully focussed on the step treads with no glare or upward spill. The towpath would remain unlit.

5.104 The sports pitch would be served by floodlights. Although the final design is not fixed at this stage, an assessment of light trespass as a result of these floodlights has been provided to ensure light emission is controlled to FA Class III standard (120 lux / 0.5 Uo).

Drainage

5.105 A surface water drainage strategy has been developed for the Stag Brewery component of the Site. In respect of the Chalkers Corner component of the Site, as this is predominantly highway land drainage and surface water run-off will be addressed as part of the wider highways drainage and would be discharged to the sewer as existing, and would be the responsibility of the local highway authority.

5.106 Surface water runoff from the north east part of the Stag Brewery component of the Site would discharge by gravity to the River Thames (adjacent to the northern boundary of the Stag Brewery component of the Site) via three outfalls. Appropriate treatment would be incorporated into the drainage system to ensure that the quality of water discharged to the River Thames is acceptable, such as through the incorporation of green roofs, a rain garden and permeable paving.

5.107 Foul flows from the Stag Brewery component of the Site would discharge by gravity to the Thames Water sewer network. The Drainage Strategy (refer to **Appendix 11.2**) confirms that surface water runoff from the Stag Brewery Component of the Site can be managed sustainably to ensure that flood risk is not increased elsewhere.

5.108 Further detail on the drainage strategy is provided in **Appendix 11.2**.

Utilities

5.109 A number of new substations would be provided at ground floor level around the Site. These substations would connect to the existing High Voltage (HV) network and serve the Low Voltage (LV) supplies within the Development.

5.110 New connections to BT and other communication services would be requested after planning permission has been granted. Due to the location of the Site and the existing services, it is highly likely that there would be sufficient capacity within the existing networks for the Development.

5.111 New gas connections would be required to serve the new energy centres. A number of smaller capacity connections would be requested to allow for A3 catering units.

5.112 New water supplies would be required to serve cold water storage plant in each phase of the Development. Each retail unit would be provided with their own mains water supply. Commercial buildings (e.g. cinema, office, school, community centres) would also each have their own water supply. Each phase would require its own fire supply to serve sprinkler plantrooms. Further information on the potable water supply is provided in **Chapter 12: Surface Water Drainage and Flood Risk** and within the Foul Sewage and Utilities Statement.

Energy and Sustainability

Energy Strategy

5.113 Two energy centres are proposed for Application A (hybrid component of the Development), with one located within each basement. The energy centre within the basement to the east of Ship Lane in Development Area 1 would comprise 5 gas fired boilers gas input and 3 gas fired Combined Heat and Power (CHP) units. The energy centre within the basement to the west of Ship Lane in Development Area 2 would comprise 4 gas fired boilers and 3 gas fired CHP units.

5.114 The energy centre within the proposed school (Application B) would contain 2 gas fired boilers and 1 gas fired CHP unit, located within the second floor of the building. A sub-station would also be located within the ground floor of the building.

5.115 PV panels would also be provided on the roof areas throughout the Development. A total area of up to 520 m^2 would be provided in the outline component of the Development and 520 m^2 would be provided in the detailed component of the Development (up to 1,040 m^2 across the whole

Development in total). PV panels are not proposed to be located on the school building as the roof area would be used for play space and plant allocation.

Sustainability

5.116 The Development is targeting a BREEAM 'Excellent' rating through the incorporation of a number of features to ensure high environmental performance. These sustainable features include the following (refer to the Sustainability Statement for further information):

- the energy strategy is designed to achieve regulated CO_2 emissions reductions, with the Development targeting a reduction of 20% beyond the Site-wide baseline;
- water efficient devices would be installed to target a reduced water consumption in the non-domestic areas;
- Sustainable Urban Drainage Systems (SuDS) would be provided, such as green roofs and underground attenuation tanks, in order to limit the run-off of rainwater surface;
- re-use of the main building façade, structure and floors would be undertaken for The Maltings, the former hotel and the Bottling building. Where new materials are introduced they would be specified where possible and practicable to be sustainably sourced, recycled or re-used building materials;
- recyclable waste storage would be provided for the occupants to manage their operational waste;
- secure cycle storage and facilities would be provided to encourage the use of bicycles;
- all occupied spaces of the Development would achieve compliance with the Building Regulations Part L 2013 Criterion Three requirements[2]. The risk of overheating would be mitigated by the inclusion of features such as internal blinds, g-value of the glazing, an appropriate glazing ratio and mechanical ventilation rates in excess of the minimum requirements of building regulations.

Waste Management

5.117 To the east of Ship Lane within the Stag Brewery component for the Site in Development Area 1, bin stores would be located beneath ground level. Bins would be wheeled to street level at the collection points at collection times by the on-Site facilities management team. Refuse collection would occur along the new high street within the Site; all collection points within the Stag Brewery component of the Site east of Ship Lane in Development Area 1 would be located within 20 m from where the rear of the refuse lorry can safely stop, as required by LBRuT. Refuse vehicles would therefore be able to enter the Site at the south-east corner of the Stag Brewery component of the Site, and drive along the new high street to collect all refuse from the east side of the Stag Brewery component of the Site. A reversing manoeuvre may be required to access the bin store at Building 12.

5.118 To the west of Ship Lane, with the exception of the school, the Stag Brewery component of the Site is in Outline only and so the delivery and servicing regime is not yet fixed.

5.119 The school would have its own separate waste storage unit and would be serviced by a separate refuse truck. A specific school loading bay would be used to carry this out. Again, servicing trips would be managed in order to avoid school pick up and drop off times.

5.120 The on-Site facilities management team and LBRuT refuse team would liaise to co-ordinate the refuse collection process and agree the collection days, times and process. Waste and recycling would be collected on the same day, with two collections per week to be made. Commercial waste collection would be subject to a separate regime to residential waste but would be controlled by the estate management company to ensure that is operates efficiently and that collections are timed to avoid peak traffic hours. In addition, on sensitive parts of the Site, waste collection would occur early in the day to minimise conflicts with pedestrians and cyclist's times.

References

1 Institute of Lighting Professionals (2011); Guidance Notes for the Reduction of Obstructive Lighting GN01:2011.

2 Department for Communities and Local Government (2014); Conservation of fuel and power: Approved Document L.

6. Development Programme, Demolition, Alteration, Refurbishment and Construction

Introduction

6.1 This Chapter describes the anticipated programme of works and the key activities that would be undertaken on the Site during the demolition, refurbishment, alteration and construction works (hereafter referred to as the 'Works') necessary to facilitate the Development. This Chapter sets out how the Works would be carried out and the Applicant's intentions for managing environmental effects during the Works. Detailed consideration of likely significant environmental effects related to the Works are provided in **Chapters 7** to **18** of this ES.

6.2 A summary of the likely significant environmental effects arising from the Site preparation and construction works are briefly set out, together with a summary of the relevant mitigation measures. A Framework Construction Management Statement (FCMS) has been provided / submitted to support the Planning Applications. The FCMS provides an indicative strategy for the proposed demolition, construction methodology, construction logistics and associated assumptions for the Works. The FCMS is an initial plan and has been prepared in advance of the appointment of a Principal Contractor(s). Upon appointment, the Principal Contractor will outline the project Construction Method Statement and Construction Logistics Plan.

6.3 It is proposed that a detailed Construction Environmental Management Plan (CEMP) would also be prepared for the Development and secured through planning condition attached to the planning permission, based on the FCMS provided with the planning application. The CEMP would include details of relevant environmental management controls necessary for environmental protection during the Works, as detailed later in this Chapter, and would be implemented by the Principal Contractor for the Development.

6.4 Planning for construction is necessarily broad at this stage and may be subject to modification. Specific activities may vary in frequency, depending upon the particular stage of works. However, it is considered that sufficient planning has taken place to enable the identification and assessment of all likely significant environment effects related to the works.

Programme of Works

6.5 It is currently anticipated that the Works required to facilitate the Development would be carried out over a period of approximately 8 years. The Works are anticipated to commence in June 2019 and complete in September 2027.

6.6 **Table 6.1** sets out an indicative outline programme of key activities associated with the Works. This is graphically represented within **Figure 6.1**. **Appendix 6.1** indicates the proposed Phases.

Table 6.1: Indicative Outline Programme of Key Site Preparation and Construction Activities

Key Stages of Work	Start	Finish	Approximate Duration (Weeks)
Site wide enabling works and services isolation	June 2019	September 2019	11
Site wide demolition and slab removal	June 2019	January 2020	30
Chalkers Corner works	April 2021	April 2022	48
Development Area 1 Site preparation works including sheet piling and infrastructure	September 2019	April 2021	74
Development Area 1, Phase A • Archaeological inspection period • Basement construction • Building 1-3 Construction • Building 4 Alteration / refurbishment	May 2020	December 2022	126
Development Area 1, Phase B • Archaeological inspection period • Basement construction (including basement for Development Area 1, Phase C) • Building 5 Alteration / refurbishment • Building 6-8, 10, 20 Construction	June 2021	April 2024	142
Development Area 1, Phase C • Building 9, 11-12 Construction	December 2022	August 2024	82
Development Area 1 completion and handover		December 2022	
Development Area 2 Site preparation works including sheet piling and infrastructure	April 2021	December 2022	82
Development Area 2, Phase D • Archaeological inspection period • Basement construction • Building 13-19 Construction	December 2022	June 2027	224
Development Area 2, Phase E • Building 21 – 22 Construction	March 2026	September 2027	75
Development Area 2 completion and handover		September 2027	
School Construction • School construction • Temporary road construction	August 2019 September 2021	April 2022 April 2022	130 26
School completion and handover		April 2022	

Description of the Works

6.7 The Works are anticipated to be undertaken in the following way:

- demolition works will be undertaken Site wide in one phase;
- excavation of the Development Area 1, Phase A basement will be complete prior to commencement of the Development Area 1, Phase B and C basement which will be complete prior to commencement of the Development Area 2, Phase D basement;
- the anticipated order of construction would be Development Area 1 Phase A, Development Area 1 Phase B, Development Area 1 Phase C, Development Area 2 Phase D, Development Area 2 Phase E;
- construction of the School will be concurrent with Development Area 1 Phase A, and Phase B, and will be completed and operational before commencement of construction works on Development Area 1 Phase C, Development Area 2 Phase D, Development Area 2 Phase;
- Chalkers Corner works would be undertaken prior to the completion of the school;
- a temporary road would be set up to service the operational school (Application B) until the completion of Application A and associated permanent roads are in place; and
- an entire Phase would be completed before any buildings within the Phase are occupied.

Stag Brewery Component of the Site

6.8 Details of the retention and alteration works to retained structures is provided in **Chapter 5: The Proposed Development**.

Enabling Works

6.9 Prior to commencing enabling works, the boundary of the Stag Brewery Component of the Site would be secured by the installation of solid 2.4 m high hoarding. Further hoarding would enclose work areas and buildings where access is to be provided to the contracting team and where external works are to take place adjacent to public areas. This would establish a safe working enclosure and exclusion zones for the general public. The hoardings would comply with the Health and Safety Executive (HSE) and LBRuT requirements. They would be well lit and maintained throughout the works to ensure public safety.

6.10 Full pavement width hoarding is anticipated to the road frontages with temporary pedestrian tunnels to maintain pedestrian access. The pedestrian access will be fully lit throughout, and on the highway side there will be baulk timbers that will be lit along their length. The area will be regularly maintained to ensure it is kept clean and maintained to acceptable standards. The Scaffold Tunnel will be constructed such that it is weather proof from above as well as protected from the unlikely event of any falling material. Where the pedestrian tunnel extends beyond the pavement into the highway (if necessary) the levels will be locally adjusted to create a level walking surfaces.

6.11 Prior to demolition work, the following enabling works would be carried out to protect infrastructure, buildings and features that would be retained through the Works:

- protection of buildings or structures to be retained, as outlined in **Chapter 5: The Proposed Development**, including the Maltings, former Hotel and former Bottling buildings (façade retention), memorial plaques, northern and southern boundary structures;

- protection of tree preservation order (TPO) protected trees; and
- decommissioning of the existing services within the brewery and disconnection of services and utilities connected to the existing Site has already been undertaken. However, these utilities will be made safe, diverted and protected during the Works with the intention that many utilities and underground services may require upgrading at a later date to accommodate the Development.

Demolition

6.12 As outlined above Site-wide demolition would be undertaken, and is anticipated to be undertaken from June 2019 to January 2020. However, the following structures within the Site would be retained and therefore not demolished:

- Maltings;
- (Former) Hotel (façades);
- (Former) Bottling Building (façades);
- railway tracks, paving and moorings;
- memorial plaques;
- Sections of the river walls;
- fence south of Watney's sports ground; and
- the brewery gates.

6.13 Buildings due for demolition would be demolished by top-down de-construction method by means of mechanical plant and mobile craneage. Fully wrapped scaffolding would be utilised within the Stag Brewery component of the Site to provide protection during the demolition works. The wrap would protect adjacent roads, walkways and buildings from debris, falling materials and dust.

6.14 The memorial plaques and historic gates would be stored for protection in containers on the Site during the Works and re-instated post-construction.

6.15 A phased archaeological evaluation programme would be implemented, following demolition and Site clearance, moving across the Site behind the demolition (see **Chapter 14: Archaeology** for further details). In addition, further ground and geotechnical investigations would be undertaken to inform an appropriate remediation strategy for the Site (see **Chapter 11: Ground Conditions and Contamination** for further details). A suitably qualified Asbestos remediation company would be employed to survey, make notifications and remove all asbestos from the Site in accordance with good practice to a suitably registered waste facility in line with the Control of Asbestos Regulations 2012[1].

Site Preparation

6.16 As outlined above the anticipated order of construction of the Development within the Stag Brewery component of the Site would be Development Area 1 (Phase A, B, C), Development Area 2 (Phase D, E) with the construction of the School being concurrent with Development Area 1 Phase A and Phase B. Chalkers Corner works would be undertaken and completed prior to the completion of the school (see below for further information).

6.17 Following Site-wide demolition works, Site preparation activities will be carried out at the commencement of work to each phase, which would include but not be limited to:

- installation of site accommodation and clear directional signage;
- establish escape routes, emergency plans and contact details;
- utility diversions, supplies and connections agreed with relevant statutory authorities;
- installation of temporary power, lighting and water;
- connection of welfare facilities to drainage system; and
- temporary site and access track drainage including temporary surface water collection tank and potential oil separator to account for the increased temporary surface run-off within a cleared site area.

6.18 Since the proposed school would be implemented and operational before the surrounding development (Application A), it is proposed that the hard landscaped area to the north of the school and the road to the east of the school would be built simultaneously with the school in order to provide a route for vehicles to circulate in a single anti-clockwise direction around the school from and to Lower Richmond Road. This route would remain functioning until the completion of Application A, after which the route to the north would become a controlled access route only.

Substructure Works

6.19 Sub-structure works will commence after the completion of enabling and site preparation work. Sub-structure works would comprise of the following activities:

- deep excavations;
- dewatering and disposal, using standard techniques such as sumps and pumps;
- sheet piling to form a retaining well and groundwater stop to the basement structure;
- ground remediation and preparation of excavated surface;
- construction of basement structure including foundations, columns and reinforced concrete slabs;
- waterproofing of substructure system; and
- backfilling as necessary.

6.20 As outlined in **Chapter 5: The Proposed Development** a single storey basement is proposed underneath the majority of the Stag Brewery detailed component of the Site, east of Ship Lane (Development Area 1). The bottom of the proposed basement slab within this east part of the Stag Brewery component of the Site would be set at 0.76m AOD with the basement Finished Floor Level (FFL) set at 1.76 m AOD. A single storey basement is proposed west of Ship Lane, located in the north-east section of this part of the Site (Development Area 2). The maximum extent of the proposed basement within this west part of the Stag Brewery component of the Site (west of Ship Lane), would be set at 2.45m AOD.

6.21 It is anticipated that excavation for basements would be undertaken as follows:

- Development Area 1, Phase A basement - June 2020 to June 2021;
- Development Area 1, Phase B and C basement - July 2021 to December 2022; and
- Development Area 2, Phase D basement - January 2023 to March 2024.

6.22 Sheet piling, using Continuous Flight Augur (CFA) piling, would be used to retain the external basement walls.

6.23 The proposed foundation design for all buildings within the detailed element of the Stag Brewery component of the Site would comprise a 1m deep piled raft, with the exception of the proposed cinema area which would be founded in 1m deep local pile caps with 1m deep ground beams. Below the foundations, all buildings would have an expanse of piles (3 to 5 per column) that would be 600mm in diameter and extending down 25m in length. The new river wall would be formed of a sheet pile wall with an in-situ reinforced concrete capping beam. The toe level of the sheet pile wall would be set at -1m AOD.

6.24 The sub-structure works will be phased progressively with the above superstructure works.

Superstructures Works

6.25 The new buildings on Site will be constructed in steel sections. These sections would be delivered and constructed on site. Flatbed trailers would be used to move sections around the Site as required.

6.26 Ground-bearing slabs would be poured directly above the basement structures and tower cranes would be used to move all superstructure sections into place once a level platform is provided for operative to work on.

6.27 Once one level of columns are installed and formwork installed and propped as required, floor slabs would be poured using reinforced concrete slabs on profiled metal decking. Core construction methods would be utilised whereby reinforced concrete lift shafts are prioritised for construction early in the programme to provide the spine which the remainder of the buildings are constructed around.

6.28 Safety fans would be utilised on all structures once work has progressed beyond the first floor level. Like the Full Building (Body) Scaffolding, the safety fans would prevent objects falling and as such protecting the public, site operatives and adjacent property.

6.29 Completion of the roof would be undertaken by specialist roofing teams using the roof slab and a perimeter scaffold system. The roof would be completed when the roof slab has been cured to enable early weathering and commencement of internal works. Roof materials would be delivered in bulk and tower cranes used to place it at the workface.

Fit Out

6.30 Internal materials for the mechanical & electrical, fit out and equipment would be brought to Site using rigid delivery vehicles using a just in time approach to avoid excessive on-site storage and double-handling. The material would be distributed to each area of the Site using tower cranes and to each floor plate using hoists.

6.31 Fit-out of all newly constructed buildings would utilise a hoist and lift system. Given the specialist nature of the equipment required, the on-site sequence would be determined by the final design stage development.

Landscaping and External Works

6.32 External works would be phased to suit handover sequences. Any occupied areas would be provided with segregated walkways and routes if any external works are still being completed prior to completion of final access routes.

6.33 Local storage and stockpiles would be made available around the Site and it is anticipated that external / soft-engineering works would be undertaken in phases, determined by the wider construction programme.

6.34 External soft engineering works areas would be segregated from other users until the completion of work and integrated with the overall landscaping proposals. Drainage would be provided at this stage to prevent contamination and allow minimal impact to the existing drainage system.

6.35 Landscaping works would be undertaken in seasonally acceptable periods.

Chalkers Corner Work

6.36 It is anticipated that the Works to the Chalkers Corners component of the Site would be undertaken from April 2021 to April 2022. As noted in **Chapter 5: The Proposed Development**, works to Chalkers Corner include reconfiguration of Chalkers Corner traffic junction and existing landscaped and informal parking area to facilitate amendments to lane configuration, a new cycle lane, works to existing pedestrian and cycle reservoirs and provision of landscaping and trees. The Lower Richmond Road arm would be re-aligned by 12 m to the north east to allow:

- the provision of a short additional left turn lane (flare) from Lower Richmond Road into the junction (26 m long or about 5 car lengths);
- provision of an extended queuing reservoir between the main junction of Lower Richmond Road (this would accommodate about 9 extra cars south westbound) and would also provide extra storage for north east bound vehicles including those waiting to turn right into Lower Richmond Road); and
- provision of a wider pedestrian island within the Lower Richmond Road arm to 4 m wide to sufficiently cater for cyclists crossing as well as pedestrians.

6.37 An extended, dedicated lane for traffic turning left from Clifford Avenue into Lower Richmond Road would also be provided.

Access

6.38 Access to the Works for both Development Area 1 and 2 would be via Ships Lane. This location has been selected as it allows for a separate entrance and exit whilst utilising existing infrastructure. For Development Area 1, additional access / egress at the corner of Bulls Alley and Mortlake High Street would also be utilised. The gates to the Site would be designed not to encroach on to the footpaths or highway. It would be ensured that access to Development Area 2 for construction vehicles can be achieved without impacting on the school operation through the use of a temporary school access road whilst the Works for Application A are underway.

6.39 The final construction vehicle routes will be agreed and confirmed as part of the final Construction Logistics Plan (CLP) post submission of the planning application and once a Principal Contractor has been appointed. For the purposes of the EIA, it has been assumed that all construction HGVs would access the Site from the west via Chalkers Corner – Lower Richmond Road. As access

from the east is constrained by 17 and 18 tonne weight restrictions along The Terrace, it has been assumed that only LGV trips would access the Site from the east.

Employment

6.40 The number of jobs generated by the Site preparation and construction works is set out in **Chapter 7: Socio-Economics**. The Local Plan requires Local Employment Agreements (LEA) to be in place for large scale developments which would assist in ensuring that local residents have access to the employment opportunities arising from the Development. The measures to target local employment during Site preparation and construction would be secured through a Section 106 agreement.

Plant and Equipment

6.41 The types of plant that are likely to be used during the Works are identified in **Table 6.2**.

Table 6.2: Indicative Schedule and Plant and Equipment

Plant and Equipment	Site Preparation and Demolition	Enabling Works	Substructure	Superstructure	Cladding	Fit out	Public Realm & Landscaping
360º tracked excavator	✓	✓					✓
Concrete crusher and handheld compressor breakers	✓	✓					
Concrete ready-mix lorries	✓		✓	✓			✓
Concrete splitters and concrete saws / Steel muncher machines	✓						✓
Cranes and hoists	✓		✓	✓	✓	✓	✓
Cutters, drills and small tools	✓		✓	✓	✓	✓	✓
Excavators and breakers	✓	✓					✓
Floodlights / telehandler	✓	✓	✓	✓	✓	✓	✓
Fork lift trucks	✓		✓	✓	✓	✓	✓
Hydraulic benders and cutters	✓		✓	✓	✓	✓	✓
Lorries / vans	✓	✓	✓	✓	✓	✓	✓
Tarmac laying equipment	✓						✓
Scaffolding and hydraulic access platforms	✓		✓	✓	✓	✓	✓

Plant and Equipment	Site Preparation and Demolition	Enabling Works	Substructure	Superstructure	Cladding	Fit out	Public Realm & Landscaping
Temporary supports	✓	✓	✓	✓	✓	✓	✓
Articulated flatbed trucks	✓	✓	✓	✓	✓	✓	✓
Piling Rig			✓				
Scissor Lift	✓						
Site Dumper	✓						✓

Hours of Work

6.42 It is anticipated that the normal working hours for demolition and construction would be:

- 08:00 to 18:00 hours weekdays; and
- 08:00 to 13:00 hours Saturday.

6.43 Generally, working on Sundays or Bank Holidays would be limited to specific major events such as crane erection and dismantle and the delivery of large or heavy materials or plant, which due to their size would have to be transported outside of normal working hours. In all instances, times and dates for these would be previously agreed with LBRuT, and other relevant parties.

6.44 Night-time working would be restricted to exceptional circumstances and would also be subject to prior agreement.

Likely Significant Environmental Effects

6.45 Demolition, refurbishment and construction sites have the potential to cause temporary disturbance and nuisance to neighbouring occupants, highway users and other sensitive receptors. Detailed assessments of the likely significant environmental impacts resulting from the Works of the Development are described within the technical chapters of this ES (i.e. **Chapters 7** to **Chapter 18** inclusive).

Construction Environmental Management Plan

6.46 The nature and magnitude of likely significant environmental effects associated with Site preparation and construction works are largely dependent on the implementation of effective management controls e.g. employment of dust suppression methods and use of properly maintained plant.

6.47 The Contractor would be required to prepare a Site-specific CEMP and for it to be approved under the planning permission. The preparation of a CEMP is an established method for managing environmental effects resulting from demolition and construction works and is consistent with

methods generally adopted for major schemes in urban areas. The CEMP would be an operational manual for carrying out environmental controls and monitoring during works, and would include reference to essential standards for dealing with waste and materials, air quality and noise, as defined by the Mayor of London's Supplementary Planning Guidance on Sustainable Design and Construction published in May 2014[2]. The CEMP would include guidelines on environmental controls to protect the environment in line with LBRuT's Sustainable Construction Checklist Guidance Document[3] and would be discussed with LBRuT's Environmental Health Department prior to being submitted for approval by the Council, pursuant to a planning condition proposed for inclusion in the planning permission sought.

6.48 The CEMP would include the following key considerations:

- restrictions and targets for specific work activities in order to minimise environmental effects, including disruption and disturbance to local residents, workers and the general public;
- details of the means by which appropriate environmental monitoring, record keeping and reporting would be managed to ensure the above targets are being met;
- procedure(s) to deal with necessary 'abnormal' works that could result in deviation from the agreed procedures and targets (targets are essential components for effective environmental management); and
- provision for a programme of regular environmental audits and reviews at key stages in the construction programme.

6.49 The CEMP would be secured by a suitably worded condition of the planning permission. The CEMP would place stringent contractual and procedural performance obligations upon trade Contractors. These would be maintained and reinforced by commitments detailed below and, where relevant, within **Chapters 7** to **18** inclusive. Such commitments would be enforced through subsequent detailed agreements with, and consents provided by LBRuT. A clear management structure and description of the responsibilities and authority of a specific Project Environmental Manager (PEM) would be included.

6.50 The PEM would have primary responsibility for liaising with LBRuT and other agencies on environmental matters. It is anticipated that regular meetings would take place to review progress and to agree necessary actions. Nevertheless, it is recognised that positive action and reaction by site operatives at the time of any environmental incident or breach of targets are essential components of effective environmental management.

6.51 The CEMP would address requirements in relation to environmental controls and would allow for, and include, the following:

- the appointment of an experienced PEM responsible for the preparation and implementation of the CEMP;
- details of the phasing of the works, including information on construction works that may be carried out by trade Contractors;
- procedure for construction activities, highlighting any operations likely to result in adverse environmental effects, with an indication of the mitigation measures to be employed;
- reference to, and provision of a framework for compliance with all legislation that would be relevant;
- emergency procedures that would be implemented on-Site;

- prohibited or restricted operations;
- control limits or target criteria for environmental issues, where practicable;
- requirements for monitoring and record-keeping;
- mechanisms for third parties to register complaints and the procedures for responding to complaints;
- provisions for reporting, public liaison and prior notification, especially where dispensations would be required;
- details of construction operations, highlighting the operations most likely to result in disturbance and / or working outside core working hours, together with an indication of the expected duration of each activity;
- possible departures from target criteria, and details of how any adverse effects would be minimised, or potential complaints addressed;
- details of proposed routes for HGVs travelling to and from the Site;
- provisions for auditing by the PEM, LBRuT and other regulatory authorities where appropriate;
- details of plant to be used;
- details of all construction works involving interference with a public highway, including temporary carriageway / footpath closures, realignments and diversions; and
- housekeeping procedures and environmental management controls.

6.52 Further detail on specific control measures for the different potential environmental issues are identified further below.

Waste Management and Minimisation

6.53 As detailed within the Site Waste Management Plan (appended to the FCMP submitted with the Planning Applications), it is estimated that approximately 210,610 tonnes of waste would be generated as a result of the demolition of the existing buildings on Site. The anticipated breakdown of this total is detailed within **Table 6.3**.

Table 6.3: Indicative Quantities of Demolition Waste

Waste Stream	Estimated Quantity (tonnes)
Concrete	123,000
Masonry	22,775
Aggregates	21,410
Ferrous	26,550
Non-Ferrous	1,020
Timber	8,620
Glass	250
Plasterboard	5,700
Slates	990
Miscellaneous	295
Overall Total	**210,610**

Note: Quantities estimated by AECOM using the Waste and Resources Action Programme (WRAP) Net Waste Tool[4] based on the approximate length, width, and height of existing buildings

6.54 It is estimated that site clearance activities will be carried out on an approximate Site area of 60,995m^2.It is estimated that excavation activities would result in a total of approximately 163,652m^3 (286,391 tonnes) of material being removed from the Site, although it is expected that 26,528m^3 (46,424 tonnes) of this waste would be re-used on Site.

6.55 It is estimated that approximately 29,107 – 60,545 tonnes of construction waste would be generated as a result of the Development. The anticipated breakdown of this total is detailed within **Table 6.4**.

Table 6.4: Anticipated Quantities of Waste Materials likely to Arise during the Construction of the Proposed Development

Material	Composition of Construction Waste Stream (%)	Approximate Quantity of Total Tonnes of Waste Anticipated to ırise during Construction (tonnes)
Packaging (incl. wood pallets, cable drums, cases)	25 – 35	7,277 – 10,188
Plasterboard	5 – 36	1.456 – 10,479
Rubble – broken bricks, blocks, tiles etc	25 – 40	7,277 – 11,643
Timber - (excludes pallets)	15 – 25	4,366 – 7,277
Cement and plaster	10 – 17	2,911 – 4,948
Insulation – rockwool and fibreglass	6 – 15	1,747 – 4,366
Metal	3 – 9	873 – 2,620
Dry concrete products – blocks, slabs etc	2 – 12	582 – 3,493
Plastic products (excludes packaging)	1 – 11	291 – 3,202
Ceramic material	1 – 8	291 – 2,329

6.56 The SWMP details the likely waste management measures and procedures to be implemented on Site during the Works. Detailed information would be provided at subsequent stages by the Principal Contractor, once details and methods associated with the demolition, excavation and construction phases are known.

6.57 Where it is necessary to transport waste to and from the Site, transportation would comply with The Waste (England and Wales) Regulations 2011 (as amended)[5] including:

- transporting waste via registered carriers;
- disposal to appropriately licensed sites; and
- maintenance of appropriate waste transfer documentation.

6.58 Additionally, all waste arisings would be managed in accordance with the 'proximity principle' (i.e. managing waste as close to its origin of source as possible).

6.59 All relevant contractors would be required to investigate opportunities to minimise and reduce waste generation in line with WRAP's 'Halving Waste to Landfill' initiative[6] through:

- agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme;
- implementation of a 'just-in-time' material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste;
- use of standard size components in design detailing to eliminate risk at source where possible to do so;
- the pre-assembly and pre-fabrication of elements wherever practicable to minimise waste generation on-Site;
- attention to material quantity requirements to avoid over-ordering and generation of waste materials;
- re-use of materials wherever feasible, e.g. the Government has set broad targets for the use of reclaimed aggregate, and in keeping with best practice, contractors would be required to maximise the proportion of materials recycled;
- segregation of waste at source where practical;
- re-use and recycling of materials off-Site, where re-use on-Site is not practical (e.g. through use of an off-Site waste segregation facility and re-sale for direct re-use or re-processing);
- skips would be colour coded and signposted to reduce risk of cross contamination and covered to prevent dust and debris blowing around the Site, these would be cleared on a regular basis; and
- burning of wastes or unwanted materials would not be permitted on-Site.

Traffic and Access Management

6.60 As set out previously and in **Chapter 8: Transport and Access**, access to the Works on the Stag Brewery component of the Site would utilise the existing infrastructure. The FCMS submitted for planning provides an indicative strategy for construction logistics. A Construction Logistics Plan would be prepared upon appointment of the Principal Contractor. Recognition is given to traffic and pedestrian management, as well as the segregation of construction activities. The use of just-in-time deliveries would look to minimise material delivery waiting times and reduce congestion and pollution on local highways. The segregation of construction traffic and public vehicles would be maintained wherever possible and deliveries would be aimed for times avoiding traffic rush-hours.

6.61 Whilst on-Site, construction traffic would utilise custom-built temporary haul roads throughout all phases. These roads would be constructed with a temporary asphalt / concrete surface to avoid the Site becoming waterlogged. A wheel-wash facility would be identified for use at all exit points from the Site at the designated loading areas and manned power-wash stations would be identified for exit points where wheel-wash facilities do not provide suitable means of cleaning.

6.62 Clear directional signage and consistent drop-off / pick-up areas are recommended to be maintained. This would provide continuity regardless of which haulage contractor is involved during the Works at any given time. The Principal Contractor would also need to implement a strong Site induction targeting specific areas of Site access and deliveries.

Control of Noise and Vibration

6.63 During the Works, measures to reduce noise and vibration levels would be implemented (refer to **Chapter 9: Noise and Vibration**). This would be achieved by:

- application of the principle of Best Practice Measures (BPM) as defined in Section 72 of the Control of Pollution Act 1974[7], carrying out all work in such a manner as to reduce any disturbance from noise to a minimum;
- identification and use of low noise techniques. For example, equipment that breaks concrete by munching or similar, rather than by percussion. Where construction plant which is known to generate significant levels of noise then it is to be used sparingly and the construction activity is closely monitored to minimise noise levels;
- all plant brought on to Site should comply with the relevant European Commission (EC) / UK noise limits[8,9] applicable to that equipment or should be no noisier than would be expected based on the noise levels quoted in BS 5228: 2009[10]. Plant should be properly maintained and operated in accordance with manufacturers' recommendations;
- where feasible, all stationary plant should be located so that the noise at all occupied sensitive receptors is minimised and, if practicable, every item of static plant when in operation should be sound attenuated using methods based on the guidance and advice given in BS 5228 (e.g. local screening);
- items of plant on the Site operating intermittently should be shut down in the intervening periods between use;
- adoption of a noise monitoring regime and the establishment of noise Action Levels in consultation with LBRuT, above which consideration would be given to the use of alternative techniques and / or other means of controlling noise levels;
- use of hoarding to the required height and density appropriate to the noise sensitivity of the Site;
- implementation of a Construction and Logistics Plan (CLP) to pre-plan and manage traffic associated with the Works to minimise disturbance to sensitive receptors.

Control of Dust

6.64 As set out in **Chapter 10: Air Quality**, to minimise the release of dust and air pollution during the Works, the following would be undertaken:

- appropriate site management including implementation of a stakeholder communications plan, a dust management plan, and regular site inspections to monitor dust control procedures;
- provision of appropriate hoarding and / or fencing to reduce dust dispersion and restrict public access;
- avoid Site runoff of water and mud;
- maintenance of Site fencing, barriers and scaffolding by cleaning using wet methods;
- removal of materials that have potential to produce dust, where possible;
- ensure all on-road vehicles comply with the requirements of the London Low Emission Zone;
- ensure all non-road mobile machinery (NRMM) comply with the standards set in the Mayor of London Guidance;

- avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment, where possible;
- fitting equipment (particularly cutting, grinding or sawing) with dust control measures such as water sprays, wherever possible;
- enclosing chutes, conveyors and covered skips;
- restricting drop heights onto lorries and other equipment;
- no fires would be allowed on the Site;
- control of cutting or grinding of materials on the Site and avoidance of scabbling;
- ensuring sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process and other control measures are in place;
- ensuring that a road sweeper is available to clean mud and other debris from hard-standing, roads and footpaths;
- ensuring vehicles entering and leaving the Site are securely covered; and
- using a wheel wash system (with rumble grids).

Control of Lighting

6.65 The CEMP would recommend that the use of portable external lighting be used in such a way so as to avoid the spill of light into neighbouring properties and into the night sky. Furthermore, lighting used during the Works would accord with the Institute of Lighting Professionals (ILP) Guidance so as not to cause a nuisance to nearby receptor (refer to **Chapter 18: Daylight, Sunlight, Overshadowing and Light Pollution**).

Townscape and Visual

6.66 Specific to the issues of townscape and visual impact, good site management, maintenance and housekeeping and careful siting of construction machinery would be implemented through the use of the CEMP to minimise visual intrusion the Works (refer to **Chapter 16: Townscape and Visual Effects**). This would ensure that temporary deterioration of townscape character and visual intrusion would be minimised as far as practicable. The use of attractive hoardings and the maintenance of a clean, safe pedestrian environment along the street frontages of the Site would aid in screening views of much of the ground level construction works from the adjoining townscape in and around the Site.

Ground Contamination

6.67 As detailed in **Chapter 11: Ground Conditions and Contamination**, following further detailed ground investigation, a Remediation Strategy would be produced. This would be agreed with the EA and LBRuT. The Remediation Strategy would outline the measures necessary to break potential pollutant linkages at the Stag Brewery component of the Site. The purpose of the Remediation Strategy would be to ensure the Site would be 'suitable for the end use' (i.e. the completed and operational Development) and that no unacceptable contamination risk would remain. Remedial measures may include, but would not be limited to, the following:

- removal of contaminated material;
- treatment of soil prior to reuse or disposal;

- appropriate reuse of material beneath paved areas or cover systems;
- importation of clean soils for areas of soft landscaping;
- the use of ground gas / vapour membranes in basements; and
- appropriately designed buried concrete and service pipes.

6.68 Following the completion of any remedial works required, a Verification Report would be produced. This would detail the results of testing, audits, as-built plans and duty of care documents to demonstrate identified linkages have been broken.

6.69 In addition to the remedial works, precautions would be taken to minimise the exposure of Site workers and the public to potentially harmful substances. Such protective measures would include:

- monitoring and preventive measures to control dust, which could include water spraying in dry weather and wheel washing facilities for vehicles leaving the Works;
- handling and storage of any potential hazardous liquids / materials not only in accordance with relevant legislation, but also in line with best practice including EA pollution prevention guidance. Storage tank and container facilities would be appropriately bunded with designated areas and located away from surface water drains. All drums and barrels would be fitted with flow control taps and would be properly labelled;
- stockpiling of contaminated materials would be avoided, wherever possible. Stockpiles would be located on areas of hardstanding or on plastic sheeting to prevent mobile contaminants infiltrating into the underlying ground and located away from the Thames and drains;
- procedures for the management of construction materials, spillage response, use of best practice construction methods and monitoring.
- surface drainage would pass via settlement and oil interceptor facilities, within the proposed basements and where required, and discharge arrangements would be agreed with the EA and Thames Water; and
- the provision of adequate drainage to manage surface water run-off and minimise contaminated water reaching the groundwater.

6.70 Post-demolition of the buildings on-Site, work should be carried out to locate and decommission the historic abstraction wells in-line with best practices and EA guidance, to prevent them acting as preferential pathways to the Principal Aquifer in the Chalk Formation.

Unexploded Ordnance

6.71 Prior to commencement of the Works a detailed desk-based Unexploded Ordnance (UXO) assessment would be undertaken to identify and classify the actual on-Site risk posed by UXO. The desk-based UXO assessment would include recommendations for mitigation to be undertaken during the Works. Dependent on the Site's actual UXO classification, mitigation may include:

- safety and awareness training to all construction staff;
- UXO safety testing and appropriate clearance certification for each ground penetration; and / or
- UXO safety procedures where UXO is discovered.

Protection of Water Resources and Site Drainage

6.72 The construction of the basement within the east part of the Stag Brewery component of the Site (east of Ship Lane) would involve excavation to below likely groundwater levels. Appropriate dewatering and disposal, using standard techniques such as sumps and pumps would likely be required.

6.73 Temporary measures to control surface water runoff from the Site during the Works would be provided. Such measures would include the provision of adequate drainage to manage surface water run-off. Construction of the drainage system should be designed and managed to comply with BS 6031:2009 'The British Standard Code of Practice for Earthworks'[11], which details methods that should be considered for the general control of drainage on construction sites. Discharge rates and volumes of water discharged would be agreed with the EA and Thames Water. Where appropriate, cut-off drainage would be provided around the Site during the Works when there is no on-Site drainage network in place.

6.74 The existing river wall would be lowered in certain areas, however, this would be undertaken after the new flood defence wall has been built, and would still be above the statutory flood defence level. Temporary defences would also provide the required level of protection until any replacements are in place and the Works would be undertaken when there is no practical risk of tidal flooding. All such work would be undertaken in conjunction with the EA to ensure necessary approvals for design and constructional sequence through Environmental Permits.

12.1 To reduce the water demand of the Development during the Works, all relevant contractors would be required to investigate opportunities to minimise and reduce the use of water in accordance with the CEMP. These would include:

- selection and specification of equipment;
- implementation of staff-based initiatives such as turning off taps, plant and equipment when not in use;
- use of recycling water systems in functions such as wheel washes and toilets;
- rainwater harvesting system for equipment and vehicle washing; and
- where possible, water from excavation would be used for dust suppression during construction.

6.75 Water consumption throughout the Works would be monitored, either through sub-metering or utility bills to allow a comparison against best practice benchmarks.

6.76 Easements would be provided to ensure existing drainage infrastructure is not impacted upon. The CEMP would set out measures to ensure that the existing sewers are adequately protected and / or diverted in line with best practice. Requirement for asset protection measures during the Works would be confirmed with Thames Water during the future design stages. The adoption of appropriate piling methods, which would be detailed in the CEMP, would ensure vibration levels are kept to a minimum and would not affect existing below ground infrastructure.

Protection of Ecological and Arboricultural Resources

6.77 As set out in **Chapter 13: Ecology**, the CEMP would ensure appropriate environmental controls to protect the River Thames and commuting and foraging bats from dust, noise, vibration, surface water run-off and lighting. Such protective measures would include:

- the use of environmental screens, water jet suppression, dust monitoring devices and other best working practices to minimise noise and dust;
- no waste materials, including silt laden drainage and spillages, hazardous / contaminated materials, chemicals or fuels shall be allowed to enter the River Thames through measures such as the use of appropriately tanked and bunded storage areas; and
- all construction lighting would be positioned so that no increased light levels are spilled on to the adjacent River Thames. In addition, the main hours of the Works would be undertaken during typical working hours minimising the requirement for additional lighting during the night.

6.78 It is recommended that any retained semi-mature or mature trees situated within and around the boundaries of the Site should be safeguarded during the Works following arboricultural best practice (BS 5837:2012: 'Trees in Relation to Design, Demolition and Construction)[12]. Construction activities, materials storage or changes in level should generally be avoided within the root protection area of a tree to be retained.

Protection of Built Heritage and Archaeological Resources

6.79 As described in **Chapter 14: Archaeology**, A phased archaeological evaluation programme would be undertaken following demolition and Site clearance, moving across the Site behind the demolition. Implementation of further excavation work would be dependent upon the results of the evaluation programme.

6.80 All buildings on the Site that have been identified as being of historic interest would be retained as part of the Development, ensuring that the group value and relationships between the heritage assets on the Stag Brewery component of the Site would be retained. As set out in **Chapter 15: Built Heritage**, a programme of archaeological building recording would be carried out prior to the demolition of historic fabric associated with the heritage assets.

6.81 Easements around the Buildings of Townscape Merit (BTMs) within the Stag Brewery component of the Site (i.e. the Maltings, façade of the former Hotel and façade of the former Bottling Building) would form a specified distance from the edge of the retained buildings / façades and structures where no demolition or slab removal works would take place. This would prevent ground loading or any ground disturbance which may cause foundations to move. In addition, and where required, all diesel and oil filling for plant and machinery would be located at the further cleared distance, in excess of the easement from the BTMs. The Site Manager would undertake dilapidation photographs of the retained buildings and structures and assess whether any additional protection is required such as boarding of windows or the erection of a physical barrier around them. Necessary protective measures would be identified through consultation with the relevant parties and review and sign off on a pre-construction condition survey of adjacent historic assets.

6.82 Further mitigation measures to protect historic assets during the Works would include:

- arrangement of delivery locations and times to limit disruption and possible damage to neighbouring historic structure;
- use of excavation and demolition methods that produce low vibration levels and participation in a monitoring programme to ensure vibration levels are within established thresholds;
- ensuring surface water runoff is not directed towards any historic assets; and
- directing debris chutes away from historic assets.

References

1 Control of Asbestos Regulations 2012.

2 Mayor of London (2014); 'Supplementary Planning Guidance: Sustainable Design and Construction'.

3 London Borough of Richmond upon Thames (2015); 'Sustainable Construction Checklist Guidance Document, Draft for Consultation'.

4 Waste and Resources Action Programme (WRAP); 'Demolition Quantities Estimator (DQE) as part of the Net Waste Tool'. URL: nwtool.wrap.org.uk.

5 The Waste (England and Wales) Regulations 2011 (as amended).

6 WRAP, (2014); 'A guide to Volume Mass Conversion Factors and List of Waste (Low) Categories used within WRAP's Tool's.

7 Section 72 of the Control of Pollution Act 1974

8 European Commission (2002); 'Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise'.

9 The Control of Noise at Work Regulations 2005.

10 British Standards Institute (BSI) (2014); 'BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites. Noise'.

11 British Standards (2009): BS 6031:2009 'The British Standard Code of Practice for Earthworks', December 2009.

12 British Standards (2012); BS 5837:2012: Trees in relation to design, demolition and construction. Recommendations.

7. Socio-Economics

Introduction

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

7.2 The Chapter provides a description of the methods used in the socio-economic assessment, a description of the relevant baseline conditions of the Site and surrounding area, and an assessment of the likely significant effects of the Development during demolition, alteration, refurbishment and construction (the 'Works') and once the Development is completed and operational.

7.3 Mitigation measures are identified where appropriate to avoid, reduce or offset any likely significant adverse effects and enhance any likely significant beneficial effects. The Chapter concludes by examining the nature and significance of likely residual effects.

7.4 This Chapter is accompanied by the following appendices:

- **Appendix 7.1:** List of Early Years provision within the local impact area;
- **Appendix 7.2:** List of Primary Schools within 2 miles of the Site;
- **Appendix 7.3**: List of Secondary Schools within 3 miles of the Site;
- **Appendix 7.4:** List of GPs within 1 mile of the Site; and
- **Appendix 7.5:** Consultation correspondence.

7.5 The following separate standalone report are submitted with the Planning Applications for the Development:

- **Retail Impact Assessment** - considers the impact of the Development on neighbouring centres and shopping parades of local importance and establish whether the Development might draw trade away from centres and thus have potentially negative effects;
- **Health Impact Assessment** - considers the impact on well-being and health as a result of the loss of or provision of open space, children's play space, playing fields, soft landscaping and trees as part of the Development;
- **Employment Assessment** - provides details in relation to employment floorspace and the demand for both office and industrial space;
- **Assisted Living Assessment** – presents an assessment of demand and supply for accommodation for those aged 65+ and focussing on the demand for Assisted Living units; and
- **Culture and Communities Assessment** – presents an assessment of the community facilities provided by the Development.

Assessment Methodology and Significance Criteria

Assessment Methodology

Overview

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

Establishing the Baseline Conditions

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

- The Business Register and Employment Survey[1] (Office for National Statistics (ONS));
- The 2011 Census of population and Annual Population Survey (APS)[2] (ONS);
- ONS Family Expenditure Survey[3];
- London Borough of Richmond upon Thames (LBRuT) Revised Planning Obligations[4] (2014);
- National Health Service (NHS) Choices[5] (location of health facilities);
- NHS Richmond Clinical Care Commissioning Group (CCG);
- Department for Education (DfE) (school locations and capacity information)[6];
- Achieving for Children, Community Interest Company delivering children's services on behalf of LBRuT;
- Greater London Authority (GLA) Child Yield and Open Space Calculator; Play and Informal Recreation Supplementary Planning Guidance (SPG)[7]; and
- The GLA's London Data Store[8].

7.8 The relevant baseline conditions are typically described according to the following areas:

- the Local Impact Area (LIA) - primarily defined as Mortlake and Barnes Common Ward. In addition, community infrastructure facilities are also assessed in relation to a number of local 'catchment' spatial scales as summarised in **Table 7.1**.
- the District Area - covering the LBRuT as the local administrative area; and
- the London Area - where appropriate and for 'benchmarking' purposes to set the relevant baseline data in the context of London as a whole.

7.9 The geographical and spatial scales are shown on **Figure 7.1**.

Table 7.1: Community Infrastructure Baseline Spatial Areas

Baseline Parameter	Spatial Area[A]	Rationale for Spatial Area
Primary health care facilities.	Within one mile[i] for GPs not including facilities outside of LBRuT CCG.	Based on consultation within London Borough of Richmond upon Thames (LBRuT) NHS Clinical Commissioning Group (CCG) and NHS London Health Urban Development Unit (HUDU)
Early years facilities.	Within LBRuT.	Based on the consultation comments received from LBRuT in respect of the assessment.
Primary schools.	Local (within two miles of the Site) not including schools in the western half of or outside of LBRuT.	Based on the Department for Education recommendations[C] as per the consultation received from LBRuT in respect of the assessment.
Secondary schools.	Local (within three miles of the Site). Not including schools in the western half of or outside of LBRuT.	Based on DfE recommendations[D] as per the consultation received from LBRuT in respect of the assessment.
Open spaces.	Local (within 1.2km radius of the Site) and LBRuT.	GLA Open Space Strategies[9], LBRuT Open Space Assessment[10].
Play spaces.	Local (within 800m radius of the Site).	GLA London Plan 2011, GLA Supplementary Planning Guidance (SPG) 2012 (Shaping Neighbourhoods. Children and Young People's Play and Informal Recreation); LBRuT Open Space Assessment.
Other community resources services.	Local (within 1km of the Site).	Facilities located within a reasonable walking distance of the Site.

Notes:

A. Distances are measured from the approximate centre of the Stag Brewery component of the Site as this is where the housing associated with the Development would be situated.
B. 2 miles has been applied as a proxy catchment area for GP surgeries. In practice each surgery will operate its own catchment distance depending on the size of the local population.
C. Section 444(5) of the Education Act 1996 suggests a maximum walking distance of 2 miles (3.2 km) for a child who is under the age of eight. This is used as the upper bound for determining eligibility for free school transport. As this guidance applies to children under the age of eight, the distance of 2 miles (3.2 km) is used to assess primary provision.
D. Section 444(5) of the Education Act 1996 suggests a maximum walking distance of 3 miles (4.8 km) for a child older than eight years of age. This forms the basis of assessing secondary school provision.

7.10 To help inform the baseline and methodology a number of consultations were held with the following:

- Matthew Paul, Associate Director, School Place Planning, Achieving for Children - providing children's services for Kingston and Richmond;
- Yvonne Kelleher; Parks Service Manager LBRuT and Steve Marshall, Wild Outdoor Futures Ltd;

[i] 1 miles has been applied as a proxy catchment area for GP surgeries based on consultation with the CCG and NHS London HUDU. In practice each surgery will operate its own catchment distance depending on the size of the local population.

- Bernie McManamon; Library Service Manager, LBRuT; and
- Liz Ayres, Relationship Manager and Kathryn MacDermott, Director of Primary Care; Richmond NHS CCG.

7.11 Correspondence associated with the consultation noted above is situated within **Appendix 7.5**.

Employment Generation and Expenditure During the Works

7.12 To estimate employment during the Works, Homes and Communities Agency (HCA) Labour Coefficients[11] (person years of employment per development £1m spend) were applied to the forecast costs associated with the Works. Person years of employment are divided by the expected timescale of the Works, as set out in **ES Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, to provide the average annual number of jobs.

7.13 It is acknowledged that whilst some construction workers paid as a result of the construction activity may live locally and their expenditure on household goods and services would also support employment in local businesses, construction worker could be drawn from all over London depending on the construction role they can provide. On this basis, an estimate of the induced (local expenditure) effects of this construction expenditure cannot be quantified with accuracy.

Local Expenditure of the Completed and Operational Development

7.14 Once completed and operational, the expenditure effects of both the residents and employees of the Development are captured via the induced effects of direct employment (see paragraph 7.18) and via the effects of household expenditure from residents (see paragraph 7.20).

Employment Generation of the Completed and Operational Development

7.15 The assessment of the completed and operational employment effects of the Development was based on the schedule of commercial floorspace uses as set out in **Chapter 5: The Proposed Development**. Where flexible commercial floorspace uses are proposed, a 'worst-case' scenario of flexible floorspace provision was defined (in this case, the floorspace totals for each commercial or community use that would likely generate the lowest density of employment whilst meeting the maximum Gross Internal Area (GIA) requirements). Assumptions regarding the worst-case scenario for the flexible floorspace uses are set out in **Table 7.2**.

Table 7.2: Flexible Floorspace Assumptions

Use	Maximum GIA/NIA	Worst case scenario (GIA/NIA)
Retail	2,500	1,255
Financial and Professional Services	200	0
Restaurant	2,200	0
Bar	1,600	0

Use	Maximum GIA/NIA	Worst case scenario (GIA/NIA)
Office	2,000	1,910
Community	1,148	1,148
Boathouse	351	351
Overall Maximum Flexible	**4,664**	**4,664**
High Street Zone (within overall max flexible):	2,510	
No < than 50% within high street zone to be flexible retail	1,255	

7.16 The HCA Employment Densities Guide[12] was used to calculate the likely number of full time equivalent (FTE) jobs that would be supported by each type of floor space proposed. Where necessary conversions are made from GIA to Net Internal Area (NIA) based on ratios set out within the Employment Densities Guide. In the absence of applicable floorspace densities in the Employment Densities Guide, assumptions on employment generation have been informed by industry standards and guidance have been made. As such, the floorspace densities and assumptions used to estimate employment generation are as follows:

- Flexible Retail / Café / Restaurant: all uses 15 m^2 (NIA) per FTE job;
- Finance and Professional Services: 16m^2 (NIA) per FTE job;
- Bar: 20 m^2 (NIA) per FTE job;
- Office / Small business / flexible space / management: 30 m^2 (NIA) per FTE job;
- Hotel: 1 FTE job per 2 beds;
- Cinema: 200 m^2 (GIA) per FTE job;
- Gym: 65 m^2 (GIA) per FTE job;
- Nursing Home and Assisted Living Units: Employment estimates are based on the number of residents (capacity) together with staffing guidelines for residential care homes from the Regulation and Quality Improvement Authority[13];
- Secondary school: two FTEs per class (maximum class size of 30 pupils) based on School Workforce Statistics[14];
- Community uses: the density for 'visitor and cultural' attractions using the lowest density of the scale set out within the Guidance. This equates to 300 m^2 (GIA) per FTE.

7.17 Indirect and induced multipliers were used to measure the indirect and induced effects on employment of the Development. A multiplier of 1.1 was used at the District level as per HCA guidance. The indirect employment effects generated by the Development include employment growth as a result of the purchase of goods and services by residents and businesses located in the Development.

7.18 Leakage and displacement has also been accounted for. Leakage is assumed to be 0% as the estimated direct jobs are generated by on-Site elements of the Development and would therefore be contained within the LIA and District. Displacement assumptions have been made in line with

HCA Guidance and range from 0% for community uses to 25% to commercial office and retail uses.

7.19 Induced employment would also be generated from the goods and services purchased by residents of the Development. Household expenditure was calculated using Regeneris' bespoke housing impact model. The impact model estimates the likely income of households in the Development based on the breakdown of house types and the likely price range of each house type. For each income group, the typical expenditure on different categories of goods and services was determined using the ONS Family Expenditure Survey.

7.20 For each category, assumptions are applied regarding the proportion of expenditure spent locally and the proportion spent in the district. These assumptions are based on the latest available local Retail Capacity Studies[15] together with an element of professional judgement and an understanding of the retail facilities and services that currently exist in the area surrounding the Site. The model then deducts indirect taxation (i.e. netting off tax on goods, taken from the 2015 Family Expenditure Survey) and multiplier impacts of 1.15 for the LIA and 1.25 for LBRuT (taking into account knock on effects of expenditure in local goods and services, taken from the HCA Additionality Guide[16]) to arrive at a figure for total spend. This is then converted to jobs using an estimate of output per FTE in different sectors (obtained from the UK Business Survey[17]).

7.21 It is not considered robust to estimate the household expenditure effects derived from any residents of the Care Village as their spending profile and patterns would be different to those of mainstream households. Any household expenditure effects derived from this element of the population would be additional to those estimated in this Chapter.

Housing Supply Effects resulting from the Completed Development

7.22 Due to the flexible use living accommodation for either assisted living or residential use within Buildings 13, 16 and 17, and given that affordable housing provision has not yet been determined, (see **Chapter 2: EIA Methodology** and **Chapter 5: The Proposed Development** for more detail), for the purposes of this assessment, four housing scenarios have been considered, as follows:

- **Scenario 1a**: Up to 667 residential units including 35% affordable provision; up to 150 Assisted Living units and an 80-bed nursing home;
- **Scenario 1b**: Up to 667 residential units with 0% affordable provision; up to 150 Assisted Living units and an 80-bed nursing home;
- **Scenario 2a**: Up to 817 residential units including 35% affordable provision and an 80-bed nursing home; and
- **Scenario 2b**: Up to 817 residential units with 0% affordable provision and an 80-bed nursing home.

7.23 Under scenario 2a and 2b, where no Assisted Living units are provided, it is assumed the 150 Assisted Living units will become residential units and will include an unspecified mix of 1,2 and 3 bedroom units. For the purposes of this assessment, the site wide split of 1-3 bed units has been applied to the 150 units in order derive a housing mix which can be used to determine population and child yields.

7.24 For the purposes of assessing scenarios 1a and 2a with 35% affordable provision, an indicative mix of units was provided by the Architects with a total provision of 35% affordable habitable rooms. This amounts to 224 affordable units. The split of social rented and intermediate units was based on the emerging Local Plan policy in relation to affordable housing which stipulates an 80:20 split. For scenario 2a, the additional 150 units were distributed using the same proportions for affordable housing as scenario 1a.

7.25 Further details on the proposed housing mix and scenarios can be found in **Chapter 5: The Proposed Development**.

7.26 A qualitative assessment of the provision of new homes for each housing mix scenario (considering number, type and tenure proposed) and the contribution to local housing targets was undertaken using professional judgement taking into consideration existing housing quality and housing requirements identified by LBRuT.

Population and Labour Market Effects of the Completed and Operational Development

7.27 For population and labour market effects, Regeneris' in-house model, based on the DCLG English Housing Survey, was used for each housing mix scenario to estimate the total number of people living in different size dwellings and UK Census data has been used to estimate the likely proportion that are working age and in employment (depending on whether they reside in affordable or market housing). To estimate the skill level of residents, small area (Lower Super Output Areas (LSOAs) Census data has been used to identify other LSOAs in LBRuT which have a similar mix of dwelling sizes, based on the number of rooms, to the Development. The average skill profile of these LSOAs is then applied to the new population of the Development.

Demand for Community Infrastructure of the Completed and Operational Development

7.28 Completed Development child yield (for education purposes) was calculated using the GLA Play Space Calculator combined with the housing and tenure mix for each scenario set out above. Schools Capacity data from LBRuT and Achieving for Children[18] LBRuT School Place Strategy and GLA School Place Forecasts were used to estimate existing and future school place demand.

7.29 For the purposes of assessing the effect of the Development on capacity of primary healthcare facilities, Regeneris' in-house model, which is based on the DCLG English Housing Survey[19], was first used to estimate the total number of residents the Development would accommodate. This level of demand for GP services by the Development was then compared with the forecast capacity of GP surgeries in the local area of the Site to determine the magnitude of effect on the capacity of local GP surgeries.

7.30 Open space requirements arising from the completed Development were calculated using the assessment methodology in LBRuT aforementioned Planning Obligations SPD and consultation with LBRuT.

7.31 Children's play space requirements were calculated using the previously referenced GLA's SPG on Play and Informal Recreation and Play Space calculator.

Community Safety and Wellbeing

7.32 The assessment of community safety and wellbeing is qualitative and based on professional judgement of the potential effects of the Development upon public safety.

Significance Criteria

7.33 Since there are no formalised technical guidance or criteria available to assess the significance of socio-economic effects, likely effects are assessed by considering the following factors, using professional judgement:

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

7.34 The sensitivity of each receptor was evaluated as being high, medium, low or negligible based on a review of the baseline position of each receptor and its performance against benchmark areas, together with consideration of the importance of the receptor in policy terms. This can be summarised as follows:

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

7.35 The magnitude of change to a receptor has been determined by considering the estimated deviation from baseline conditions, both before and, if required, after mitigation. The criteria used for the assessment of the magnitude of socio-economic effects (both beneficial and adverse) are shown in **Table 7.3**.

Table 7.3: Definition of Magnitude of Change

Magnitude	Criteria
High	Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements (adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (beneficial).
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of / damage to key characteristics, features or elements (adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (beneficial).
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (adverse).

Magnitude	Criteria
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (beneficial).

7.36 In reporting the likely significance of the effects of the Development, in respect of the Works and once completed and operational, the assessment contextualises both the sensitivity of the receptor and the magnitude of the change relevant to the receptor as a result of the Development. The matrix used to determine significance of socio-economic effects is presented in **Table 7.4**.

Table 7.4: Matrix Used to Determine the Significance of Socio-economic Effects

Sensitivity of Receptor	Magnitude of Change			
	Negligible	**Low**	**Medium**	**High**
Negligible	Insignificant	Insignificant	Minor	Minor
Low	Insignificant	Minor	Minor	Moderate
Medium	Insignificant	Minor	Moderate	Major
High	Minor	Minor or moderate	Moderate or major	Major

Baseline Conditions

Population and Demographic Characteristics

7.37 There is no existing resident population present on the Site. Headline demographic and population data for the impact area is set out in **Table 7.5**. There are currently around 11,000 people living in the Mortlake and Barnes Common ward with growth since 2001 of around 10%. LBRuT as a whole has also experienced population growth, albeit to a lesser extent, with 8.5% between 2001 and 2011. The overall growth rate for London over the same period was 14%.

7.38 The profile of the population in Mortlake and Barnes Common ward (the LIA) is similar to that of LBRuT as a whole as well as London. Around 68% of the population in the ward are of working age which is slightly higher than that of LBRuT (66.7%) and slightly lower than London as a whole (69.1%).

Table 7.5: Demographics

	Dataset	Mortlake & Barnes Common	LBRuT	London
Overall Population	2011	10,920	186,990	8,173,940
	Change 2001-2011	10.0%	8.5%	14.0%
Age	% Working Age (16-64)	68.2%	66.7%	69.1%
	% 0-15	19.8%	19.8%	19.9%
	% 65+	12.0%	13.5%	11.1%

Source: Census 2001 and 2011

7.39 The most recently produced population projections (2014-based Sub-National Population Projections (SNPP)) are not yet available below local authority level, but indicate that for the LBRuT as a whole, the population is expected to increase by around +17% between 2016 and 2032, or 34,000 in absolute terms (refer to **Table 7.6**). The 65+ age group is expected to see the greatest percentage change with an increase of +47% compared to +13% for the working age population.

Table 7.6: LBRuT Population Projections ('000s)

	2016	2018	2022	2027	2032	Absolute change (2016-32)	% change
Total	200	205	216	227	234	34	+17%
0-14	40	41	43	44	44	5	+12%
15-64	131	133	139	145	148	17	+13%
65+	30	31	34	38	44	14	+47%

Source: ONS, 2014-based sub-national population projection

Labour Market

7.40 Headline labour market information is set out in **Table 7.7**. The data indicates that LBRuT performs above the London average on a number of key labour market indicators, including economic activity rates and unemployment, as well as qualification levels.

Table 7.7: Labour Market Profile

	Dataset	LBRuT	London
Economic Activity	Economic Activity Rates	82.8%	77.7%
	Unemployment Rates	3.9%	6.1%
Occupations (% employed)	Managerial, professional and associate professionals	72.3%	52.8%
	Administrative, skilled	13.9%	17.7%

	Dataset	LBRuT	London
	trades		
	Care, leisure, sales	8.1%	14.9%
	Process, elementary	4.8%	14.1%
Qualifications	% Level 4+	69.6%	49.8%
	% No qualifications	3.2%	7.4%

Source: Annual Population Survey (APS), 2015 (data is not available below local authority level)

7.41 According to the data, in 2015 economic activity rates for LBRuT stood at 82.8% compared to 77.7% for London. The unemployment rate measured by the APS data was 3.9%, lower than the London average of 6.1%.

7.42 Skills levels on LBRuT are well above the London average with almost 70% of the working age population qualified to Level 4+ compared to around 50% for London as a whole. Furthermore, just over 72% of the population are employed in managerial and professional occupations compared to just under 53% for London as a whole.

7.43 Up to date labour market information is not available for the LIA as the APS does not provide data at a sub-District level. The last available data is from the Census 2011 which suggests LIA performs slightly above the LBRuT average with higher skills levels and economic activity levels.

Employment

7.44 The Stag Brewery ceased brewing operations in late 2015 and decommissioning of brewery infrastructure was undertaken following cessation of brewery activities. Most recently, works on-Site have been undertaken in respect of removal of brewery fixtures and fittings. . With the exception of security personnel, there is no existing economic activity present on the Site.

7.45 Headline data for the economic conditions are set out in **Table 7.8**. According to the most recently available data (2015) the number of jobs in the LIA was around 2,500. Over the last six years the number of jobs in the LIA has fallen by around -9% compared to an increase experienced by LBRuT (+16.5%) and London (+18%) over the same period.

Table 7.8: Jobs

Dataset	Mortlake & Barnes Common Ward	LBRuT	London
Number of Jobs (2015)	2,500	83,000	5,037,000
Absolute Change 2009-2015	-250	+11,770	+764,320
% Change 2009-2015	-9.1%	+16.5%	+17.9%

Source: Bres 2015

7.46 The latest BRES data shows that the construction industry accounts for around 3.6% of London's (187,000) and LBRuT's (3,000) employment and 3.0% within the LIA (500).

Housing Supply

7.47 Headline information on key housing characteristics are set out in **Table 7.9**. This demonstrates that broadly, the LIA performs in line with or slightly above the LBRuT average.

Table 7.9: Housing Characteristics

	Dataset	Mortlake & Barnes Common Ward	LBRuT	London
Home Ownership	Owned	58%	64%	48%
	Private Rented	24%	22%	25%
	Social Rented	16%	13%	24%
Household Occupancy (rooms)	of +2 or more (surplus)	38%	45%	30%
	of +1	28%	23%	21%
	of 0	23%	21%	27%
	of -1	8%	8%	14%
	of -2 or less (deficit)	2%	2%	7%
Median House Prices	Median (2015)	£685,000	£575,000	£399,950
	% Change 2005-2015	6.9%	6.7%	5.7%

Source: Census 2011

Notes: Compound Annual Growth Rate (CAGR)

7.48 The proportion of home ownership in the LIA is 58% which is some way below the LBRuT average (64%) but above the London average (48%). In contrast, the LIA has a higher proportion of both social rented and private rented tenure compared to the LBRuT as a whole.

7.49 Household occupancy ratings in the local impact area are similar to that of LBRuT with 67% reporting a surplus of rooms compared to 69% for LBRuT. This is well above the London average of 51%. Both the LIA and LBRuT as a whole have a lower incidence of deficit compared to the London average.

7.50 Median house prices in the LIA (£685,000) are above the average for LBRuT (£575,000) and well above the London average (£399,950). Prices have increased by an average of +6.9% per annum over the last decade, which is above the rate of increase experienced by the LBRuT and London. The LBRuT draft Local Plan[20] notes that the borough has one of the highest average house prices in the UK and a continuing need for affordable housing. Policy LP 36 states the affordable housing target is 50% with a tenure mix of 40% rented and 10% intermediate.

7.51 The Local Plan publication version sets out the overall housing target for LBRuT as 3,150 dwellings for the period 2015-2025. However, the recently published draft London Plan (2017) presents a revised housing target for LBRuT of 8,110 for the period 2019/20-2028/29 or 811 per annum. Local Plan Policy LP 35 on Housing Mix and Standards indicates developments should

provide family size housing except in areas of mixed use, where a higher proportion of smaller units is acceptable.

7.52 The Assisted Living Demand and Supply Assessment referred to earlier within this Chapter indicates there is a current deficit in capacity of Assisted Living units of up to 495 over the Local Plan period.

Educational Facilities

Early Years Provision

7.53 Pre-school education facilities for children under 5 years are provided through a range of resources including local authority children centres and private run nurseries.

7.54 The draft LBRuT School Place Planning Strategy[21] and consultation with LBRuT suggests that demand for Early Years places across the District as a whole is very high. According to the Strategy, 20 of the 40 infant and primary schools in LBRuT have attached maintained nurseries, and there is one stand-alone nursery school. Between them there are a total of 1,070 places and each of the maintained nurseries is oversubscribed with applications that far exceed the number of available places.

7.55 Almost three quarters (3,015) of the nursery places (4,085) within the District are within the private, voluntary and independent sector and therefore not free of charge.

7.56 A review of data from the LBRuT website indicates there are eight maintained nurseries within the LIA providing services ranging from full-day care from age 0 to pre-school (from 3 - 5 years old). The total capacity is around 420.

7.57 There are also a 51 private, voluntary and independent (PVI) nurseries within the LIA. However, capacity and demand is not readily available for these facilities.

Primary School Provision

7.58 Summary information on primary school provision is set out in **Table 7.10**. There are a total of 14 primary schools within two miles[ii] of the Site. The latest admissions data[iii] and consultation with LBRuT suggests there is a +31 place surplus in capacity across all primary schools within a two mile radius.

7.59 The closest primary school to the Site is Thompson House School where there was no capacity in Autumn 2016. Two of the 14 schools within the 2-mile radius have capacity deficits. Further detail is provided in **Appendix 7.2**.

Table 7.10: Primary School Provision

	Reception Class Enrolment within 2 miles of Site			
Type of school	**No. of schools**	**School Places**	**Pupils on roll**	**Surplus / Deficit**
Primary Schools	14	832	832	+31

Source: Education Funding Agency; School Capacity Tables 2015-16

[ii] Facilities that are located on the Western side of the Thames or outside LBRuT have been excluded from the assessment, as per consultation with the local education authority.
[iii] LBRuT Autumn School Census 2016; provided by education authority.

7.60 The LBRuT draft School Place Planning Strategy 2017 sets out LBRuT's strategy for meeting current and future demand for school places at primary and secondary level up to 2024, based on population projections.

7.61 The LIA falls within the LBRuT's Area 9 for school places planning which comprises the wards of Mortlake and Barnes Common and Barnes. The Strategy and consultation with LBRuT's education authority has highlighted that there is a need for at least one more form of entry (30 pupils) in Area 9. It has been recommended that it is essential to expand Barnes Primary School to meet future demand, the expansion is currently scheduled for 2019.

7.62 The neighbouring school planning Area 8, which comprises East Sheen, is noted to overlap with demand from Area 9. The Strategy and further consultation with LBRuT states the expansions of Sheen Mount and East Sheen Primary have met the previously forecast need for places within this area and therefore no action is needed at present, or in the foreseeable future.

Secondary School Provision

7.63 Summary information on secondary school provision is set out in **Table 7.11** (with further detail provided in **Appendix 7.3**). There are a total of three secondary schools within three miles[iv] of the Site. In Autumn 2016 these schools admitted 554 Year 7 pupils, with a capacity of 540 places, which suggests a deficit of -14 places. One school is oversubscribed within the three mile catchment area of the Site. Richmond Park is the closest secondary school which had +14 places in Autumn 2016.

Table 7.11: Secondary School Provision

	Year 7 Enrolment within 3 miles of developments		
Type of school	**Pupils on roll**	**School Places**	**Surplus / Deficit**
Richmond Park Academy	180	166	14
Christ's Church School of England	150	148	2
Grey Court School	210	240	-30
Total	**554**	**540**	**-14**

Source: Education Funding Agency; School Capacity Tables 2015-16

7.64 The LBRuT draft School Place Planning Strategy 2017 states there were 2,002 places available in Year 7 across the District. However, these places were not diversely spread out.

7.65 According to the Strategy and further consultation with LBRuT, it is envisaged that the opening of Turing House in 2015 and Richmond upon Thames School in September 2017 will mean that there will be sufficient places in the western half of LBRuT for the period covered by the Strategy.

7.66 However, a need for additional places has grown in the eastern half of the LBRuT, at a faster rate than was previously forecast. The main reason for this is due to the fact that spare capacity at Year 7, which traditionally existed at Richmond Park Academy and its predecessor school, Sheen, has sharply and unexpectedly decreased.

7.67 The numbers for the other two secondary schools within the eastern half of LBRuT, Christ's and Grey Court have also grown, particularly at Ofsted-rated 'outstanding' Grey Court.

[iv] As per Primary School catchment areas; Facilities that are located on the Western side of the Thames or outside LBRuT have been excluded from the assessment, as per consultation with the local education authority.

7.68 The Strategy states that in the last two years, there were a significant number of children in the eastern half of the LBRuT, mostly in Barnes and Kew, for whom offers could not be made at any of the three local schools at the initial allocations stage.

7.69 Based on recent forecasts, LBRuT would be unable to meet its statutory duty to provide places for those children unless a new school were provided.

7.70 It is forecast that the children who are at most risk of not being admitted to any of the three schools in the eastern half of the LBRuT live in Kew, and east and north Barnes. The draft LBRuT School Place Planning Strategy 2017 states that the Stag Brewery Site has been identified as the only suitable location for a new school in the east of LBRuT.

Primary Health Care

GPs: Current Provision

7.71 Summary information on GP provision is set out in **Table 7.12**. Based on data from the Health and Social Care Information Centre (HSCIC)[22] and NHS Choices there are currently 6 GP centres based within 1 mile[v] of the Site providing a total of 39 GPs (31 FTEs) and with a total of 51,600 registered patients.

7.72 According to the NHS, there is no recommended number of patients per FTE GP per practice. This recognises the differing needs of the registered patients of GP practices. However, NHS London Healthy Urban Development Unit (HUDU) use a figure of 1,800 patients per GP FTE to benchmark capacity.

7.73 The average number of patients per FTE GP is 1,654 within 1 miles of the Site and 1,972 across the wider NHS LBRuT CCG area. Therefore, patient levels at both the local and wider level are slightly higher than the HUDU benchmark.

7.74 The two surgeries that are closest to the Site (Jezierski & Partners and Johnson & Partners) both fall below the HUDU benchmark.

7.75 All 6 surgeries within 1 mile of the Site are accepting new patients indicating there may be spare capacity.

Table 7.12: GP Provision

	Within 2 miles of Site	LBRuT CCG average
No of GPs (FTEs[vi])	39 (31)	-
Registered patients	51,600	-
Patients per GP	1,323	1,498
Patients per FTE GP	1,654	1,972

Source: NHS Choices. Date Accessed: August 2017.

[v] A number of sites that are located north of the river have been discounted as the actual distance from the Site exceeds 1 mile.
[vi] Multiplier of 0.8 used to reflect GP FTEs for all GP surgeries based on average hours worked per week for Medical Practitioners; ONS ASHE, 2017

Open Space Provision

7.76 LBRuT is renowned for its green spaces and large parks such as Richmond Park, Old Deer Park, The Royal Botanic Gardens at Kew and its highly accessible green space alongside the River Thames.

7.77 There are several publicly accessible open spaces within proximity to the Site, including those that have play areas and other community uses such as sports fields. **Table 7.13** summarises the open space categories defined by the GLA. Although Watney's Sports Ground playing fields are greater than 2ha and are located within the Stag Brewery component of the Site, it has private access only. In addition, part of the tow path is located within the redline but is currently not accessible from the Site. As such, there is currently no publicly open green space as defined by the GLA on the Site.

Table 7.13: GLA Open Categorisation and Benchmarks

Open Space categorisation	Size Guideline	Distances from Homes
Regional Parks	400 ha	3.2 to 8 km
Metropolitan Parks	60 ha	3.2 km
District Parks	20 ha	1.2 km
Local Parks / Open Spaces / Small Open Spaces / Pocket Parks	2 ha	<=400 metres

Source: GLA, 2011

7.78 There are several open spaces within proximity to the Site, including those that have play areas and other community uses such as sports fields. The **Table 7.14** summarises the open space provision within 1.2km of the Site.

Table 7.14: Open Space Provision Within 1.2km of the Site

Type	Distance and Direction from the Stag Brewery Component of the Site (km)	Typology as Defined By the GLA	Additional Amenities
Mortlake Green	0.2 km to the south	Open space	Play for 7-14 and under 7's, basketball court.
Barnes Common	1.5 km to the east	Open Space	Football pitch.
Barnes Green	1.5 km to the east	Open space	Play for under 7's.
Jubilee Gardens	0.6 km to the east	Open space	Boat race viewing point.

Type	Distance and Direction from the Stag Brewery Component of the Site (km)	Typology as Defined By the GLA	Additional Amenities
Tapestry Court	0.5 km to the east	Open Space	Boat race viewing point.
Thames Bank	0.2 km to the north	Open Space	Boat race viewing point.
Vine Road Recreation Ground	1.5 km to the east	Local park	Children's play areas, paddling pool and informal space.

Source: LBRuT

7.79 The aforementioned LBRuT Open Space Assessment Report identifies around 200 open space sites in the District equating to a total provision of 527ha. The assessment divides LBRuT into three areas for the purposes of analysis, Mortlake and Barnes Common is located within the Richmond assessment area. The area performs well above the LBRuT average on all typologies of space in terms of provision per 1,000 population.

7.80 **Table 7.15** summarises the play space provision in proximity to the Site. Based on consultation with LBRuT[vii] the closest space for children and young people is Mortlake Green Play Area, which is of sufficient size and within 400m of the Site. However, the play area does require reinvestment in some of the play equipment which is now old and of poor quality. This facility also provides limited play space for people aged 15+ years.

7.81 Mullins Path is also less than 800m from the Site. The Open Space Assessment Report suggest that the location is of sufficient quality for its size and purpose. However, it is very small in size and would only serve the population within its immediate vicinity.

Table 7.15: Play Space Provision in Proximity to the Site

Play Area Name	Size (ha)	Distance and Direction from the Stag Brewery Component of the Site (km)	Facilities
Mortlake Green	1.54	0.2 km to the south	Play area, Natural play, Fitness, Half basketball
Mullins Path Open Space	0.05	0.3 to the southeast	Play area
North Sheen Recreation Ground	3.30	1.6 to the west	Senior play area, Toddler play area, Fitness, Paddling pool,
Palewell Common	15.38	1.6 to the southeast	Play area, Fitness, Paddling pool,
Vine Road Recreation Ground	2.32	1.7 to the east	Play area, Natural play, Paddling pool
Old Deer Park	28.62	3.4 to the west	Senior play area, Toddler play area, Fitness,

Source: Wild Futures and LBRuT

7.82 The District contains a high proportion of Locally Equipped Area for Play (LEAP) and Neighbourhood Equipped Area for Play (NEAP) sized play areas, many of which score high for quality and value. The majority of play sites (95%) across LBRuT are assessed as being above the threshold for quality.

[vii] LBRuT/Wild Futures, Parks and Open Space Team

7.83 According to the LBRuT Open Space Assessment Report, the Richmond assessment area has the highest amount of play space provision per 1,000 population compared to the other assessment areas in the District and has the greatest number of play sites in LBRuT. **Table 7.16** sets out the provision of open space per 1,000 population in the Richmond Assessment Area compared to LBRuT as a whole. It demonstrates that area is relatively well provided across all typologies of open space However, consultation has suggested that local play space could be improved in terms of its quality and provision for older children (i.e. 15+).

7.84 In addition, LBRuT's Playing Pitch Assessment Report, includes an assessment of education provision of playing pitches, concluded a shortfall in football provision, capacity for cricket, a potential shortfall in rugby provision, only one tennis court, one full sized hockey all weather pitch and a need for three full sized 3G (synthetic) pitches.

Table 7.16: Open Space Summary, Richmond Assessment Area

Typology	Number	Total Provision (ha)	Richmond Provision per 1,000 Pop	LBRuT Provision per 1,000 Pop
Parks and gardens (urban parks and formal)	4	47.25	0.61	0.39
Natural & semi-natural green space	19	237.78	3.08	1.44
Amenity space	31	57.62	0.75	0.52
Provision for children and young people	17	3.49	0.05	0.03
Allotments	13	12.48	0.16	0.15

Source: LBRuT Open Space Assessment Report, April 2015, Knight Kavanagh Page

7.85 In addition to the above, the Site is located adjacent to the River Thames. This provides a significant amount of usable open space. The tow path alongside the River Thames and within the Site also links together open space sites, which would otherwise be isolated from one another.

7.86 The Development is located between a number of larger parks with more facilities for weekend or occasional visits. The Thames towpath gives access to nature and links to smaller passive parks such as Thames Bank and Jubilee Gardens, but only Mortlake Green provides access to open space facilities such as playground and informal recreation within 400m.

7.87 The other locations within 400m are Thames Bank (small grassy area, two benches), Tapestry Court (a narrow cut through between the towpath and Mortlake High Street) and Mullins Path (a small site with 1 bench and 4-5 pieces of play equipment). These are very small, low on features and unlikely to attract visitors away from Mortlake Green.

Other Community Facilities

7.88 There are a number of existing community uses within a 1km of the Site (a reasonable walking distance). These are summarised in **Table 7.17**.

Table 7.17: Community Facilities Provision

Name	Services
Power Station Youth Centre.	Youth club, multi-purpose sports hall, music production and rehearsal studios.
East Sheen Library.	Library facilities.
Shene Sports Centre.	Fitness centre, multi-use sports hall, all weather pitches.
St Mary's Church (including St. Mary's Rooms).	Community groups and church services.
Guide Hall.	Guides and Scouts.
Mortlake Community Garden.	Communal Garden.
The Old Bakery.	Mortlake Community Association.

Source: LBRuT

7.89 The community facilities situated close to the Site such as Sheen Sports Centre, East Sheen Library and Power Station Youth Centre are of good quality. Consultation with the local library has suggested that East Sheen Library is well used by local families. However, there is sufficient capacity at the library. The Sheen Sports Centre provides a range of facilities such as floodlit outdoor pitches, indoor sports hall, fitness suite and spin studios. The Power Station Youth Centre, provides music rehearsal space, an indoor gym and IT suite. Barnes Children's Centre is also located at the same facility as the Youth Centre.

Crime, Community Safety and Wellbeing

7.90 **Table 7.18** provides a summary of the crime rates in the LIA and LBRuT over the period of June 2016 to May 2017.

Table 7.18: Crime Rates, per 1,000 Population (June 2016-May 2017)

Offences per 1,000 Population	June 2016-May 2017	
	Mortlake and Barnes Common	LBRuT
Total offences	69.75	80.54
Anti-social behaviour	12.52	19.39
Burglary	9.45	8.15
Robbery	1.58	0.75
Vehicle	11.38	10.37
Violent	12.43	14.15
Shoplifting	1.14	3.51
CD&A	4.11	6.11
Other Theft	5.86	7.00

Offences per 1,000 Population	June 2016-May 2017	
	Mortlake and Barnes Common	LBRuT
Drugs	0.79	1.47
Bike theft	5.16	3.92
Theft from the person	0.96	1.04
Weapons	0.09	0.21
Public order	4.03	3.77
Other	0.26	0.69

Source: UKCrimeStats, Date Accessed 15/08/2017

7.91 The latest statistics show that the crime rate in Mortlake and Barnes Common ward (LIA) is lower than in the LBRuT. Anti-social behaviour was much lower in the LIA compared with LBRuT. There is also less violent crime and shoplifting in the ward. Conversely, there is a greater rate of bike theft and burglary offences in the ward compared with LBRuT.

7.92 Mortlake and Barnes Common ward (the LIA) ranks thirteenth out of the 18 wards in LBRuT terms of total offences per 1,000 residents. The LIA had 69.75 offences per 1,000 residents in the year between June 2016 and May 2017, compared with the rate of 80.54 in across the District as a whole.

Table 7.19: Yearly Crime Rates (January-December)

	Mortlake & Barnes Common Ward			LBRuT		
Year	Total crimes per year	Total crimes per year per 1,000 population	%Change	Total crimes per year	Total crimes per year per 1,000 population	% Change
2011	974	85.24		20,051	102.97	
2012	1,039	90.93	7%	18,967	97.40	-5%
2013	1,002	87.69	-4%	17,164	88.14	-10%
2014	893	78.16	-11%	16,352	83.97	-5%
2015	809	70.80	-9%	16,041	82.38	-2%
2016	757	66.25	-6%	17,076	87.69	6%

Source: UKCrimeStats, Date Accessed 15/08/2017

7.93 **Table 7.19** shows crime data for the LIA and LBRuT. It shows total crimes per year in both absolute and per head terms and the yearly percentage change. Total offences in the LIA have fallen over the last four years. While total offences have generally fallen in LBRuT, over the last few years, offences have fallen at a faster rate in LIA.

Summary of Baseline Receptors and Their Sensitivity

7.94 **Table 7.20** provides a summary of the identified baseline receptors and their relative sensitivity to change that may be brought about by the Development.

Table 7.20: Summary of Baseline Assessment and Receptors

Receptor	Summary	Sensitivity of Receptor
Population and labour market.	Labour market challenges relate to the need to accommodate the growing population across the impact area as well as London and this is a driver of housing and economic growth. Overall, the LIA and District as a whole perform well relative to London averages.	Low.
Housing Supply.	There are existing pressures in terms of overall housing affordability, availability and below average levels of home ownership. The delivery of housing is a strategic objective of the Local Plan and London Plan.	High.
Employment.	Local economic challenges within the LIA include underperformance in terms of overall employment growth and a reliance on lower-value employment sectors. However, there is evidence of growth in employment and relative strengths in a number of higher value sectors such as ICT and finance and insurance.	Medium.
Education provision: Primary	Any net increase in the number of children within a given area implies additional demand for school places. There is evidence of some existing capacity within local primary schools as well as expansion plans.	Medium.
Education provision: Secondary	Any net increase in the number of children within a given area implies additional demand for school places. Capacity within Secondary schools is more limited and the need for an additional school has been identified.	High.
Primary Health Facilities.	Any net increase in the population implies additional demand for health services. There is evidence of capacity amongst local GPs within 1 mile of the Site accepting new patients. The average number of patients per FTE GP is lower than the NHS HUDU benchmark.	Medium.
Open Space.	An increase in the resident population of the Site would increase pressure on existing provision of open space. However, the Site is well catered for with above average levels of open space relative to other parts of the District.	Low.
Other Community Facilities.	The provision of community centres in the LIA is diverse. The Development would increase the demand for local amenities. However, the current supply does not appear to be over capacity. It is also anticipated there would be some community provision as part of the Development, which would help absorb some of the additional demand.	Low.
Crime.	Crime rates in the LIA are generally lower than the District as a whole and for the both LIA and borough crime rates have been falling over the last few years.	Low.

Source: Regeneris Consulting 2016

Likely Significant Effects

The Works

Loss of Existing Employment Floorspace

7.95 Existing floorspace on the Site comprises buildings associated with the operations of the former Stag Brewery including Brew House, Grains Handling and Energy Centre. Collectively, this floorspace amounts to 35,402m^2 (GIA).

7.96 Whilst the amount of existing floorspace on the Site is substantial, the Stag Brewery ceased brewery operations in 2015. Most recently, works on-Site have been undertaken in respect of removal of brewery fixtures and fittings. Security personal currently work at the Site. The LBRuT Planning Brief for the Site[23] acknowledges that the Site was a low-density employment generating site and that on-Site employment levels typically averaged 185 staff whilst the Brewery was in operation.

7.97 During the Works, all of the existing space on Site would be lost to other uses either through demolition or in the case of the Maltings, the façade of the (former) Bottling Hall and façade of the (former) Hotel, alterations to provide other uses. As part of the Development a range of employment uses are expected, which would be of a higher employment density than the previous brewery usage. The likely effects of this employment is considered later within this Chapter.

7.98 The receptor is existing employment floorspace (not the number of jobs) and magnitude of change has been assessed as follows:

- the sensitivity of the receptor is **low**. The emerging Local Plan notes that additional employment floorspace is required throughout the borough. However, it is recognised the floorspace in its existing format is not suitable for employment generating uses and there is currently no employment on Site.
- the loss of 35,402m^2 (GIA) of existing employment floorspace would not materially alter LBRuT's stock of useable / fit for purpose employment generating floorspace and the Development would generate operational employment in the future. The magnitude of change is therefore assessed as **negligible**.

7.99 Considering the above, the effect of the Works on existing employment floorspace is considered to be **insignificant.**

Employment Generation and Local Spend During the Works

7.100 Employment associated with the Works is relatively mobile. Based on the estimated costs of the Works and using the approach presented earlier in this Chapter, it is estimated that 8,870 person years of employment associated by the Works would be created by the Development over the eight-year build period (2019 to 2027).

7.101 Due to the varied nature of construction projects, these jobs would not necessarily be FTEs. However, to provide an indication of the number of FTEs the Works could support, the number of

jobs have been split over the eight-year build period. Based on this assumption, this would equate to an average of up to 1,110 FTEs per annum over the period of the Works.

7.102 Given the scale of the construction works, jobs and workers would likely be drawn from all over London. A Local Employment Agreement, as required by the emerging Local Plan would assist in ensuring that residents have access to the employment opportunities arising from the Development. The measures to target local employment during Site preparation and construction would be secured through a Section 106 agreement.

7.103 The estimated construction effect represents jobs directly linked to the Development. It would therefore include on-Site and off-Site jobs including jobs in the suppliers of materials and services to the Development. There may be employment benefits further down the supply chain which are not captured in this estimate, although these effects are likely to be relatively small. Some workers paid as a result of the construction activity may live locally, and their expenditure on household goods and services would also support employment in local businesses.

7.104 As such and as previously indicated, an estimate of the induced (local expenditure) effects of construction expenditure cannot be quantified. It is not possible to quantify this effect with any accuracy therefore this has been excluded from this assessment.

7.105 The receptor is employment and magnitude of change has been assessed as follows:

- the latest BRES data shows that the construction industry accounts for around 3.6% of London's and LBRuT's employment and 3% within the LIA. Construction jobs would likely be generated all over London and similarly workers would be drawn from across the region. Supporting economic growth is a key policy within the LBRuT Local Plan and this Site supports this. The Local Plan also requires Local Employment Agreements (LEA) to be in place for large scale developments which would assist in ensuring that local residents have access to the employment opportunities arising from the Development. Based on this the sensitivity of this receptor is deemed as **medium.**
- as noted, the Development could generate construction jobs both on site and off site. An average of 1,110 construction jobs per annum would represents a small increase within London's construction employment levels (1%). Therefore, the magnitude of change brought about by the development is **low** at the regional level. At the district level it is reasonable to expect a proportion of the construction jobs would be secured locally, however, it is not possible to quantify the likely number of jobs that will be captured within the borough, therefore the magnitude of change is also assumed to be **low**.

7.106 Considering the predicted employment generation detailed above, the likely effects on employment is anticipated to be **short-medium term**, **beneficial**, and of **minor** significance at both the **regional** and **district** level.

Completed Development

Population and Labour Market

7.107 Under the Scenario 1 housing mix, up to 667 residential units are proposed, together with up to 150 Assisted Living units and up to 80 nursing home units are proposed. Regeneris estimates this would generate a total population of around 1,750. This is based on the average number of

residents by size of property drawn from national research[24] applied to the assumed housing mix of the Development under each Scenario as summarised in **Table 7.21**.

7.108 Under Scenario 2, up to 817 residential units together with up to 80 nursing home units are proposed. Regeneris estimate this will generate an overall population of around 1,850. Given that population is calculated using Regeneris' model and the child yield is calculated using the GLA calculator (as required by policy), there is no difference in population between Scenarios a and b (35% and 0% affordable housing).

7.109 For the purposes of this assessment, it is assumed all of this population would be net additional, and so would increase the existing population in the LIA by 16-17% and the District by around 1%.

7.110 Under Scenario 1, the working age of the Developments resident population is expected to amount to around 930-1,000 people and around 1,100-1,200 under Scenario 2. Under both scenarios Economic activity rates are expected to be broadly in line with those of the LIA and District and the number of highly skilled residents could increase by around 500 (Scenario 1) to 700 Scenario 2.

7.111 The receptor is population and labour market and the significance of effects has been assessed as follows:

- the sensitivity of the receptor is assessed as **low**; and
- an additional 1,750 - 1,850 population equates to an increase of 16-17% for the LIA and 1% for the District and economic activity rates and skills profile are expected to remain in line with the area. The magnitude of change is therefore assessed as **medium** for the LIA and **low** for the District**.**

7.112 In view of the above, the likely effect of the Development on population and labour market under both Scenario 1 and 2 is considered **long-term**, **beneficial, and of minor** significance at both the **local** and **district** level.

Housing Supply

7.113 Under Scenario 1, the provision of up to 667 new dwellings built at an average rate of up to 83 per year would contribute up to 10% towards meeting the draft London Plan (2017) revised housing target for LBRuT (811 dpa).

7.114 Under Scenario 2, the provision of up to 817 new dwellings built at an average rate of up to 102 per year would contribute up to 12.5% towards meeting the draft London Plan (2017) revised housing target for LBRuT.

7.115 **Table 7.21** sets out the indicative mix of dwellings under Scenario 1 and 2. Under both Scenarios, around 85% of the proposed dwellings are 2 bedrooms or more, therefore contributing towards LBRuT's policy objective of providing family housing.

7.116 Under Scenario 1, the provision of up to 150 Assisted Living units and up to 80 nursing home units would provide choice and flexibility of accommodation for older residents of LBRuT and help meet the levels of demand that have been identified in the Assisted Living Assessment which have been submitted as standalone documents in support of the Planning Application. Under

Scenario 2, the provision of up to 80 nursing home units would also make a contribution towards meeting the housing needs of older residents.

Table 7.21: Indicative Dwelling Mix for Scenario 1 and 2

	Flats				House		Total
	1 bed	2 bed	3 bed	4 bed	3 bed	4 bed	
Scenario 1							
Resi Units	97	319	212	15	12	12	**667**
Assisted Living							150
Nursing Home							80
Scenario 2							
Resi Units	120	395	263	15	12	12	**817**
Nursing Home							80

7.117 For the purposes of this assessment, 0% and 35% affordable housing provision has also been considered under both Scenario 1 and Scenario 2. Under Scenario 1a and 2a, the provision of affordable housing units could be in the region of 224 to 277 (see paragraph 7.25) therefore making a contribution to local affordable housing policies.

7.118 The receptor is housing supply and the significance of effect has been assessed as follows:

- the sensitivity of the receptor is assessed as **high.** New housing development is a strategic objective in the Local Plan and London Plan and it must respond to pressure from household growth; and
- Under both Scenario 1 and 2, the provision of new residential units from the Development would represent an increase in the LIA's housing stock of around 1%, and less than 1% of that of the District. The contribution to the draft London Plan revising housing target would range between 10% (Scenario 1) and 12.5% (Scenario 2). The mix of housing under both Scenario 1 and 2 would make a positive contribution to local policy objectives including the provision of family units. Under Scenario 1a and 2a the Development would also contribute to the provision of affordable housing units. The magnitude of the change is therefore assessed as **medium** at the LIA level and **low** at the District level.

7.119 In view of the above, the likely effect of the Development under Scenario 1 and 2 on housing supply is considered to be:

- **long-term**, **local**, **beneficial** and of **moderate significance**; and
- **long-term**, **district**, **beneficial** and of **minor significance**.

Employment

7.120 The likely FTE job creation derived from the Development under both Scenario 1 and 2 is set out in **Table 7.22**. It should be noted that under Scenario 2, the 150 Assisted Living units which generate direct employment are excluded (see paragraph 7.23).

7.121 Under Scenario 1, the total gross direct FTEs are estimated to be 503 and 373 under Scenario 2. These are likely to be minimum figures given that a worst-case scenario is assumed for the flexible floorspace element of the Development.

7.122 Once leakage, displacement and multiplier effects have been considered the total net effects for LBRuT are likely to be 491 FTEs under Scenario 1 and 347 FTEs under Scenario 2.

Table 7.22: Employment Effects

Type	Floorspace (m^2 GIA)	Gross Direct FTEs	Leakage	Displacement	Net local Direct FTEs	Multiplier	Total Net FTEs LBRuT
Small business space	2,424	69	0%	25%	52	1.1	57
Hotel (16 bedrooms)	1,668	8	0%	25%	6	1.1	7
Cinema	2,120	11	0%	25%	8	1.1	9
Gym	740	11	0%	25%	9	1.1	9
Secondary school (6FE, 1,200 pupils)	n/a	80	0%	0%	80	1.1	88
Assisted Living and Care Home	n/a	200	0%	0%	200	1.1	220
Flexible Uses (Assumed Worst Case Scenario)							
Retail	1255	75	0%	25%	56	1.1	62
Professional Services	0	0	0%	25%	0	1.1	0
Restaurant / Cafe	0	0	0%	25%	0	1.1	0
Pub	0	0	0%	25%	0	1.1	0
Office	1,910	54	0%	25%	41	1.1	45
Cinema / Gym	1,148	4	0%	0%	4	1.1	4
Boathouse	351	1	0%	0%	1	1.1	1
Scenario 1 Total		**513**			**456**		**502**
Scenario 2 (exc Assisted Living) Total		**383**			**326**		**359**

Source: Regeneris

7.123 In addition to the likely direct on-Site employment effects associated with the Development, the provision of new households under both Scenario 1 and 2 would generate additional retail and other spend that would support the local economy of the LIA, LBRuT and the wider area. This increased expenditure would support employment in retailers and other service providers.

7.124 The level of the employment generated locally would be determined by the types of goods and services the new residents consume and where they choose to spend their income. Table 7.23 sets out the estimated annual expenditure generated by the new households together with the likely number of jobs supported by this expenditure under each of the housing scenarios.

7.125 When the Development is complete and fully occupied, it is estimated that the total annual expenditure generated by the new households would be between £2.79 million and £4.17 million in the LIA, and £8.5 million and £12.76 million in the District.

7.126 The expenditure of residents would support a number of jobs in the local area. Taking into account indirect taxes (i.e. netting off tax on goods, taken from the 2015 Family Expenditure Survey) and multiplier impacts (taking into account knock on impacts of expenditure in local goods and services, taken from the HCA Additionality Guide[25)], the aforementioned expenditure would support around 38 to 57 FTE jobs in the LIA, 115 to 174 FTE jobs in LBRuT, as shown in **Table 7.23.**

7.127 It is not possible to estimate the likely household expenditure effects derived from any residents of the Assisted Living and Nursing Home units as their spending profile and patterns would be different to those of mainstream households. Any household expenditure effects derived from this element of the population would be additional to those set out in **Table 7.23.**

Table 7.23: Local Household Expenditure Effects

	Total Expenditure after indirect tax (£m) per annum		Jobs supported locally (FTEs) inc. induced	
	LIA	LBRuT	LIA	LBRuT
Scenario 1a	£2.79	£8.52	38	115
Scenario 1b	£3.52	£10.78	48	147
Scenario 2a	£3.40	£10.39	46	140
Scenario 2b	£4.17	£12.76	57	174

Source: Regeneris

7.128 Table 7.24 sets out the total FTEs supported locally (combined effect of direct, on-site employment and indirect and induced employment) under each scenario. These range from 429 to 561 at the LIA level and 499 to 649 at the District level.

Table 7.24: Total FTEs

	Total FTEs	
	LIA	District
Scenario 1a	551	617
Scenario 1b	561	649

	Total FTEs	
	LIA	District
Scenario 2a	429	499
Scenario 2b	440	533

Source: Regeneris

7.129 The receptor is employment and magnitude of change has been assessed as follows:

- the sensitivity of the employment receptor is assessed as **medium**. Local economic challenges within the LIA include underperformance in terms of overall employment growth and a reliance on lower-value employment sectors. However, there is evidence of growth in employment and relative strengths in a number of higher value sectors such as ICT and finance and insurance; and
- the total increase in jobs supported locally would increase overall employment levels in the LIA by between 17% (scenario 2a) and 22% (scenario 1b) and the wider District by less than 1% (for all Scenarios). The magnitude of the change is considered to be **medium** at the LIA level and **low at** the District level.

7.130 In view of the above, the significance of the likely effects of the Development across all scenarios on employment is:

- **long-term**, **local**, **beneficial** and of **moderate significance**; and
- **long-term**, **district**, **beneficial** and of **minor significance**.

Capacity of Education Facilities

7.131 **Table 7.25** below provides a summary of the child yield under each of the residential scenarios being assessed and is based on the GLA's SPG Play Space Requirement Calculator. Each stage of education is then assessed in turn in terms of significance of effects.

Table 7.25: Child Yield

	Under 5	5-11	12+
Scenario 1a	149	134	87
Scenario 1b	70	36	15
Scenario 2a	183	157	100
Scenario 2b	84	50	22

Source: Regeneris; GLA SPG Play Space Calculator

Early Years Education

7.132 It is estimated that the Development would result in an Early Years child yield (children aged under 5) of between 70 (scenario 1b) and 183 (scenario 2a). In each scenario, not all of these children would require an Early Years education place. However, it is prudent to assume the Development would yield this worst-case demand.

7.133 Whilst there are some vacancies in the LIA, LBRuT's School Place Planning Strategy suggests early years providers across LBRuT tend to be over subscribed. Therefore, it is unlikely the number of additional Early Years children could be accommodated within existing provision.

7.134 The receptor is Early Years education provision and the **sensitivity of the receptor** is assessed as **high**. Demand for additional Early Years places would place greater pressures upon nursery / day care centres and impose additional costs upon individual education providers.

7.135 The significance of effects for each housing mix scenario is assessed as follows:

Table 7.26: Early Years Significance of Effects

	Magnitude of Change	Significance of Effect
Scenario 1a	An additional 149 children aged under 5 would be generated from the Development which represents 35% of the registered child care places in the LIA and 3.7% of child care places in LBRuT. The magnitude of change is therefore assessed as **medium** at the **LIA** level and **low** at the **District** level	The likely effect of the Development on Early Years education provision is considered to be; • **long-term**, **local**, **adverse** and of **major significance**; and • **long-term**, **district**, **adverse** and of **minor significance**.
Scenario 1b	An additional 70 children aged under 5 would be generated from the Development which represents 17% of the registered child care places in the LIA and 1.7% of child care places in LBRuT. The magnitude of change is therefore assessed as **medium** at the **LIA** level and **low** at the **District** level	The likely effect of the Development on Early Years education provision is considered to be; • **long-term**, **local**, **adverse** and of **moderate significance**; and • **long-term**, **district**, **adverse** and of **minor significance**.
Scenario 2a	An additional 183 children aged under 5 would be generated from the Development which represents 44% of the registered child care places in the LIA and 4.5% of child care places in LBRuT. The magnitude of change is therefore assessed as **high** at the **LIA** level and **low** at the **District** level	The likely effect of the Development on Early Years education provision is considered to be; • **long-term**, **local**, **adverse** and of **major significance**; and • **long-term**, **district**, **adverse** and of **minor significance**.
Scenario 2b	An additional 84 children aged under 5 would be generated from the Development which represents 20% of the registered child care places in the LIA and 2% of child care places in LBRuT. The magnitude of change is therefore assessed as **medium** at the **LIA** level and **low** at the **District** level	The likely effect of the Development on Early Years education provision is considered to be; • **long-term**, **local**, **adverse** and of **moderate significance**; and • **long-term**, **district**, **adverse** and of **minor significance**.

Source: Regeneris; GLA SPG Play Space Calculator

Primary School Education

7.136 It is estimated that the Development would result in a primary school aged child yield of between 36 (scenario 1b) and 157 (scenario 2a). In each scenario it is possible that some of the children in the Development would already be residing in the area and attending local schools, however, for the purposes of this assessment it is assumed all children would be additional.

7.137 There is a current surplus in capacity of primary school places within two miles of the Site. Consultation with the local education authority and the LBRuT School Place Planning Strategy suggests that due to recent expansions at East Sheen and Sheen Mount primary schools, along with the planned expansion at Barnes Primary School in 2019 no further action is needed at present or in the foreseeable future.

7.138 The receptor is primary school education provision and the significance of effects has been assessed as follows:

- any net increase in the number of children implies additional demand for school places. Sufficient school places are a key priority for LBRuT however consultation has indicated that capacity is currently sufficient and therefore the sensitivity of the receptor is assed as **medium**; and
- an additional 36 (scenario 1b) to 158 (scenario 2a) children would be generated from the Development which is unlikely to exceed any surplus in capacity within the local catchment areas once expansion plans have been considered. However, it would nonetheless generate a net increase in children and increase pressure on local school places. The magnitude of change is therefore assessed as **low.**

7.139 As such, the likely effect of the Development on primary school education provision is considered to be **direct, long-term,** and of **minor** significance at both the **local** and **district** level.

Secondary School Education

7.140 It is estimated that the Development would result in a secondary school aged child yield of between 15 (scenario 1b) and 100 (scenario 2a). In each scenario it is possible that some of the children in the Development would already be residing in the area and attending local schools, however, for the purposes of this assessment it is assumed all children would be additional.

7.141 The Development includes provision of a six form entry Secondary School with a sixth form with capacity for up to 1,200 pupils. It is therefore considered the additional demand arising from the Development could be absorbed by the existing surpluses together with the new on-Site provision.

7.142 The receptor is secondary school education provision and significance of effects has been assessed as follows:

- the sensitivity of the receptor is assessed as **high**. Capacity data shows there are some existing surpluses across secondary schools in the catchment area but LBRuT has identified the need for an additional secondary school going forward.
- an additional 15 (scenario 1b) to 101 (scenario 2a) children would be generated from the Development which exceeds capacity. However, the provision of a six form entry Secondary School with a sixth form as part of the Development would substantially increase the capacity

for secondary school aged children residing within three miles of the Development. The magnitude of change is therefore assessed as **negligible**.

7.143 In view of the above, the likely effect of the Development on secondary school education provision is considered to be **insignificant** at both **local** and **district level**.

Primary Health Care Capacity

7.144 As previously stated, the Development would likely generate a total population of 1,750 (scenario 1) to 1,850 (scenario 2). As a worst-case scenario, it is expected that all of these residents of the Development would register with a local GP.

7.145 There are six GP surgeries within one mile of the Site. These surgeries have a list size averaging 1,654 patients per FTE GP, which is below the HUDU average (1,800) and the CCG average of 1,972. If the maximum number of residents (Scenario 2: 1,850) of the Development were to register with a local GP within 1 mile of the Site, the average list size would increase to 1,713.

7.146 The receptor is primary health care and the significance of the effects are assessed as follows:

- the sensitivity of the receptor is assessed as **medium**. The requirement for health services would impose additional demands and costs upon the existing provision. The baseline assessment demonstrates a below average list size within 1 mile of the Development and local surgeries continue to accept new patients; and
- if the likely maximum number of residents (scenario 2: 1,850 residents) registered with a surgery within 1 miles of the Site, the average patient list size per FTE GP would increase by less than 0.5%. The magnitude of the change is therefore assessed as **low**.

7.147 In view of the above, the likely effect of the Development on GP facilities for scenarios 1 and 2 would be **direct, long term, adverse and of minor significance at both the local and district level**.

Demand for Open Space and Play Space

7.148 In line with the GLA's Play Space Calculator, the requirement for children's play space has been calculated for each of the housing mix scenarios. On this basis, Table 7.27 sets out the expected requirement for play space using the GLA's benchmark standard of 10m2 per child and using the child yields set out in Table 7.25. This suggests a resulting play space requirement of between 1,210 m2 (scenario 1b) and 4,400 m2 (scenario 2a).

Table 7.27: Play Space Requirements (m^2)

	Under 5	5-11	12+	Total
Scenario 1a	1,490	1,340	870	3,700
Scenario 1b	700	360	150	1,210
Scenario 2a	1,830	1,570	1,000	4,400
Scenario 2b	840	500	220	1,560

Source: Regeneris; GLA SPG Play Space Calculator

7.149 The Development includes provision of up to 4,084m^2 GEA of children's play space with a further 10,305m^2 GEA of play space provided as part of the 6FE Secondary School bringing total on-Site provision of up to 14,353m^2. This is more than sufficient to accommodate additional demand arising from the Development.

7.150 As indicated within **Chapter 5: The Proposed Development**, play facilities for different age groups would be positioned within residential courtyards, parks, plazas and open space areas throughout the Development, to achieve the required areas of play and the distribution related to residential units, as follows:

- Up to 1,846m^2 of Doorstep Play (0-4yrs) within 100 m of residential units;
- Up to 1,612m^2 of Local Play space (5-11yrs) within 400 m of residential units;
- Up to 626 m^2 of Neighbourhood Space (12+yrs) within 800 m of residential units; and
- Play on the way (all ages).

7.151 Play elements and facilities would be provided in a range of forms within the public and private realms of the Development, including designated and fenced playgrounds, unfenced but contained play spaces with a range of play elements and carer seating, topographic variation and play opportunities in the landscape (within planting areas) and 'play on the way' elements within circulation spaces and public realm areas. This provision and distribution of play facilities within the Development has been developed in line with the GLA (Play and Informal Recreation SPG 2012) and the LBRuT (Planning Obligations SPD 2014).

7.152 The 10,305m^2 of playspace associated with the school would comprise a semi-enclosed play space at roof level, an indoor sports hall and activity studio, an external Multi Use Games Area (MUGA) to the south of the school building and a full sized artificial all weather playing pitch with spectator facilities to the west of the school building. The Applicant (and the Education Schools Funding Authority (ESFA) who would deliver the Planning Application C as referred to within **Chapter 1: The Introduction**) have committed to a Community Use Agreement which would enable local groups, teams, clubs, organisations and bodies the opportunity to use the external play pitch, indoor sports hall, activity studio and MUGA of the school out of school hours.

7.153 In terms of open space, the baseline analysis has indicated the local area already has above average levels of provision per head of population when compared to the LBRuT average. The Development would result in the loss of 2.06 ha of privately open space (Watney's Sports Ground playing fields) but would provide a total of 3.06 new green space and a total of 3.89 ha of total publicly accessible amenity space. When considering the additional population arising from the Development (up to 1,850) this level of provision (3.89 ha) amounts to around 2.0 ha per 1,000 population which is above average levels of provision for the majority of types of space set out in Table 7.16.

7.154 The receptor is open space and play space and magnitude of change has been assessed as follows:

- the sensitivity of the receptor is assessed as **low**. The Site is in an area which is already well provided for in terms of open space and play space with above average levels of provision per population; and

- the Development includes provision of 14.353m^2 of children's play space and a total of 3.89 ha of total publicly accessible amenity space. This is sufficient to cater for demand arising from the on-Site population, and taking the loss of Watney's Sports Ground playing fields into account provides a net increase in overall provision. The magnitude of the change is therefore assessed as **low**.

7.155 In view of the above, the likely effect of the Development on open space and play space provision is considered to be **direct, long term, beneficial, and of minor significance at both the local and district level**.

Demand for Community Facilities

7.156 The local area is well provisioned in terms of community facilities, with a range of amenities within 1km of the Site. The quality of these facilities is also of a good standard

7.157 In respect of community facilities, the Development would provide a school (with community facilities via a Community Use Agreement), cinema, gym, and an area for flexible community uses which could include a community boathouse. In addition, the Development would provide up to 5,912m^2 private amenity space and up to 38,943m^2 public amenity space (Including external and internal play space for residence and school play space) and includes provision of Public Community Park.

7.158 The receptor is community facilities and magnitude of change has been assessed as follows:

- the additional resident population would increase demand for these types of amenities however, there is no evidence to suggest these facilities are over capacity, therefore the sensitivity of this receptor is deemed as **low**.
- the provision of school facilities, cinema, gym, and an area for flexible community uses on-site would help meet some of the additional demand generated by the Development. Based on this the magnitude of change is therefore assessed as **low**.

7.159 In view of the above, the likely effect of the Development on community facility provision is considered to be:

- **direct, long-term, beneficial, local and of minor significance**; and
- **insignificant** at the **district** level.

Community Safety and Wellbeing

7.160 It is expected the profile of the additional population derived from the Development would be similar to that of the surrounding area and LBRuT as a whole. As such, therefore incidents of crime per head of population are unlikely to materially change from the existing situation.

7.161 Nevertheless, designed in line with designing out crime features, the Development would animate and activate the Site and the mix of uses would mean there would be a new residential population as well as employees and visitors to the Site. The proposed mix and layout of land uses, high street and publicly accessible spaces would provide active frontages at ground floor level and encourage activity at all times throughout the day. This would maximise natural surveillance, thereby reducing the opportunity for crime and improving perceptions of safety.

7.162 Furthermore, the Development would include pedestrian routes through the Site which would open up the Site improving access and permeability in and around the Site. This would help to ensure a safe environment for pedestrians. Specific measures to design out crime include:

- Ground floor level private garden areas provided with railings in order to clearly define private space and to provide a more secure threshold to ground floor level dwellings;
- The publicly accessible landscaped areas will be designed to avoid areas that are hidden from view;
- Main entrances to residential buildings will be from well lit main streets and or pedestrian routes through the site;
- Basement level car parking will have a management strategy that limits access to the basement level during evening hours;
- Further security measures include CCTV and access control.

7.163 In view of the above, the likely effect of the Development on community safety and wellbeing is considered to be:

- **direct**, **long-term**, **beneficial**, **local** and of **minor significance; and**
- **insignificant** at the **district level.**

Mitigation Measures and Likely Residual Effects

The Works

Loss of Existing Employment Floorspace

7.164 Due to employment floorspace being provided on-Site as part of the Development no mitigation is required. Therefore, the likely residual effect to the loss of existing employment floorspace would remain **insignificant**.

Employment Generation

7.165 The Works could support an average of up to 1,110 FTEs per annum over the 8 year period of the Works. Jobs and workers would likely be drawn from all over London. However, measures to target local employment during Site preparation and construction would be secured through a Section 106 agreement which would help to ensure workers would also be drawn from the borough. The likely residual effects on employment during the works remain as **short-medium term**, **beneficial**, **effects** of **minor** significance at the **regional** and **district level**.

Completed Development

Population and Labour Market

7.166 No mitigation measures are required and the likely residual effects of the Development on population and labour market would remain **direct**, **long term**, **beneficial** and of **minor significance** at the **local** and **district level**.

Housing Supply

7.167 The Development would provide new dwellings contributing towards LBRuT's annual housing target and the annual housing target for East Sheen, as set out in the emerging Local Plan. As such, no mitigation measures are required and the likely residual effects of the Development on housing supply would remain as:

- **long-term**, **local**, **beneficial** and of **moderate significance**; and
- **long-term**, **district**, **beneficial** and of **minor significance**.

Employment and Local Spend

7.168 On account of the generation of jobs as a result of the Development and expenditure of the new resident population and visitors to the Development, no mitigation measures are required and the likely residual effects of the Development remain as:

- **long-term**, **local**, **beneficial** and of **moderate significance**; and
- **long-term**, **district**, **beneficial** and of **minor significance**.

Early Years Education Capacity

7.169 Owing to the existing pressures on Early Years capacity within the LIA and District, mitigation in via a Section 106 agreement or Community Infrastructure Levy receipts may be a matter for negotiation to off-set the potential pressures faced by existing providers in accommodating the additional demand arising from the Development. With mitigation, the residual effect from the Development on Early Years providers would be **insignificant** at both the **local** and **district** level.

Primary Education Capacity

7.170 Owing to the existing pressures on primary school capacity within 2 miles of the Site and the within the District, mitigation via a Section 106 agreement or Community Infrastructure Levy receipts may be a matter for negotiation to off-set the potential pressures faced by existing schools in accommodating the additional demand arising from the Development. With mitigation, the residual effect from the Development on primary school capacity would be would be **insignificant** at both the **local** and **district** level.

Secondary Education Capacity

7.171 The Development includes provision of a six form entry Secondary School with sixth form with capacity for up to 1,200 pupils. It is therefore considered the additional demand arising from the Development could be absorbed by the existing surpluses together with the new on-Site provision and the likely residual effect remains as **insignificant**.

Primary Health Care Capacity

7.172 Owing to the existing pressures on the capacity of primary healthcare facilities within the LIA and District, mitigation via a Section 106 agreement or Community Infrastructure Levy receipts from the Development may be a matter for negotiation to off-set the potential pressures faced by existing providers in accommodating the additional demand arising from the Development. With

mitigation, the likely residual effect from the Development on primary healthcare providers would be **insignificant** at both the **local** and **District level**.

Demand for Open Space and Play Space

7.173 Owing to the provision of 14,353m^2 of children's play space and a total of 3.89 ha of publicly accessible amenity space on Site, there is more than sufficient play space to accommodate additional demand arising from the Development. As such, the likely residual effects of the Development on open space and play space capacity are considered to remain **direct**, **long-term**, **beneficial** at **local** to **district** level and of **minor significance**.

Demand for Community Facilities

7.174 Owing to the provision of school facilities for multi-use via a Community Use Agreement, as well as provision of a cinema, gym and an area for flexible community uses on-site, the likely residual effects of the Development on community facilities would remain as:

- **direct**, **long-term**, **beneficial**, **local** and of **minor significance**; and
- **insignificant** at the **district** level.

Community Safety and Wellbeing

7.175 On account of the consideration of designing out crime features and the that Development would animate and activate the Site, the likely residual effects of the Development on community safety and wellbeing would remain as:

- **direct**, **long-term**, **beneficial**, **local** and of **minor significance**; and
- **insignificant** at the **district** level.

Summary

7.176 **Table 7.28** provides a summary of the likely significant effects together with mitigation measures and likely residual effects. Unless otherwise stated in the table, the summary information is inclusive of all housing mix scenarios (Scenarios 1a, 1b, 2a and 2b) that have been assessed.

Table 7.28: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Loss of 35,402m^2 GIA of employment floorspace.	**Insignificant**.	No mitigation required – employment floorspace and employment generating uses being provided as part of the Development.	**Insignificant**.

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Generation of an average of up to 1,110 FTEs per annum over 8 years.	**Short-medium term**, **beneficial**, **district** to **regional** and of **minor significance**.	S106 Agreement to target local employment during Site preparation and construction.	**Short-medium term**, **beneficial**, **district** to **regional** and of **minor significance**.
Completed Development			
Population and Labour Market.	**Long-term**, **beneficial**, **local** to **district** and of **minor significance**.	No mitigation required.	**Long-term**, **beneficial**, **local** to **district** and of **minor significance**.
Provision of housing contributing to LBRuT targets.	**Long-term**, **local**, **beneficial** and of **moderate significance**. **Long-term**, **district**, **beneficial** and of **minor significance**.	No mitigation required.	**Long-term**, **local**, **beneficial** and of **moderate significance**. **Long-term**, **district**, **beneficial** and of **minor significance**.
Generation of employment as a result of the Development and expenditure of the new resident population and visitors to the Development.	**Long-term**, **local**, **beneficial** and of **moderate significance**. **Long-term**, **district**, **beneficial** and of **minor significance**.	No mitigation required.	**Long-term**, **local**, **beneficial** and of **moderate significance**. **Long-term**, **district**, **beneficial** and of **minor significance**.
An additional population of children under the age of 5 and demand for early years places.	**Scenarios 1b, 2b**: **Long-term**, **adverse** and **moderate** at the **local** level and **minor** at the **district level**. **Scenario 1a and 2a:** **Long-term**, **adverse** and **major** at the **local** level and **minor** at the **district** level.	Section 106 / Community Infrastructure Levy receipts to mitigate.	**Insignificant**.
An additional population primary school aged children and demand for primary school places.	**Direct**, **long-term**, **adverse**, **local** to **district**, **adverse** and of **minor significance**.	Section 106 / Community Infrastructure Levy receipts to mitigate.	**Insignificant**.
The additional demand for secondary school places arising from the Development would be accommodated by proposed Secondary School and existing surpluses.	**Insignificant**.	No mitigation required - Secondary school provided as part of the Development.	**Insignificant**.
Additional demand by the new population of the	**Direct, long-term, local** to **district**	Section 106 / Community	**Insignificant**.

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Development for primary health care.	**adverse** and of **minor significance**.	Infrastructure Levy receipts to mitigate.	
Provision of 14,353m^2 of children's play space and a total of 3.89 ha of publicly accessible amenity space on Site as part of the Development to accommodate additional demand.	**Direct**, **long-term**, **beneficial** at **local** to **district** and of **minor significance**.	No mitigation required – Provision of children's play space and amenity space provided as part of the Development.	**Direct**, **long-term**, **beneficial** at **local** to **district** and of **minor significance**.
Provision of a school (with shared sports facilities via a Community Use Agreement), cinema, gym, and an area for flexible community uses which could include a community boathouse, together with up to private amenity space, public amenity space and Public Community Park.	**Direct**, **long-term**, **beneficial**, **local** and of **minor significance**. **Insignificant** at the **district** level.	No mitigation required – community facilities and inclusion of Community Use Agreement as part of the Development.	**Direct**, **long-term**, **beneficial**, **local** and of **minor significance**. **Insignificant** at the **district** level.
The Development would seek to design out crime features and would animate and activate the Site.	**Direct**, **long-term**, **beneficial**, **local** and of **minor significance**. **Insignificant** at the **district** level.	No mitigation required.	**Direct**, **long-term**, **beneficial**, **local** and of **minor significance**. **Insignificant** at the **district** level.

Note: where the level of significance of effects varies between scenario tested this has been outline in the table.

References

[1] Office for National Statistics (2016), Business Register and Employment Survey, ONS, London

[2] Office for National Statistics (2016), '2011 Census of Population' and 'The Annual Population Survey', ONS, London

[3] Office for National Statistics (2015), 'Family Expenditure Survey', ONS, England

[4] LBRUT (2014), Planning Obligations Supplementary Planning Document (SPD), LBRUT

[5] www.nhs.uk/Service-Search

[6] www.gov.uk/government/collections/statistics-school-capacity

[7] Greater London Authority – SPG Child Yield and Play Space Calculator; https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/play-and-informal

[8] https://data.london.gov.uk/

[9] GLA (2008) Open Space Strategies: Best Practice Guidance

[10] LBRuT Open Space Assessment Report, April 2015, Knight Kavanagh and Page; Table 2.3

[11] Homes and Communities Agency Calculating Cost Per Job, Best Practice Note 2015 (3rd Edition)

[12] HCA Employment Densities Guide, 3rd Edition, November 2015

[13] Regulation and Quality Improvement Authority, January 2009, Staffing Guidelines for Residential Care Homes, SCIE Social Care Online

[14] Department for Education, School Workforce England, 2013; https://www.gov.uk/government/statistics/school-workforce-in-england-november-2013

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[19] www.gov.uk/government/collections/english-housing-survey

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[21] London Borough Richmond Upon Thames (2017) draft LBRuT School Place Planning Strategy.

[22] General and Personal Medical Services in England 2005-2015

[23] LBRuT, Supplementary Planning Document (SPD) Stag Brewery, Mortlake SW14 Planning Brief, Adopted July 2014, LBRuT

[24] English Housing Survey (2008)

[25] Homes and Community Agency (2014), 'Additionality Guide', HCA, England

8. Transport and Access

Introduction

8.1 This Chapter, prepared by Peter Brett Associates LLP (PBA), presents an assessment of the likely significant effects of the Development on the existing transport and access conditions within the area local to the Site and the wider surrounding area.

8.2 The Chapter provides a description of the methods used in the transport and access assessment, a description of the relevant baseline conditions of the Site and surrounding area, and an assessment of the likely significant environmental effects relating to transport and access of the Development during the demolition, alteration, refurbishment and construction works (the Works) and once the Development is completed and operational (the Completed Development).

8.3 Mitigation measures are identified, where appropriate, to avoid, reduce or offset any adverse effects. The Chapter concludes by examining the nature and significance of likely residual effects taking account of the mitigation measures.

8.4 A Transport Assessment (TA) has been submitted in support of the Planning Applications for the Development. This Chapter has been prepared on the basis of the detailed assessment within the TA and refers to the TA, supporting appendices and transport documents where further information is required. The TA can be found in **Appendix 8.1** to this ES.

Assessment Methodology and Significance Criteria

8.5 This Chapter has been prepared in accordance with the requirements set out in the 2011 EIA Regulations and has taken account of the guidance presented within the following:

- Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA), 2004)[1];
- Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (now IEMA), 1993[2]) (the 'IEMA Guidelines'); and
- Volume 11 of the Design Manual for Roads and Bridges (DMRB) – Environmental Assessment (Highways Agency et al., 2007 / 2008 / 2009 / 2011[3]).

8.6 The above listed 'Guidelines for the Environmental Assessment of Road Traffic' refer to the 'Manual of Environment Appraisal' (MEA) published by the (then) Department of Transport in 1983, which has been superseded. Reference has therefore been made to the relevant sections of the DMRB - specifically Volume 11 entitled 'Environmental Assessment'.

8.7 The IEMA Guidelines identify that the main transport effects that could arise from the construction and operation of new developments relate to the following:

- severance;
- driver delay;
- pedestrian delay;
- pedestrian and cycle amenity;
- fear and intimidation;
- accidents and road safety;
- dust and dirt; and
- hazardous Loads.

8.8 The ‘dust and dirt’ criterion has not been considered within this assessment as this topic is covered within **Chapter 10: Air Quality**.

8.9 The ‘Hazardous Loads’ criterion has also not been considered in this assessment, as at this stage as it is deemed unlikely that the Development Works or operation of the Development will require the transportation of hazardous loads.

8.10 Therefore, in accordance with IEMA guidance, this Chapter considers the likely effects of the Development in terms of changes in traffic flow volume and composition in relation to the above listed criteria.

8.11 In addition, although the IEMA guidance does not identify a requirement to assess the effect of public transport changes, due to the specific request from LBRuT, a public transport assessment has been included in this Chapter. A full assessment of the Development on surrounding public transport facilities is included within the TA in **Appendix 8.1**.

Assessment Methodology

Assessment of the Works

8.12 The assessment of the indicative peak daily construction two-way flows arising from the Development has been completed in advance of appointing a contractor. As a result of the range of construction activities and processes occurring on any one day, there will be some variation in the flows anticipated once a contractor is appointed. Nevertheless, a reasonable worst-case assessment of the likely extent of construction-related activities occurring at any one time has been undertaken for the purpose of assessing environmental effects.

8.13 The additional public transport assessment presented in this Chapter relating to the Works considers the morning (08:00-09:00) and evening (17:00-18:00) peak hours exclusively, as those times are considered the busiest throughout the day and thus any adverse effects identified during the peak hours would present a worst case. It should be noted that the number of construction staff expected to work on Site during the peak construction period is currently unknown. However, as part of the socio-economics assessment presented in **Chapter 7: Socio-Economics**, it has been estimated that an average of up to 1,140 full time equivalent jobs per annum over the period of the Works could be supported by the Works. The precise number of construction staff required for the Works would be confirmed post planning approval and once a construction contractor has been appointed prior to any works commencing on Site.

Completed and Operational Development Assessment

8.14 In order to identify the likely significant environmental effects relating to transport and access of the operational Development a trip generation assessment has been undertaken. The trip generation methodology, including trip rates, have been agreed with LBRuT and TfL during pre-application discussions.

8.15 It should be noted that the trip generation assessment presented within the TA, and considered in this Chapter, is not based on the final development schedule, as the Development proposals for the Site have been amended post completion of the TA work. It is not anticipated that the changes to the development schedule will make any material difference to the significance of the environmental effects set out in this Chapter. shows the assessed and final development quantum as well as the change between them.

Assessed Land Use Quanta

8.16 Within the detailed component of Application A, the ground floor of a number of proposed buildings, particularly along the new 'high street' have been identified as flexible use in order to provide the necessary flexibility to respond to market demand.

8.17 **Chapter 5: The Proposed Development** provides the maximum floorspace per land use within the overall flexible use space which should not be exceeded. For the purposes of this assessment, the following mix of flexible uses has been assumed, as set out in **Table 8.1**.

8.18 As outlined above, the below is not based on the final development schedule. However, as also shown above the changes in development schedule have minimal impact on the daily trip generation forecast of the Stag Brewery component of the Site.

Table 8.1: Flexible Use Assumptions

Use	Floor Area sqm (GIA)	Comment
Retail – Local Shops	691	The combined retail area (1,259) is the minimum retail required as part of the mix. The area for local shops has been minimised as this use will mainly generate local / linked trips. The food store is the floor area for the identified unit fronting Mortlake High Street (Building 5).
Retail – Food Store	568	
Office and Financial / Professional Services	1,353	Highest AM peak vehicle generator plus significant PM peak generator.
Community	848	Combined ground floor of the Maltings (Building 4) and Boathouse (Building 9). Buildings which are both identified for this use.
Cafés, Restaurants and Bars	1,353	Highest vehicle generator during PM peak.
Total	4,819	-

8.19 It is considered that this mix of flexible uses will provide a likely worst case assessment of highway effects. **Table 8.2** provides the final floor areas for the detailed component of Application A that have been used in this assessment.

Table 8.2: Detailed Component of Application A - Non-Residential Units used within Trip Generation Assessment

Land Use	Architects Schedule (GIA)	Floor Area (GIA)		Units used for Trip Generation
Unspecified Flexible Floor Area inc. Retail / Restaurant / Office	3,965 m^2	Food Store	568 m^2	568 m^2*
		Local Retail	691 m^2	Included in food store assessment
		Restaurant	1,353 m^2	1,353 m^2
		Office	1,353 m^2	-
Hotel	1,266 m^2	1,266 m^2		16 rooms

Land Use	Architects Schedule (GIA)	Floor Area (GIA)	Units used for Trip Generation
Community	854 m^2	854 m^2	854 m^2
Office	2,424 m^2	2,424 m^2	3,777 m^2**
Cinema	1,899 m^2	1,899 m^2	370 seats
Gym	757 m^2	757 m^2	757 m^2
Total	11,165 m^2	11,165 m^2	-

** 568 m^2 represents the size of the convenience store (Building 5) which the retail trip generation is based on.*

*** Including Flexible Use Office.*

8.20 For the outline component of Application A, there are no flexible uses proposed. **Table 8.3** shows the quanta by land use that have been applied for the trip generation assessment for the outline component of Application A.

Table 8.3: Outline Component of Application A - Trip Generation Units

Land Use	Floor Area (GIA)	Units used for Trip Generation
Residential	26,547 m^2	232 units
Extra Care	12,324 m^2	150 Assisted Living Units
Care Home	8,450 m^2	70 Care Home beds
Health Care	748 m^2	4 Consulting Rooms

8.21 The trip generation for the proposed school (Application B) has been based on the requirements to cater for up to 1,260 pupils and 60 staff.

Trip Generation

8.22 A detailed multi-modal trip generation assessment for each proposed land use on the Stag Brewery component of the Site has been undertaken as part of the TA, contained within **Appendix 8.1**.

8.23 Generally, the person trip generation for each of the proposed land uses has been based upon data of comparable development sites derived from the Trip Rate Information Computer System (TRICS) database, with appropriate comparable sites selected for each proposed individual use in accordance with the TRICS guidance. The one exception to this has been for the cinema use where a first principles approach has been agreed with LBRuT and TfL which relates to the number of seats and the likely arrival and departure patterns based on a three screen operation.

Vehicular Trip Distribution

8.24 The distribution of trips to / from the Stag Brewery component of the Site has been estimated using the SoLHAM forecast traffic distribution to / from three 'donor' zones in the SoLHAM model. The development trips have then been distributed accordingly based on these three zones. A more detailed description of the distribution is included in a Technical Note produced by PBA and attached at Appendix L of the TA in **Appendix 8.1**.

Public Transport Trip Distribution

8.25 The distribution of public transport trips, namely bus and rail trips, have been distributed using the census data for journeys to work. These trips were then distributed across the relevant services they related to dependent upon the destination. For example, if someone was recorded as taking the bus to Richmond they would be allocated onto the 419 as this is the most appropriate service for them to use.

8.26 **Table 8.4** and **Table 8.5** show the predicted distribution of public transport users onto the different bus services that can be accessed from the Site.

Table 8.4: Bus Distribution - Residential

Bus Route	Proportion by Route	Proportion by Direction	
		Bus Route Destination	Proportion
419	58%	Hammersmith	41%
		Richmond	17%
190	36%	West Brompton Station	36%
209	3%	Hammersmith	3%
R68	3%	Kew	2%
		Hampton Court	1%

Table 8.5: Bus Distribution – Non-Residential

Bus Route	Proportion by Route	Proportion by Direction	
		Bus Route Destination	Proportion
419	76%	Hammersmith	55%
		Richmond	21%
190	18%	West Brompton Station	18%
209	4%	Hammersmith	4%
R68	3%	Kew	3%

Peak Hour Assessments

8.27 The public transport assessment relating to the operational Development as well as the driver delay assessment relating to the Works and operational Development presented in this Chapter focus on the morning (08:00-09:00) and evening (17:00-18:00) peak hours to present a worst case scenario.

Establishment of Baseline Conditions

8.28 An independent survey company was commissioned to undertake a variety of surveys in order to gain an understanding of the existing transport conditions in the surrounding area of the Site. The following surveys were undertaken in June 2016:

- vehicle turning counts and queue length surveys at:
  - A31 Lower Richmond Road / Clifford Road / South Circular Road / A3003 Lower Richmond Road Staggered Signalised Junction;
  - Upper Richmond Road West (South Circular) / Sheen Lane Signalised Junction; and

- A3003 Lower Richmond Road / Mortlake High Street / Sheen Lane Roundabout.

- Mortlake Station pedestrian counts at:
  - Mortlake Station at all four access points.
- level crossing timings and queues at:
  - Mortlake Station level crossing on Sheen Lane.
- 7-day automatic traffic counts (ATC) on:
  - Mortlake High Street, to the east of the Lower Richmond Road / Mortlake High Street / Sheen Lane roundabout.

8.29 Further surveys were undertaken in November 2016. These surveys comprised:

- on-street parking surveys extending:
  - To the east up to Ashleigh Road;
  - To the west up to Clifford Avenue;
  - To the south of the railway between Bexhill Road / Elm Road to the west; and
  - Alexandra Road to the east.
- turning counts at:
  - Vineyard Path / Mortlake High Street Junction.
- pedestrian and cycle counts as well as vehicle entry and exit counts at the following comparable residential developments:
  - Kew Riverside Park, Strand Drive;
  - Kew Riverside, Melliss Avenue; and
  - Kew Bridge, A315 Kew Bridge Road.

8.30 The following further surveys were undertaken in June 2017:

- video survey at:
  - Mortlake station at all four access points.
- 7 day ATCs at:
  - Sheen Lane to the south of South Circular Road;
  - South Circular Road to the west of Sheen Lane;
  - A3003 Lower Richmond Road adjacent to Watney's Sports Ground;
  - A3003 Lower Richmond Road adjacent to Mortlake Green;
  - Williams Lane;
  - Clifford Avenue to the south of Chiswick Bridge;
  - The Terrace to the west of Barnes Bridge station; and
  - White Hart Lane to the south of Mortlake High Street.

8.31 In addition to the above surveys, accident data have been obtained from TfL for a study area around the Site comprising Mortlake High Street, the A3003 Lower Richmond Road, Chalkers Corner including Clifford Avenue up to Chiswick Bridge, and the South Circular Road between Chalkers Corner, Upper Richmond Road W and White Hart Lane. The data covers a five-year period up to 31 January 2016. Detailed accident data records can be found in the TA, **Appendix 8.1**.

Extent of Assessment Area

8.32 The IEMA Guidelines suggest two broad rules to identify the appropriate extent of the highways assessment area, as follows:

- road links with all vehicle or Heavy Vehicles traffic flow increases in any assessment year of +30%; and
- road links with Medium or High sensitivity receptors with flow increases greater than 10%.

8.33 Based on these rules, the highway assessment area includes all links of the Site's surrounding local and strategic road network that are included in the TfL South London Highway Assignment Model (SoLHAM) used to assess the impact of the Development and that are subject to any daily traffic flow changes as a result of the Development's construction or operation. Links that are forecast to be subject of traffic flow changes of less than 10% have also been included to present a robust assessment.

8.34 The study area is bound in the west by all arms of the Chalkers Corner junction, in the north by the river Thames, in the east by The Terrace and White Hart Lane and in the south by the South Circular Road and Sheen Lane to the south of the South Circular Road.

Assessment Scenarios

8.35 The assessment of environmental effects relating to transport and access have considered the following scenarios:

- 2017 Do Nothing (Baseline);
- 2022 Do Minimum (peak construction year);
- 2022 Do Something (peak construction year);
- 2027 Do Minimum (operational Development year);
- 2027 Do Something (operational Development year);
- 2031 Do Something with Highway Improvements (operational Development);
- 2042 Do Minimum (15 years' after operational Development); and
- 2042 Do Something (15 years' after operational Development).

8.36 The Do Minimum scenarios include background traffic growth only, which is added to the baseline traffic flows. In these scenarios, no account has been taken of trips associated with the Development. Development trips have been taken account of in the Do Something scenarios, which also take account of background traffic growth.

8.37 The Do Something (operational Development) scenarios constitute Do Minimum plus the completed and operational Development (i.e. all three Planning Applications), taking account of the vehicular trip generation of the Stag Brewery component of the Development as well as the existing traffic re-assignment as a result of the re-configured junction layout which forms part of the Chalkers Corner component of the Development.

8.38 It should be noted that the driver delay assessment presented in this Chapter is based on outcomes of the strategic traffic model which considers the year 2031 rather than 2027 and 2042. The strategic modelling undertaken for the development utilises TfL's SoLHAM, which is set up for the modelling year of 2031. It is considered that the different assessment year would not affect the outcomes as:

- the Development's trip generation would be the same in 2027, 2031 and 2042;

- background traffic growth is greater in 2031 compared to 2027, hence presenting a worst-case scenario compared to 2027, but a better-case scenario compared to 2042.

8.39 The highway improvement measures included within the 2031 Do Something with Highway Improvements scenario comprise highway improvements along Lower Richmond Road, Mortlake High Street, Williams Lane and Ship Lane. The highway improvements are outlined below and described in detail within the TA in **Appendix 8.1**.

Significance Criteria

8.40 The significance of the environmental effect of the Development on the above listed IEMA criteria has been determined based on the magnitude of the effect, the sensitivity of the receptor, and whether the effect is beneficial or adverse and temporary or permanent.

Magnitude of Effect

8.41 For each of the considered assessment criteria, a scale of magnitude has been identified. The magnitude of effects has been assessed against a scale divided into negligible, small, medium and large magnitude.

8.42 The assessment criteria, as well as their scale of magnitude, are described as follows.

Severance

8.43 The IEMA Guidelines states that: "*severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery.*" Further, "*Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively*". However, the guidance acknowledges that the measurement and prediction of severance is extremely difficult. The assessment of severance pays full regard to specific local conditions, in particular the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided.

8.44 Volume 11, Section 3, Part 8, Chapter 6 of the Design Manual for Roads and Bridges entitled 'Pedestrians and Others and Community Effects' provides further guidance on the aspect of New Severance within a community in terms of the 2-way Annual Average Daily Traffic flow (AADT) on a link. It states that new severance should be described in terms of "Slight", "Moderate" or "Severe" and that these categories: "… *should be coupled with an estimate of the numbers of people affected, their location and the community facilities from which they are severed.*"

8.45 The potential effects as set out later in this Chapter are based on an assessment, which takes into account the IEMA's thresholds. **Table 8.6** summarises these thresholds.

Table 8.6: Severance Thresholds (based on IEMA Guidance)

Magnitude	Definition
Large	Over 90% change in AADT flows as a result of the Development
Medium	Between 60 – 90% change in AADT flows as a result of the Development
Small	Between 30 – 60% change in AADT flows as a result of the Development
Negligible	Less than 30% change in AADT flows as a result of the Development

Driver Delay

8.46 Delay to drivers can be predicted through capacity assessments at key points on the local and strategic highway network. The addition of new development generated traffic could result in an increase in the number of vehicles using key routes and junctions. This may lead to additional delays depending on the existing operation, levels of background traffic and development generated traffic.

8.47 Assessment of junction capacity and delay is undertaken through the use of standard practice analytical tools and junction analysis programs. Driver delay is only likely to be an issue requiring consideration of mitigation (improvements) where junctions are operating beyond capacity.

8.48 **Table 8.7** below shows the magnitude-scale applied to the category 'driver delay' along road corridors for the purpose of this assessment.

Table 8.7: Driver Delay – Magnitude of Effect

Magnitude	Definition
Large	Average vehicle delay changes of more than 180 seconds per mile as a result of the Development during the peak hour periods
Medium	Average vehicle delay changes are between 120 to 180 seconds per mile as a result of the Development during the peak hour periods
Small	Average vehicle delay changes are between 60 and 120 seconds per mile as a result of the Development during the peak hour periods
Negligible	Average vehicle delay changes are less than 60 seconds per mile as a result of the Development during the peak hour periods

Pedestrian Delay

8.49 Pedestrian delays for a particular walking journey can be increased by changes to traffic flows, and can affect the ability of pedestrians to cross roads. This, therefore, will affect an individual's desire to make a particular walking journey. Changes in the volume, speed or composition of traffic are most likely to affect pedestrian delay, with the level of severity dependent on the general level of pedestrian activity and the physical condition of crossing points.

8.50 The determination of what constitutes a material impact on pedestrian delay is generally left to the judgement of the assessor and knowledge of local factors and conditions. However, the IEMA Guidelines suggest: "*a lower threshold of 10 seconds delay and an upper threshold of 40 seconds delay, for a link with no crossing facilities*". It further advises that the lower threshold equates to a two-way flow of approximately 1,400 vehicles per hour.

8.51 **Table 8.8** below shows the magnitude-scale applied to links with insufficient or no pedestrian facilities at desired lines and links subject to significant volumes of pedestrian footfall.

Table 8.8: Pedestrian Delay – Magnitude of Effect

Magnitude	Definition
Large	Link subject to a two-way traffic flow of more than 5,600 vehicles per hour
Medium	Link subject to a two-way flow of 3,500-5,600 vehicles per hour
Small	Link subject to a two-way flow of 1,400-3,500 vehicles per hour
Negligible	Link subject to a two-way flow of less than 1,400 vehicles per hour

Pedestrian and Cycle Amenity

8.52 Pedestrian and cycle amenity is broadly defined as the relative pleasantness of a journey, which is affected by traffic flow, traffic composition and pavement width / separation from traffic. This potentially significant effect is considered to be a broad assessment category which also encompasses fear, intimidation and exposure to noise and air pollution.

8.53 A tentative threshold for judging the significance of changes in pedestrian and cyclist amenity is described by the IEMA guidance as instances "*where traffic flow (or its lorry component) is halved or doubled*".

Fear and Intimidation

8.54 A further effect of traffic flows on pedestrian and cycle movements is the issue of fear and intimidation individual travellers will experience with respect to vehicular movements. The impact of this factor is dependent on the volume of traffic, the HGV content, the width of footpath and closeness of the footpath to the carriageway edge. As is the case with pedestrian delay, there are no commonly agreed thresholds for the measurement of this impact, with appraisal based on the judgement of the assessor.

8.55 The IEMA Guidelines does nevertheless suggest some thresholds, based on previous research, which could be used and these are shown in **Table 8.9**.

Table 8.9: Suggested IEMA Threshold Guidelines for Pedestrian Fear and Intimidation

Degree of Hazard	Change in Average Traffic Flow over 18 Hours day (vehicles/hour)	Average 18 Hour HGV Flow	Change in Average Speed over 18 Hours (mph)
Extreme	1800+	3000+	20+
Moderate	1200-1800	2000-3000	15-20
Slight	600-1200	1000-2000	10-15

8.56 Notwithstanding the thresholds set out above, the IEMA Guidelines suggests that they should be approached with a certain level of caution as the individual factors could be weighted by local circumstances to decide on the overall value of intimidation. For example, a road may show higher speeds but lower flows making crossing easier or high flows but congested and constant traffic, therefore reducing total fear of passing vehicles but increasing crossing difficulties.

8.57 **Table 8.10** below shows the magnitude-scale applied to the category 'fear and intimidation' for the purpose of this assessment.

Table 8.10: Fear and Intimidation – Magnitude of Effect

Magnitude	Definition
Large	Change in average traffic flow over 18 hours of 1500 + vehicles/hr as a result of the Development; An average 18-hour HGV flow of 3000 +; or Change in average speed over 18 hours of 17 + mph as a result of the Development.

Magnitude	Definition
Medium	Change in average traffic flow over 18 hours of 1200-1500 vehicles /hr as a result of the Development; An average 18-hour HGV flow of 2000-3000; or Change in average speed over 18 hours of 15-17 mph as a result of the Development.
Small	Changes in average traffic flow over 18 hours of 600-1200 vehicles/hr as a result of the Development; An average 18-hour HGV flow of 1000-2000; or Changes in average speed over 18 hours of 10-15mph as a result of the Development.
Negligible	Increase in average traffic flow over 18 hours of less than 600 vehicles/hr as a result of the Development; An average 18-hour HGV flow of less than 1000; or Increase in average speed over 18 hours of less than 10mph as a result of the Development.

Accidents and Road Safety

8.58 The assessment of accident risk and highway safety is based upon existing accident rates and specific local circumstances to identify accident clusters. For example, should a particular link or junction be found to have a high existing accident rate, the addition of substantial traffic volumes generally would be expected to have a detrimental effect on highway safety due to further increased opportunities for conflict. Mitigation measures may therefore be required.

8.59 A further assessment of highway safety may also include the comparison of accident rates at those locations identified for highway improvements, which are related to capacity issues. An assessment of expected accident rates for a new junction design compared to the existing layout will identify any future accident risk related to development traffic movements.

8.60 The IEMA Guidelines suggests that: "*Professional judgement will be needed to assess the implications of local circumstances, or factors, which may elevate or lessen risks of accidents, e.g. junction conflicts*".

8.61 **Table 8.11** below shows the magnitude scale applied to the category 'accidents and road safety' for the purpose of this assessment.

Table 8.11: Accident Risk and Road Safety – Magnitude of Effect

Magnitude	Definition
Large	Expected change in accident risk of 15 + % at the location of existing accident cluster as a result of the Development.
Medium	Expected change in accident risk of 10%-15% at the location of existing accident cluster as a result of the Development.
Small	Expected change in accident risk of 5%-10% at the location of existing accident cluster as a result of the Development.
Negligible	Expected change in accident risk of less than 5% at the location of existing accident cluster as a result of the Development.

Public Transport

8.62 As outlined above, the IEMA guidance does not identify a need to include a public transport assessment. Therefore, the magnitude of public transport effects has been based on professional judgement, the quantitative analysis of public transport trips of the Development as identified within the TA in **Appendix 8.1** and public transport service capacities.

Receptors and Receptor Sensitivity

8.63 The IEMA Guidelines identify groups and special interests which should be considered in the assessment. Categories of receptor sensitivity have been defined from the principles set out in the IEMA Guidelines and these have been used to outline in broad terms the sensitivity of receptors to traffic for the categories of effect assessed in this Chapter, although in detail, each receptor assessed has a different sensitivity to each specific effect. The sensitive receptors and their sensitivity to traffic are shown in **Table 8.12**.

Table 8.12: Sensitive Receptors to Traffic

High Sensitivity Receptors	Medium Sensitivity Receptors	Low Sensitivity Receptors
Schools, colleges and other educational institutions (Nurseries have been assumed to be included in this category).	Hospitals, surgeries and clinics.	Open space.
Retirement / care homes for the elderly or infirm.	Parks and recreation areas.	Tourist / visitor attractions.
Roads used by pedestrians with no footways.	Shopping areas.	Historical buildings.
Road safety black-spots.	Roads used by pedestrians with narrow footways.	Places of Worship.

8.64 Based on the sensitive receptors to traffic defined by the IEMA Guidelines, **Table 8.13** outlines the identified sensitivity receptors for this assessment together with their sensitivity rating and description.

8.65 It should be recognised that most of significant criteria apply to 'link' receptors, with the exception of driver delay, which is only relevant for 'junction' receptors. Therefore, 'link' receptors are assessed in terms of severance, pedestrian delay and amenity, and fear and intimidation; whilst 'junction' receptors are assessed against driver delay significance criteria. For accidents and road safety, both types of receptors are relevant, since what matters is the existence of accident clusters.

Table 8.13: Transport and Access Sensitivity Receptors

Sensitivity	Receptor	Definition
Severance / Pedestrian Delay/ Pedestrian and Cycle Amenity / Fear and Intimidation / Driver Delay		
High	Sheen Lane (north of Level Crossing).	Link comprises pedestrian crossing, access to schools.
	Sheen Lane (south of Level Crossing).	Link comprises pedestrian crossing and public transport facilities, active frontage of shops, cafes and restaurants, health centre and library.

Sensitivity	Receptor	Definition
	Sheen Lane (to the south of the South Circular Road).	Link provides access to Richmond Park and Tower House School.
Medium	A3003 Lower Richmond Road.	Link currently provides access to park and recreational areas, would provide access to proposed school on Site. Link comprises bus stops and crossing facilities.
	White Hart Lane.	Link provides access to retail and dinning outlets, as well as hospital via South Worple Way.
	South Circular Road (to the west of Sheen Lane).	Link comprises pedestrian crossing and public transport facilities, active frontage of shops, cafes and restaurants.
Low	Mortlake High Street.	Link provides access to place of worship, post office, restaurants and shops, comprises pedestrian crossing and bus stops.
	A316 Lower Richmond Road.	Link provides access to Richmond, limited active frontage, comprises bus stops.
	A316 Clifford Avenue.	Link provides access across the River Thames, limited active frontage, comprises bus stops.
	South Circular Road (to the north of the A316).	Link provides access to Kew, Royal Botanic Gardens, comprises bus stops.
	South Circular Road (to the south of the A316).	Link provides an alternative route to Richmond and provides access to the A3 and A306, both of which form part of the TLRN.
	Williams Lane.	Link provides access to residential dwellings, partially adjoined by back gardens of residential dwellings.
	The Terrace.	Link provides access to residential dwellings and Barnes Bridge station, comprises bus stops.
Accidents and Road Safety		
Medium	Chalkers Corner Junction.	Key junction on strategic network and existing accident cluster location with 11% of accidents recorded as severe.
	South Circular Road / Sheen Lane Junction.	Existing accident cluster location with 42% of accidents recorded as severe.

Evaluation of Significance

8.66 **Table 8.14** demonstrates how the proposed significance of potential effects is justified against the magnitude of effects and the sensitivity of the receptor.

Table 8.14: Transport and Access Significance Criteria

Sensitivity of Receptor	Magnitude of Effect			
	Large	Medium	Small	Negligible
High	Major	Major	Moderate	Insignificant

Sensitivity of Receptor	Magnitude of Effect			
	Large	Medium	Small	Negligible
Medium	Major	Moderate	Minor	Insignificant
Low	Moderate	Minor	Insignificant	Insignificant

Baseline Conditions

Existing Highway Network and Traffic Flows

Road Network

8.67 There are four vehicular access points to the Main Stag Brewery Site, one of which takes access off the A3003 Lower Richmond Road, one off Mortlake High Street, one off Ship Lane and one off Williams Lane.

8.68 Vehicular access to the wider Mortlake area is limited to four points of access / egress due to the impact of the River Thames and the railway line. These access / egress points are:

- the traffic light controlled junction of the A3003 Lower Richmond Road onto the A316 Clifford Road within the Chalkers Corner component of the Site. This is part of a wider signal junction, which also includes the closely associated South Circular junction. This can be regarded as the main vehicular access route into and out of the area from the east. The junction provides for all movements;
- Sheen Lane across the Mortlake Station level crossing. This in turn accesses onto the A205 Upper Richmond Road (South Circular) by way of a signal controlled junction;
- White Hart Lane across the second level crossing. This again provides access / egress to the A205 South Circular via Priests Bridge, a one-way loop road with separate priority junctions for traffic leaving and entering the South Circular. Together these junctions provide for all movements; and
- A3003 under Barnes Bridge.

8.69 The A3003 runs in an east-west direction, connecting to the A306 in Barnes in the east to the A316 in the west. It is subject to a 30 mph speed limit and is used by bus services operating through the Mortlake area.

8.70 The A306 has a north-south alignment and provides access to the South Circular Road at its junction with the A306 Roehampton Lane in the south and the A4 Great West Road in Hammersmith via Hammersmith Bridge in the north.

8.71 The A316 and A205, to the west of the Site, form part of Transport for London Road Network (TLRN). Both are subject to a 30 mph speed limit, however the speed limit along the A316, over Chiswick Bridge, increases to 40 mph. The A316 has a north-east to south-west alignment providing access to the A4, which in turn provides access to the M4 motorway, in the north-east and to the M3 motorway via Richmond in the south-west.

Baseline Traffic Flows on Highway Network Surrounding the Site

8.72 **Table 8.15** shows the baseline traffic flows for 2017, presented as Annual Average Daily Traffic (AADT) flows and its HGV percentage, for links in proximity of the Site.

Table 8.15: 2016 Baseline Traffic Flows

Link	AADT Flow	HGV Percentage
A316 Clifford Ave	29791	10.25%
A316 Lower Richmond Road	36741	5.45%
South Circular (north of A316)	14863	5.85%
South Circular (south of A316)	21164	3.75%
A3003 Lower Richmond Road (Watney's Sports Ground)	16940	8.73%
A3003 Lower Richmond Road (Mortlake Green)	17098	9.77%
Williams Lane	609	7.07%
Mortlake High Street	18049	10.94%
The Terrace (west of Barnes Bridge Station)	17223	8.68%
White Hart Lane (south of Mortlake High Street)	4825	7.90%
Sheen Lane (north of Level Crossing)	5834	3.46%
Sheen Lane (south of Level Crossing)	5559	2.48%
Sheen Lane (south of South Circular)	4817	4.19%
South Circular Road (west of Sheen Lane)	18054	8.42%

Road Safety

8.73 A detailed analysis of the personal injury collision data for the set study area surrounding the Site as outlined above, can be found in Chapter 2 of the TA (refer to **Appendix 8.1**), while the location plan and summary details of the collisions recorded during the period are appended to the TA.

8.74 In summary, no collisions that occurred in the study area were identified as having contributory factors linked to the road layout, which suggests that there are no integral highway safety issues within the study area.

8.75 The data, however, shows two locations where clustering of collisions (concentration of more than 10 collisions) occurred during the five-year period. These accident cluster locations are outlined in **Table 8.16**.

Table 8.16: Accident Cluster Locations

	Accidents over the Five-Year Period up to 31 January 2016			
Accident Cluster Location	Total Number of Accidents	Percentage of Slight Accidents	Percentage of Severe Accidents	Percentage of Fatal Accidents
Chalkers Corner junction	19	89%	11%	0%
South Circular Road / Sheen Lane Junction	12	58%	42%	0%

8.76 The detailed assessment undertaken as part of the TA has shown that none of the accidents within the cluster locations are due to the highway layout. All of the accidents recorded in these locations are due to road user errors.

Pedestrian Facilities

8.77 Footways are provided on both sides of the carriageway for the majority of roads in the surrounding area of the Site, with the exception of Ship Lane, Thames Bank, Williams Lane, The Terrace and parts of Lower Richmond Road where a footway is only present on one side of the carriageway. The majority of footways within the area are over 2 m in width and are well lit and well maintained.

8.78 Additionally, there are several footpaths through Mortlake Green, to the south of the Stag brewery component of the Site, which are approximately 2 m in width. These footpaths are well maintained and provide a connection between the A3003 Lower Richmond Road and Mortlake Station. Some lighting is provided within Mortlake Green although to a lesser standard than provided on footways adjacent to the carriageways.

8.79 The Thames path is located to the north of the Stag Brewery component of the Site adjacent to the River Thames. This link provides an unlit path along the south bank of the River Thames leading towards Kew to the west and Barnes to the east. The path consists of a mixture of unpaved and cobbled surfaces.

8.80 Several pedestrian crossings are present in the area. Two zebra crossings are located on Sheen Lane, approximately 70-100 m either side of the railway level crossing, whilst another is located on Lower Richmond Road. A further one is located on Mortlake High Street, approximately 300 m to the east of Sheen Lane. A signalised crossing is located on Lower Richmond Road in proximity to the Ship Lane junction and the northern entrance to Mortlake Green. Additional signalised crossings are located at the Chalkers Corner junction as well as the Sheen Lane / South Circular Road junction.

8.81 A Pedestrian Environment Review System (PERS) audit has been undertaken by PBA, in November 2016, in support of the planning applications for the Development. The PERS audit assesses the quality of an environment in terms of how it meets the needs of a pedestrians, in accordance with guidance set out by TfL in the PERS handbook. The PERS report, which presents the findings of the PERS audit, can be found appended to the TA, **Appendix 8.1**.

8.82 The PERS audit comprised pedestrian links to the main trip generators of the local area surrounding the Site as well as the pedestrian crossing points, public transport waiting areas and the nearby public spaces.

8.83 In summary, the PERS found:

- in total 41 links, 25 crossings, 21 public transport waiting areas and one public space were audited. The majority of these achieved ‘Green’ and ‘Amber’ scores indicating a good or acceptable standard of provision for pedestrians, respectively;
- in general, all links, crossings, public transport waiting areas and the public spaces are of a good standard. Most of the links, particularly the residential links were found to be very similar in terms of design and provision of facilities;
- one public transport waiting area scored ‘Red’ which was due to its narrow boarding points and waiting area discomfort;
- issues that have arisen throughout the audit include, the lack of crossing facilities on Lower Richmond Road and Mortlake High Street, the width of the footway in places on The Terrace, the route through the Timber Yard at Mortlake station and the quality of Barnes Bridge bus stop; and

- whilst the footway is narrow in places along The Terrace, there is still reasonable amounts of width and the Thames Path provides an alternative route on the northern side of The Terrace.

8.84 The following suggestions have been made as part of the PERS findings:

- to improve the route across the timber yard at Mortlake station, it is suggested to increase signage on the approach to make pedestrians more aware of moving vehicles; and
- several new crossing points have been suggested in order to combat the lack of permeability across Lower Richmond Road and Mortlake High Street.

Cycle Facilities

8.85 In terms of strategic access there is an existing cycle route along the A316 providing an important link between the Site and Richmond town centre to the south west and towards Hammersmith in the north east. This comprises of a mix of shared footway facility, for example across Chiswick Bridge, and segregated off road facility, to the west of the South Circular Road.

8.86 Within the immediate vicinity of the Site the provision of formal cycle facilities comprises:

- an advisory route along Mortlake High Street from the east of the Site towards Barnes Bridge;
- a further advisory route along North Worple Way, along the north side of the railway line, providing a connection to Mortlake Station from the east;
- a signed on street route connecting the cycle facilities on Chiswick Bridge with the A3003 Lower Richmond Road; and
- a further signed on street route providing access to the station from the south west.

Existing Public Transport Network

Public Transport Accessibility Level

8.87 The Public Transport Accessibility Level (PTAL) is a measure of the accessibility of a specified point to the public transport network, taking into account walk access times and service availability. The method is essentially a way of measuring the density of the public transport network at a particular point. A PTAL can range from 1a to 6b, where a score of 1 indicates a “very poor” and score of 6 an “excellent” level of accessibility.

8.88 The Site at present has a PTAL rating of predominantly 2 with a PTAL rating of 1 at the western corner of the Stag Brewery component of the Site, which represents a ‘poor’ and ‘very poor’ level of accessibility to public transport services, respectively. However, PTAL does tend to underestimate the accessibility of the Site by public transport since the nearby Mortlake Rail station provides access to the wider strategic public transport network serving London and the South East Region. It should be noted that TfL has acknowledged a PTAL rating of 2 for the Stag Brewery component of the Site.

National Rail

8.89 The closest National Rail station to the Site is Mortlake, which is situated approximately 400 m (5 minutes) to the south of the Stag Brewery component of the Site. The station is served by South West Trains services between London Waterloo and Twickenham, continuing either via Hounslow and Chiswick on the Hounslow Loop or Kingston and Wimbledon on the Kingston Loop, back to Waterloo.

8.90 **Table 8.17** shows the peak hour rail service frequencies of services departing Mortlake station.

Table 8.17: Rail Services Peak Hour Frequencies

	Service Frequency (Services per Hour)	
Direction (towards)	**AM Peak Hour**	**PM Peak Hour**
Waterloo (Fast)	4	4
Waterloo (via Hounslow)	2	2
Waterloo (via Kingston)	2	2
Total	8	8

8.91 **Table 8.18** shows the journey times from Mortlake Station to selected destinations.

Table 8.18: Journey Times from Mortlake Rail Station

Direction	Destination	Journey Time (minutes)
Eastbound	Barnes	3
	Wandsworth Town	9
	Clapham Junction	11
	Vauxhall	18
	Waterloo	28
Westbound	North Sheen	2
	Richmond	4
	St Margarets	7
	Twickenham	9
	Strawberry Hill	13
	Teddington	17
	Hampton Wick	22
	Kingston upon Thames	24
	Hounslow	21

8.92 Mortlake station is served by the new South Western Railway franchise. By 2020, there will be line upgrades to allow 4 extra trains per hour on the “Windsor Lines”, however, none of these will be via Richmond as this section of track is physically constrained by several level crossings. Whilst the number of trains calling at Mortlake will not change the passenger capacity on the line will be increased through the provision of longer trains increasing from 8 to 10 cars. Further capacity increases will occur from 2020 through the provision of a new homogeneous fleet of rolling stock that will serve all stations on the Windsor Lines. The new rolling stock have increased loading capacity and will increase the current peak hour capacity of around 8,624 (3,304 seats) to around 11,800 (4,547 seats). The actual increase will depend on the final seat configuration which is yet to be announced.

8.93 It is not foreseen that there will be any investment to increase line capacity via Richmond (as opposed to train or station capacities) until at least the 2030s. At this point there is potential that either Crossrail 2 or the Heathrow Southern Railway will be constructed -both of which will have different direct and indirect impacts on the Windsor Lines capacity.

London Underground and Overground

8.94 The closest London Underground station to the Site is Richmond, which lies approximately 2.6 km to the south-west of the Site and can be accessed via a 34-minute walk, 10-minute cycle ride, 12-minute bus ride on bus route 419, or 9-minute train ride from Mortlake Station.

8.95 Richmond Station provides access to District line services. A total of 7 District line services depart from Richmond in the morning peak hour and 6 in the evening peak hour.

8.96 **Table 8.19** shows journey times into Central London from Richmond via District Line services.

Table 8.19: District Line Journey Times by Selected Destinations

Destination	Time (minutes)
Hammersmith	00:17
Earl's Court	00:24
Paddington	00:35
Edgware Road	00:38
Victoria	00:34
Westminster	00:38
Embankment	00:40
Blackfriars	00:44

8.97 Richmond station, furthermore, provides access to London Overground services between Richmond and Stratford. A total of 4 services depart from Richmond in the morning and 4 in the evening peak hour.

Local Bus Services

8.98 The closest bus stops to the Site are situated to the south of the Site along Lower Richmond Road to the east (Stop Z) and west of Ship Lane (Stop N).

8.99 **Table 8.20** shows the bus routes available within an 850 m walking distance of the Site. It should be noted, however, that TfL recommends a maximum walking distance of 640 m to bus stops.

Table 8.20: Bus Routes and Peak Hour Frequencies

Bus Route No.	Route (towards)	Nearest Bus Stop to Site	Location of Bus Stop	Approx. Walking Distance to Centre of Site	Approximate Frequency (Services per Hour)	
					AM Peak Hour	PM Peak Hour
419	George Street (Richmond)	Ship Lane Stag Brewery (Stop Z)	Lower Richmond Road	160 m (2 mins)	4	4
	Hammersmith Bus Station	Ship Lane Stag Brewery (Stop N)		170 m (2 mins)	4	4
190	George Street (Richmond)	Thames Bank (Stop R)	Clifford Avenue	450 m (6 mins)	3	4

Bus Route No.	Route (towards)	Nearest Bus Stop to Site	Location of Bus Stop	Approx. Walking Distance to Centre of Site	Approximate Frequency (Services per Hour)	
					AM Peak Hour	PM Peak Hour
	Empress State Building / W Brompton Station	Thames Bank (Stop J)		400 m (5 mins)	4	4
209*	Hammersmith Bus Station	Avondale Road Mortlake (Stop S)	Mortlake High Street	850 m (11 mins)	14	14

**route starts / finishes in Mortlake.*

Likely Significant Effects

The Works

Construction Trip Generation during Peak Construction Traffic Period

8.100 The vehicle trip generation assessment relating to the Works considers the busiest year of construction activities in terms of vehicle movements. Based on the current construction programme, it is anticipated that the busiest year of construction vehicle movements will be 2022. During this period, it is forecast that 82 one-way vehicle trips would access the Site per day, of which 57 one-way trips are likely to be undertaken by Heavy Goods Vehicles (HGVs) and 25 one-way trips by Light Goods Vehicles (LGVs).

8.101 It is currently proposed that no parking would be provided on Site for the construction workforce. It is anticipated that construction staff would access the Site via public transport. Therefore, it is considered that construction staff would generate a negligible amount of vehicle trips along the local highway network.

Construction Site Access and Assumed Routes

8.102 During the peak construction period, access to the Site for construction vehicles would be taken via two access points off Lower Richmond Road via Ship Lane, and Mortlake High Street, adjacent to Bulls Alley.

8.103 Although the final construction vehicle routes will be agreed and confirmed as part of the final Construction Logistics Plan (CLP) post submission of the planning application and once a contractor has been appointed, for the purposes of this assessment it has been assumed that all construction HGVs would access the Site from the west via Chalkers Corner – Lower Richmond Road. As access from the east is constrained by 17 and 18 tonne weight restrictions along The Terrace, it has been assumed that only LGV trips would access the Site from the east.

8.104 **Table 8.21** shows the assumed distribution of construction vehicle trips by assumed vehicle type and **Table 8.22** shows the vehicle trips distributed along the highway network.

Table 8.21: Assumed Construction Traffic by Direction and Vehicle Type

Total One-Way Daily Construction Trips during Peak Construction Traffic Period (2021)	One-Way Trips by Assumed Vehicle Type		Assumed Construction Traffic Distribution by Direction and Vehicle Type		
			From the West		From the East
	HGV	LGV	HGV	LGV	LGV
82	57	25	57	8	17

Table 8.22: Assumed Construction Traffic by Link

Link	Daily Two-Way Constriction Trips during Peak Construction Traffic Period (2021)
A316 Clifford Ave	52
A316 Lower Richmond Road	33
South Circular (north of A316)	13
South Circular (south of A316)	33
A3003 Lower Richmond Road (Watney's Sports Ground)	130
Mortlake High Street	34
The Terrace (west of Barnes Bridge Station)	34
South Circular Road (west of Sheen Lane)	33

8.105 Further and more detailed information regarding the construction of the Development can be found within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction** and within the Framework Construction Management Statement provided / submitted to support the Planning Applications.

8.106 Consideration was given, by the Applicant, to the use of the River Thames for removal of demolition and excavation waste and the delivery of construction materials. However, this was discounted for the reasons outlined in **Chapter 4: Alternatives and Design Evolution** and therefore, the assessment of the effects of the Works does not include the use of the River Thames, which from a ES transport assessment point of view represents a worst case assessment as no discount in vehicle trips has been taken account of.

Effects Assessment

Severance

8.107 **Table 8.23** shows the percentage increase in average daily traffic flows on links in proximity of the Site. It compares traffic flows of the 2022 future baseline plus the Works (Do Something) scenario with the 2022 future baseline (Do Minimum) scenario.

Table 8.23: Peak Construction of Development – Severance Assessment

Link	Increase in Daily Traffic Flows in 2022 as a result of Traffic associated with the Works
A316 Clifford Ave	0.2%
A316 Lower Richmond Road	0.1%

Link	Increase in Daily Traffic Flows in 2022 as a result of Traffic associated with the Works
South Circular (north of A316)	0.1%
South Circular (south of A316)	0.1%
A3003 Lower Richmond Road (Watney's Sports Ground)	0.7%
Mortlake High Street	0.2%
The Terrace (west of Barnes Bridge Station)	0.2%
South Circular Road (west of Sheen Lane)	0.2%

8.108 The assessment has shown that the largest increase in daily traffic flows as a result of the Works would occur along Lower Richmond Road. It is forecast that traffic along this link would temporarily increase by less than 1%, which falls well below the IEMA Guideline threshold of a 30% increase that would produce a slight change in severance. Therefore, the addition of construction traffic will not result in a significant increase in severance along this link.

8.109 As a result, it is considered that the Works would not contribute to any significant increase in severance, thus is deemed to have an **insignificant** effect in relation to pedestrian and cycle severance on links in the proximity to the Site.

Driver Delay

8.110 HGV movements associated with the Works would be spread over the working day and would generally be timed to avoid busy periods on the local and strategic highway network surrounding the Site.

8.111 Therefore, it is not expected that the Works related vehicle movements would result in any significant increase in driver delay during peak hours. Thus, it is considered that the Works would cause an **insignificant** effect in relation to driver delay on links in the proximity to the Site.

Pedestrian Delay

8.112 As outlined within the methodology section of this Chapter, pedestrian delay is related to traffic flows, which influence the ability of pedestrians to cross individual links.

8.113 The assessment of pedestrian delay on links that form part of the assumed construction routes has shown that no assessed link would be subject to a significant increase in pedestrian delay as a result of the additional traffic movements associated with the Works.

8.114 Furthermore, it needs to be recognised that since all links that form part of the assumed construction routes to and from the Site provide pedestrian crossing facilities, pedestrians journey times would not be affected by a change in traffic volumes as these crossing facilities provide convenient opportunities for pedestrians to cross links.

8.115 As outlined above, a PERS audit has been undertaken in the surrounding area of the Site. As part of the PERS audit, crossing points on links that form part of the assumed construction routes have been assessed, all of which were found to be of a good standard, achieving a ‘Green’ rating.

8.116 Therefore, it is considered that the Works would cause an **insignificant** effect on pedestrian delay along links that form part of the assumed construction routes.

Pedestrian and Cycle Amenity

8.117 Pedestrian and cycle amenity, as outlined above, is affected by factors including traffic flow, traffic composition and pavement width / separation from traffic. A tentative threshold for judging the significance of changes in pedestrian and cyclist amenity is described by the IEMA guidance as instances *"where traffic flow (or its lorry component) is halved or doubled"*.

8.118 The additional traffic generated by the Works would not result in a doubling of traffic flows along any link assumed to be part of the construction routes. As a result, it is considered that the Works would result in an **insignificant** effect on pedestrian and cycle amenity.

Fear and Intimidation

8.119 As outlined above, an increase in the proportion of HGV movements can cause adverse effects on pedestrian fear and intimidation. The suggested IEMA threshold guidance for pedestrian fear and intimidation, as shown in **Table 8.9**, suggests a small adverse effect if average 18-hour HGV flows are in the region of 1,000 to 2,000.

8.120 The Works of the Development are forecast to generate approximately 114 two-way HGV trips per day in the peak construction period.

8.121 **Table 8.24** shows 18-hour two-way HGV flows for the 2022 Do Minimum and Do Something scenarios.

Table 8.24: Fear and Intimidation Assessment – 2022 Do Minimum and Do Something

Link on Assumed Construction HGV Route	18-Hour 2-Way HGV Flow			18-Hour 2-Way Traffic Flow per Hour		
	2022 Do Minimum	2022 Do Something	Change	2022 Do Minimum	2022 Do Something	Change
A316 Clifford Ave	3535	3581	46	1955	1958	3
A316 Lower Richmond Road	2314	2342	29	2143	2145	2
South Circular (north of A316)	1005	1016	11	867	868	1
South Circular (south of A316)	918	947	29	1234	1236	2
A3003 Lower Richmond Road (Watney's Sports Ground)	1739	1853	114	1080	1087	7
Mortlake High Street	2228	2227	0	1148	1150	2
The Terrace (west of Barnes Bridge Station)	1774	1774	0	1102	1104	2
South Circular Road (west of Sheen Lane)	1891	1919	29	1215	1217	2

8.122 As can be seen, the 18-hour HGV flow on Clifford Avenue in the 2022 future baseline without Development (Do Minimum) scenario is likely to be in excess of 3000, which would result in a

moderate effect on pedestrian fear and intimidation. The 18-hour HGV flow on Lower Richmond Road in the 2022 future baseline without Development (Do Minimum) scenario is likely to be less than 2000, which would result minor adverse effect on pedestrian fear and intimidation. These effects are a result of the forecast future traffic growth within the area and are not a result of the additional traffic generated by the Works.

8.123 The additional HGV movements associated with the Works of the Development are not considered to change pedestrian fear and intimidation compared to the 2022 Do Minimum scenario.

8.124 Apart from a change in the proportion of HGVs, increased fear and intimidation can also be caused by an increase in average traffic flows over 18 hours per day of 600 and more vehicles per hour. The assessment of fear and intimidation considering all traffic over 18 hours has shown that no link that forms part of the assumed construction route would experience an increase in traffic of more than 7 vehicles per hour (Lower Richmond Road) as a result of the Works associated with the Development.

8.125 As outlined above, pedestrian fear and intimidation can furthermore be influenced by vehicle speeds. However, it is considered unlikely that the Works associated with the Development would result in a change in vehicle speeds compared to the 2022 Do Minimum scenario.

8.126 Given the above, it is considered that the Works would result in an **insignificant** effect on pedestrian fear and intimidation.

Accidents and Road Safety

8.127 As outlined above, continued growth in traffic volumes is expected to increase the likelihood of a proportional rise in accident risk. This is especially true for locations where there are existing highway safety issues.

8.128 The accident data analysis, the findings of which are summarised in **Table 8.16** above, has identified two junctions where more than 10 collisions were recorded during the five-year period up to 31 January 2016 within the study area. The analysis has shown that the Chalkers Corner junction was subject to a total of 19 accidents and the Sheen Lane / Upper Richmond Road West (South Circular Road) junction was subject to a total of 12 accidents over the five-year period.

8.129 Nonetheless the Works associated with the Development will result in an extremely slight increase in accident risk at the existing accident cluster locations. As can be seen in **Table 8.25**, the increase will be significantly less than 1%.

Table 8.25: Increase in Accident Risk during Peak Works Phase

Junction / Link	Number of Accidents		Increase in Accident Risk DM – DS 2022
	2022 Do Minimum (DM)	2022 Do Something (DS)	
Chalkers Corner junction	20	20	0.2%
South Circular Road / Sheen Lane Junction	13	13	0.1%

8.130 The Works associated with the Development are therefore considered to cause no significant increase in accident risk. Thus, it is considered that the Works would have an **insignificant** effect on accident risk at existing accident cluster locations.

Public Transport

8.131 There will be an increased number of contractors in the local area who will use the public transport network. However, construction workers:

- generally start early and leave early resulting in the majority of the contractors travelling outside the morning and evening peak hour periods;
- public transport trips would be split between rail and bus services available in proximity of the Site; and
- arrivals in and departures from the local area around the Site would be counter-directional to the majority of existing residential public transport trips.

8.132 Furthermore, the use of the existing bus stops in the vicinity of the Site will be maintained at all times.

8.133 Therefore, it is considered that the magnitude of effects on the capacity of existing bus and rail services during the peak hours would be negligible. Thus, it is considered that the Works would result in an **insignificant** effect on public transport services available in the local area of the Site during the peak hours.

Completed Development

Transport-Related Development Proposals - Stag Brewery component of the Site

8.134 The strategy for movement across and through the Stag Brewery component of the Site revolves around reducing the number of vehicle trips required at ground floor level and to prioritise walking and cycling to, from and within the Development. Vehicular movement across the Stag Brewery component of the Site would mainly take place in the basement car parks. These are accessible via ramps from Mortlake High Street and Ship Lane. By keeping vehicular movements below ground it increases the area available for pedestrians and cyclists and reduces potential conflicts between these modes and motorised traffic.

8.135 The number of car parking spaces proposed aims to achieve a balance between over provision of spaces and therefore attracting more vehicles than necessary to the Development and providing too little and thus causing a negative impact on existing parking conditions within the local area around the Site.

8.136 The only provision of parking at ground floor level is proposed to be 24 spaces for the proposed town houses on the north-western part of the Stag Brewery component of the Site and 15 spaces for the proposed six-form entry secondary school. An agreement for a lower residential parking ratio of approximately 0.7 spaces per residential unit has been agreed with TfL officers during pre-application discussions as an appropriate level of parking based on similar sites.

8.137 It is proposed to provide car parking spaces on Stag Brewery component of the Site as outlined in **Table 8.26**.

Table 8.26: Proposed Car Parking Provision on the Stag Brewery component of the Site

Parking Area	Residential Spaces	Non-Residential Spaces
At Grade – on Ship Lane	-	5
At Grade – Residential Houses	24	-

Parking Area	Residential Spaces	Non-Residential Spaces
At Grade - School	-	15*
Eastern Basement	331	77
Western Basement	148	108
Sub-Total	503	205
Total	**708**	

**As requested by LBRuT*

8.138 Regarding at grade parking, the Stag Brewery component of the Development would provide new car club spaces, with three potential spaces identified on Ship Lane. The amount of Electric Vehicle Charging Points on the Stag Brewery component of the Site, both active and passive, is still to be agreed but would as a minimum be provided in accordance with London Plan standards.

8.139 The Development is envisaged to focus on pedestrian and cycle accessibility. The Development would comprise numerous access points for pedestrians and cyclists. Throughout the Development, particularly in the western section, there are shared spaces where pedestrians and cycles can move around without the presence of traffic. Cycle routes would connect the Site to the existing cycle network with the primary route through the Site formed by the Green Link, which would link Mortlake Green with the Thames Path.

8.140 Cycle parking for the Site would be provided in both the underground car parks and at street level in accordance with the London Cycling Design Standards. The underground cycle storage facilities are to provide for long stay parking for residents of the Site, whilst more short stay spaces would be provided at street level to cater for employees and visitors using the non-residential facilities on Site. Provision is also made for non-standard bikes in accordance with the standards. The level of cycle parking is to be provided in line with the London Plan.

Transport-Related Development Proposals – Chalkers Corner component of the Site

8.141 The Chalkers Corner junction to the west of the Stag Brewery component of Site has been identified for improvements in order to both alleviate the transport and traffic implications associated with the operation of the Development within the Stag Brewery component of the Site and to improve the pedestrian and cycle environment. The details of the Chalkers Corner improvements are outlined in **Chapter 5: The Proposed Development** and in the TA, **Appendix 8.1**, and summarised below:

- Junction of A205 South Circular Road / A316 Clifford Avenue / A3003 Lower Richmond Road and A306 Lower Richmond Road (Chalkers Corner)
  - The Chalkers Corner proposals are designed in order to provide a balanced scheme to enhance facilities for pedestrians and cycles as well as improving capacity in order to facilitate the additional demand of the Development without worsening the existing highway access to Mortlake.

Trip Generation from the Completed and Operational Development

8.142 It is forecast that the operational Development will generate 2,892 two-way vehicle trips per day, of which 122 two-way trips are likely to be undertaken by HGVs. These HGV trips are associated with deliveries and servicing of the Development. As outlined above, it should be noted that the vehicular trip generation forecast is not based on the final development schedule.

8.143 Appropriate transport modelling tools have been used to assess the transport implications of the Development, impacts associated with the trip generation of the Development within the Stag Brewery component of the Site and the highway layout changes of the Development proposed within the Chalkers Corner component of the Site. The following models have been utilised for the assessment:

- The SoLHAM has been utilised to assess the effects arising from the Development over a wide area, including all arms of Chalkers Corner and the South Circular Road up to its junction with White Hart Lane to the south east of the Site. SolHAM is TfL's strategic Saturn highway model covering the south east of London and provides a means for assessing the impacts arising from a development on traffic flows and journey times across the wider network covered by the model. It is therefore able to assess the likely changes in vehicle routing that may occur as a result of infrastructure improvements as well as the effects of new development traffic;
- Detailed junction capacity models, LinSig junction models for traffic signals and ARCADY and PICADY (Junctions 8) models for uncontrolled junctions (roundabouts and priority junctions, respectively), have been developed to assess the Development effects on junctions of the local road network. The coverage of these local assessments has been agreed with both LBRuT and TfL, and comprises the following:
  - Chalkers Corner signalised junction;
  - Upper Richmond Road / South Circular Road signalised junction;
  - Upper Richmond Road / Sheen Lane signalised junction;
  - Sheen Lane / Mortlake High Street / Lower Richmond Road roundabout;
  - Lower Richmond Road / Site internal school access road junction;
  - Lower Richmond Road / Ship Lane junction; and
  - Mortlake High Street / Site internal car park access junction.

8.144 In addition, a local VISSIM model was developed for the AM and PM peak hours to better understand the effects of the Development on the local network along Lower Richmond Road, Sheen Lane and Mortlake High Street, including interactions with the nearby railway level crossing and proposed new pedestrian crossings.

8.145 Further details of this local modelling are provided within Chapter 6 of the TA in **Appendix 8.1**.

Operational Traffic Flows on the Surrounding Highway Network

8.146 The existing traffic distribution along the strategic and local highway network in the surrounding area of the Site has been derived from the SoLHAM. This distribution has been used to distribute the Development trips around the highway network. The resultant vehicle trips by road are shown in the **Table 8.27**.

Table 8.27: Vehicular Development Traffic on Assessed Links

Link	Daily Two-Way Development Trips
A316 Clifford Ave	498
A316 Lower Richmond Road	591
South Circular (north of A316)	240
South Circular (south of A316)	96
A3003 Lower Richmond Road (Watney's Sports Ground)	1426

Link	Daily Two-Way Development Trips
A3003 Lower Richmond Road (Mortlake Green)	1466
Williams Lane	709
Mortlake High Street	1011
The Terrace (west of Barnes Bridge Station)	871
White Hart Lane (south of Mortlake High Street)	140
Sheen Lane (north of Level Crossing)	455
Sheen Lane (south of Level Crossing)	455
Sheen Lane (south of South Circular)	277
South Circular Road (west of Sheen Lane)	0

Effects Assessment

Severance

8.147 **Table 8.28** shows the percentage increase in average daily traffic flows on links in proximity of the Site. It compares traffic flows of the 2027 and 2042 future baseline plus Development (Do Something) scenarios with the 2027 and 2042 future baseline (Do Minimum) scenarios.

Table 8.28: Operational Development – Severance Assessment

Link	Increase in Daily Traffic Flows in 2027 as a result of Development Traffic	Increase in Daily Traffic Flows in 2042 as a result of Development Traffic
A316 Clifford Ave	1.5%	1.4%
A316 Lower Richmond Road	1.4%	1.3%
South Circular (north of A316)	1.4%	1.3%
South Circular (south of A316)	0.4%	0.4%
A3003 Lower Richmond Road (Watney's Sports Ground)	7.6%	7.0%
A3003 Lower Richmond Road (Mortlake Green)	7.7%	7.2%
Williams Lane	105.2%	97.4%
Mortlake High Street	5.1%	4.7%
The Terrace (west of Barnes Bridge Station)	4.6%	4.2%
White Hart Lane (south of Mortlake High Street)	2.6%	2.4%
Sheen Lane (north of Level Crossing)	7.0%	6.5%
Sheen Lane (south of Level Crossing)	7.3%	6.8%
Sheen Lane (south of South Circular)	5.1%	4.8%

8.148 As can be seen, the largest increase in daily traffic flows as a result of the Development would occur along Williams Lane. It is forecast that traffic flows on Williams Lane would increase by 105.2% in 2027 and by 97.4% in 2042.

8.149 It should be noted that baseline traffic flows on Williams Lane are very low and thus even a small increase in vehicle trips on Williams Lane presents a large percentage change. In real terms, the traffic flow on Williams Lane is forecast to increase from 674 (future baseline) to 1383 (future baseline plus Development traffic) vehicles per day in 2027 and from 728 (future baseline) to 1437 (future baseline plus Development) vehicles per day in 2042. The traffic flows for the future baseline plus Development traffic scenario in 2027 and 2042 equates to less than 1 vehicle per minute and 1 vehicle per minute, respectively. This is considered to be a low volume of traffic when compared to all other assessed links and thus it is considered that the traffic flows on Williams Lane in 2027 and 2042 with the Development in place would not cause any significant severance effects on pedestrians.

8.150 The remaining assessed links are forecast to be subject to traffic flow increases of less than 8% in both 2027 and 2042 as a result of the Development when compared to the 2027 and 2042 future baseline scenarios. As shown in the methodology section above, an increase of less than 30% is considered a negligible magnitude, according to IEMA guidance. Therefore, the operational Development is deemed to have an **insignificant** effect on severance in 2027 and 2042.

Driver Delay

8.151 Delay to drivers can be predicted through capacity assessments at key points on the local highway network. The TA (**Appendix 8.1**) includes detailed junction capacity assessments results for junctions along the local and strategic highway network surrounding the Site.

8.152 The local and strategic highway network surrounding the Site is subject to congestion at peak times, including the weekday mornings (08:00-09:00) and evenings (17:00-18:00). The TA has considered in detail driver delay and congestion during both the peak hour periods, since these are the periods when the combined effect of existing traffic and additional traffic generated by the Development has the greatest impacts.

8.153 The finding of capacity assessments, presented in detail within the TA, include the identification of changes to driver delays during the peak hours, expressed in terms of maximum delay in seconds per vehicle along key routes.

8.154 **Table 8.29** and **Table 8.30** show the change in driver delay times between Do Minimum and Do Something scenarios for the morning and evening peak hour, respectively.

8.155 It should be noted, that the journey times presented are not based on the final development schedule. The trip generation used as part of the strategic modelling potentially underestimates development trips by 14 two-way vehicle trips in the morning peak hour and 9 two-way vehicle trips in the evening peak hour, which equates to approximately 1 two-way trip every 4 minutes and 1 two-way trip every 7 minutes, respectively. An increase of this magnitude is considered unlikely to change the outcomes of the assessment undertaken. However, as part of the TA, local junction modelling has been repeated taking account of the increase peak hour trip generation resulting from the worst case in terms of vehicle trip generation associated with the flexible use of residential and assisted living units.

Table 8.29: Operational Development – Driver Delay Assessment (AM Peak Hour)

Route Number	Route Description	Direction	Journey Length (miles)	Change in Driver Delay (Do Something – Do Minimum) (Seconds / vehicle mile)
1a	Chalkers Corner -Sheen Lane/South Circular Road junction	EB	0.8	49
1b		WB		-71
2a	Chalkers Corner – White Hart Lane/The Terrace roundabout	EB	0.9	18
2b		WB		-272
3a	Chalkers Corner – A316 Lower Mortlake Road/A307 Kew Road junction	EB	1.0	16
3b		WB		0
4a	Chalkers Corner – Staveley Road	NB	1.5	0
4b		SB		101

Table 8.30: Operational Development – Driver Delay Assessment (PM Peak Hour)

Route Number	Route Description	Direction	Journey Length (miles)	Change in Driver Delay (Do Something – Do Minimum) (Seconds / vehicle mile)
1a	Chalkers Corner -Sheen Lane/South Circular Road junction	EB	0.8	20
1b		WB		-77
2a	Chalkers Corner – White Hart Lane/The Terrace roundabout	EB	0.9	11
2b		WB		-81
3a	Chalkers Corner – A316 Lower Mortlake Road/A307 Kew Road junction	EB	1.0	5
3b		WB		0
4a	Chalkers Corner – Staveley Road	NB	1.5	-1
4b		SB		25

8.156 **Table 8.29** shows that in the morning peak hour driver delay would decrease in the Do Something scenario compared to the Do Minimum scenario along Routes 1b and 2b. These decreases would result in a **long-term, local, beneficial** effect of **minor to moderate significance** on Route 1b and a **long-term, local, beneficial** effect of **moderate to major significance** on Route 2b.

8.157 All remaining Routes presented in **Table 8.29** would be subject to an **insignificant** effect on driver delay during the morning peak hour.

8.158 **Table 8.30** shows that in the evening peak hour driver delay would decrease in the Do Something scenario compared to the Do Minimum scenario along Routes 1b and 2b. These decreases would result in a **long-term, local, beneficial** effect of **minor to moderate significance** on Route 1b and a **long-term, local, beneficial** effect of **insignificant to minor significance** on Route 2b.

8.159 All remaining Routes presented in **Table 8.30** would be subject to an **insignificant** effect on driver delay during the evening peak hour.

8.160 It should be recognised that the Chalkers Corner junction would work considerably better in the future with the Development in place compared to the existing and future scenarios with no Development (including no Chalkers Corner works).

Pedestrian Delay

8.161 As outlined within the methodology section of this Chapter, pedestrian delay is related to traffic flows, which influence the ability of pedestrians to cross individual links.

8.162 Since all, but one, assessed links provide numerous pedestrian crossing facilities, pedestrians journey times would not be affected by a change in traffic volumes. It should be noted that on White Hart Lane, crossing facilities are only provided at either end of the link. Furthermore, Mortlake High Street and Lower Richmond Road have been identified as links that would benefit from additional crossing facilities, which are proposed as part of the mitigation strategy for this Development. The mitigation measures are outlined below.

8.163 As outlined above, a PERS audit has been undertaken in the surrounding area of the Site. As part of the PERS audit, a total of 25 crossing points have been assessed, all of which were found to be of a good standard, achieving a 'Green' rating.

8.164 The location of the crossing points that were assessed as part of the PERS audit are shown on **Figure 8.1**.

8.165 These crossing facilities provide convenient opportunities for pedestrians to cross links in proximity of the Site without being delayed by increases in traffic volumes. As such, the Development is deemed to have an **insignificant** effect on pedestrian delays in 2027 and 2042.

Pedestrian and Cycle Amenity

8.166 Pedestrian and cycle amenity, as outlined above, is affected by factors including traffic flow, traffic composition and pavement width / separation from traffic. A tentative threshold for judging the significance of changes in pedestrian and cyclist amenity is described by the IEMA guidance as instances "*where traffic flow (or its lorry component) is halved or doubled"*.

8.167 The only link that is likely to be subject to an approximate doubling in traffic flows as a result of the operational Development is Williams Lane. As outlined above, it should be noted that baseline traffic flows on Williams Lane are very low and thus even a small increase in vehicle trips on Williams Lane presents a large change. It is forecast that two-way daily traffic flows on Williams Lane are likely to be in the region of 1,400 once the Development is operational. This volume of traffic is considered to be low and within a safe cycling quantity. Although based on traffic flows, when strictly following the IEMA guidance, there would be a long-term, local, adverse effect of minor to moderate significance on cycle amenity along Williams Lane, it is considered that the operation of the Development would cause an **insignificant** effect cycle amenity along Williams Lane given the low traffic volumes along this link.

8.168 Williams Lane, which has been included in the PERS audit undertaken for the Development, achieved an overall 'Green' score, indicating a good provision for pedestrians. The current provision comprises a footway on the western side of the carriageway only. As part of the Development, a footway will be added to the eastern side of the carriageway. This footway is proposed to be 2 meters in width.

8.169 Given the above, it is considered that the increase in traffic flows on Williams Lane will have an **insignificant** effect on pedestrian amenity.

Fear and Intimidation

8.170 As outlined above, an increase in the proportion of HGV movements can cause adverse effects on pedestrian fear and intimidation. The suggested threshold guidance for pedestrian fear and intimidation, as shown in **Table 8.9**, proposes a small adverse effect if average 18-hour HGV flows are in the region of 1,000 to 2,000. It is anticipated that the only HGV movements associated with the operation of the Development will be delivery and servicing trips. The number of servicing trips to and from the Site will be considerably less (61 one-way trips per day) than the suggested threshold shown in **Table 8.9**. As a result, it is anticipated that the operational Development's HGV trip generation would result an **insignificant** effect on pedestrian fear and intimidation in 2027 and 2042 as a result of the traffic composition.

8.171 Apart from a change in the proportion of HGVs, increased fear and intimidation can also be caused by a rise in average speeds over 18 hours. The operation of the Development is considered unlikely to alter the current traffic speed levels on the local road network surrounding the Site. As such, the operation of the Development is anticipated to result in an **insignificant** effect on fear and intimidation of pedestrians as a result of changes in traffic speeds.

8.172 Furthermore, an increase in average traffic flows over 18 hours per day of 600 and more vehicles per hour, as shown in **Table 8.9**, has the potential to raise fear and intimidation levels amongst pedestrians, according to IEMA guidelines. The assessment of fear and intimidation, considering all traffic over 18 hours, has shown that no link will experience an increase in traffic of more than 81 vehicles per hour (Lower Richmond Road adjacent to Mortlake Green) in both 2027 and 2042 as a result of the completed Development. Therefore, it is considered that the operational Development would result an **insignificant** effect on pedestrian fear and intimidation.

Accidents and Road Safety

8.173 As outlined above, continued growth in traffic volumes is expected to increase the likelihood of a proportional rise in accident risk. This is especially true for locations where there are existing highway safety issues.

8.174 The accident data analysis, as presented in **Table 8.16**, has identified two locations where more than 10 accidents were recorded over the five-year period within the study area. The analysis has shown that the two junctions (Chalkers Corner and South Circular Road / Sheen Lane junctions) were subject to 10 or more accidents over the five-year period up to 31st January 2016.

8.175 The completed Development will result in a slight increase in accident risk at the accident cluster locations. However, as can be seen in **Table 8.31**, the increase will be less than 3%. In addition, the development proposals for the Chalkers Corner component of the Site will improve crossing facilities for both pedestrians and cycles and help to improve cycle access and safety through the junction.

Table 8.31: Increase in Accident Risk during Operational Phase

Junction / Link	Number of Accidents		Increase in Accident Risk DM – DS 2027	Number of Accidents		Increase in Accident Risk DM – DS 2042
	2027 Do Minimum (DM)	2027 Do Something (DS)		2042 Do Minimum	2042 Do Something	
Chalkers Corner junction	21	21	2.1%	23	23	2.0%
South Circular Road / Sheen Lane Junction	13	13	1.5%	14	14	1.4%

8.176 The completed Development is therefore considered to cause no significant increase in accident risk. Thus, it is considered that the operational Development would have an **insignificant** effect on accident risk at existing accident cluster locations.

Public Transport

8.177 As outlined above, a multi-modal trip generation assessment has been undertaken as part of the TA in **Appendix 8.1** as well as public transport impact assessments.

8.178 **Table 8.32** shows the forecast peak hour public transport trips of the operational Development.

Table 8.32: Operational Development – Public Transport Peak Hour Trips

Mode of Transport	AM Peak Hour			PM Peak Hour		
	Arr	Dep	2-Way	Arr	Dep	2-Way
Bus	571	113	684	106	152	258
Rail	44	46	90	80	102	182
Underground	10	45	54	28	16	44
Total	625	204	828	214	270	484

Public Transport - Rail

8.179 For the purpose of this assessment it has been assumed that all underground trips would use rail services from Mortlake Station to access underground services. The combined rail and underground trips have then been distributed based on local Census 2011 origin – destination data.

8.180 **Table 8.33** shows the increase in rail usage at Mortlake Station during the peak hours as a result of the operational Development.

Table 8.33: Operational Development – Peak Hour Rail Trip Distribution

	AM Peak Hour		PM Peak Hour	
	Arrival	Departure	Arrival	Departure
Forecast Development rail and underground trips	54	91	108	118
Number of rail services per peak hour in both directions	8	8	8	8
Increase in rail patronage per service	7	11	14	15

	AM Peak Hour		PM Peak Hour	
	Arrival	Departure	Arrival	Departure
Estimated 10-car service capacity (seating and standing)	1,475	1,475	1,475	1,475
Increase in rail patronage per service as proportion of service capacity	0.5%	0.8%	0.9%	1.0%

8.181 As can be seen, the largest increase in rail trips as a result of the Development is forecast to occur in the evening peak hour. It is estimated that an additional 15 passengers would board a service stopping at Mortlake Station, which equates to an approximate increase in rail ridership of 1.0% of the service capacity.

8.182 This increase in rail ridership as a result of the Development is considered to fall within the daily fluctuation of peak hour rail ridership and thus is considered to cause an **insignificant** effect on rail services.

Public Transport – Bus Service Delay

8.183 The environmental effect on bus services travelling along Lower Richmond Road, Mortlake High Street, Sheen Lane, Clifford Avenue and A316 Lower Richmond Road are included within the assessment of driver delay, presented above.

Public Transport – Bus Service Capacity

8.184 As shown in **Table 8.32**, the Development is forecast to generate 684 two-way bus trips in the morning and 258 two-way bus trips in the evening peak hour. **Table 8.32** shows the likely peak hour bus trips of the Development by land use.

Table 8.34: Operational Development – Peak Hour Bus Trips by Land Use

Land Use	AM Peak Hour			PM Peak Hour		
	Arr	Dep	2-Way	Arr	Dep	2-Way
Residential	9	42	51	27	15	42
Non-Residential	39	28	67	57	70	127
Sub-Total	*48*	*70*	*118*	*84*	*85*	*169*
Education (School Application)	523	43	566	22	67	89
Total	571	113	684	106	152	258

8.185 As shown in **Table 8.34**, the vast amount of likely morning peak hour bus trips of the Development would be generated by the proposed Secondary School on Site. Application B (the school) is forecast to generate 566 two-way bus trips in the morning peak hour while the remaining land uses on Site are likely to generate 118 two-way bus trips in the morning peak hour.

8.186 Discussions are currently on-going with TfL regarding the most appropriate bus improvements that could be implemented to serve the Development. It is anticipated that the non-school demand generated by the Development would be largely absorbed within the existing bus services available in proximity of the Site. However, it is considered that, at most, two additional single decker bus services could be required to cover the non-school demand of the Development. The demand likely to be generated by the school is considered to be met by the take up of spare capacity on existing bus services or dedicated school bus services. The need for school bus services will be determined once the school's catchment is better understood.

8.187 The effects of a failure to provide buses have not been modelled because the scenario is unrealistic and any bus subsidy required will be secured via planning conditions once planning consent has been granted.

Mitigation Measures and Likely Residual Effects

The Works

8.188 No mitigation measures would be required during the Works, as the above assessment of effect relating to the Works has shown that the Works would result in insignificant effects on severance, driver delay, pedestrian delay and amenity, fear and intimidation as well as accidents and road safety. However, the following measures will be implemented for the Works in order to avoid adverse effects arising during the Works:

Framework Construction Management Statement

8.189 A Framework Construction Management Statement (FCMS), which includes a draft Construction Logistics Plan (CLP), has been submitted as part of a suite of documents for the planning applications of the Development.

8.190 The CLP aims to reduce the impact of construction vehicle trips to and from the Site. It sets out the following measures to reduce adverse effects generated by construction activities:

- construction vehicle routes to site would be agreed with LBRuT and TfL and would seek to minimise impact on the local road network and community;
- commitment to use a Delivery Management System (DMS) to ensure contractors and suppliers forward plan and pre-book deliveries. This would enable site managers to control deliveries and vehicle flow to site including avoiding peak network times where possible;
- investigate the use of construction consolidation centre to help maximise vehicle load efficiency and reduce vehicle trips;
- commitment to use contractors and suppliers that are members of best practice schemes such as Considerate Constructors Scheme (CCS); and
- ensure a sufficiently robust CLP management, monitoring and compliance regime is in place so that the CLP is implemented correctly and remedial actions are taken when necessary.

Construction Environmental Management Plan

8.191 It is proposed that a detailed Construction Environmental Management Plan (CEMP) would be prepared for the Development and secured through planning condition attached to the planning permission, based on the FCMS provided with the planning application. The CEMP would include details of relevant environmental management controls necessary for environmental protection during the Works, as detailed in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, and would be implemented by the construction contractor for the Development.

8.192 The CEMP is likely to include a detailed CLP to be prepared when a main contractor has been appointed in the post planning consent phase. In addition to measures outlined in the draft CLP, the detailed CLP would include a full management, monitoring and compliance regime.

8.193 Likely residual effects associated with the Works would remain **insignificant**.

Completed Development

Mitigation Measures

8.194 The mitigation measures, proposed to avoid or minimise adverse effects on cycle amenity and driver delay as a result of the Development, are described in full detail within the TA, **Appendix 8.1**. The following summarises the measures:

Delivery and Servicing Plan

8.195 A Delivery and Servicing Plan (DSP) has been prepared and is appended to the TA in **Appendix 8.1**. The DSP will be introduced for the Development's operational stage. The DSP will set out how all types of freight vehicle movements to and from the Development will be managed.

Travel Plans

8.196 A Framework, School as well as Residential Travel Plans (TPs) have been prepared for the Development. These TPs, which are appended to the TA in **Appendix 8.1**, set out how all Site users can access the Development by sustainable forms of transport. The TPs would address, amongst others, the following:

- staff, visitor and residential cycle parking provision;
- health benefits of active travel;
- incentives for using sustainable modes of transport;
- targets to achieve modal shift from private car to more sustainable modes, in particular walking and cycling; and
- Action Plan to achieve the desired modal shift and a monitoring and review process.

Public Transport Enhancements

8.197 Discussions are currently ongoing with TfL to enhance bus services that would serve the completed Development in the future. TfL are unable to commit to a preferred strategy at this time since they envisage that these would form part of a wider re-planning of bus services in the area following the repair works to Hammersmith Bridge. Based on the current service pattern, an increased frequency for the 419 service would be the preferred solution together with provision of special buses to meet the peak demands associated with the school.

8.198 Adverse impacts on the bus service capacity in the area caused by the demand of the school could not be identified at the time of writing this Chapter due to the uncertainties relating to the schools' catchment area. Thus, as stated above, any adverse effects on bus service capacity in the area that might arise from the school will be mitigated to prevent residual adverse effects. The commitment to mitigate adverse effects on bus service capacity in the area will be secured by planning conditions / S106 obligations.

Highway Improvements

8.199 In addition to the improvement works proposed for the Chalkers Corner component of the Site, two further areas have been identified for improvements. These are detailed within the TA in **Appendix 8.1**, and summarised below:

- Lower Richmond Road Corridor including Mortlake High Street – between Williams Lane and Bulls Alley, including the north eastern corner of Mortlake Green and Sheen Lane up to the level crossing (delivered through S.278 works).

- the proposals for the Lower Richmond Road Corridor including Mortlake High Street focus on enhancing the pedestrian and cycle environment by slowing speeds and improving pedestrian and cycle crossing facilities, in particular to provide a high quality route between Mortlake Green and the station and the riverside and to take account of the new secondary school.

- Widening of Williams Lane and Ship Lane (delivered via S.278 works).
  - the proposals for Williams Lane and Ship Lane have been set out in order to integrate the public highway into the Development. This is to ensure that the pedestrian and cycle environment promoted in the Development is present on the surrounding public highway and that there is no segregation between Mortlake and the Development.

8.200 These highway improvements have been agreed in principle with LBRuT and will be secured by planning condition following planning approval.

8.201 A summary of the mitigation measures (including inherent mitigation measures is provided in **Table 8.35**.

Table 8.35: Summary of mitigation measures (including inherent mitigation)

	Mitigation Measures
1.Demolition and Construction Phase	• Environmental management controls developed and set out in the Framework Construction Management Plan and subsequent Construction Environmental Management Plans this would include dust suppression, hoarding, monitoring etc. • Avoidance, or limited use, of traffic routes in proximity to sensitive routes (i.e. residential roads etc.). All construction traffic logistics would be agreed with LBRuT. • Avoidance, or limited use, of roads during peak hours, where practicable. • Provision of a Construction Worker Travel Plan and a Construction Transport Management Plan.
2. Inherent – Measures included in the design of the Development	• Reduction of the ratio indicated by the Planning Brief of 1 car parking space per residential unit to 0.74 of a space per residential unit. • Preparation and implementation of a Delivery and Servicing Plan that will set out how all types of freight vehicle movements to and from the Development will be managed; • Framework, School and Residential Travel Plan setting out how all Site users can access the Development by sustainable forms of transport. • Provision of new car club spaces as part of the Residential Travel Plan; • Provision of a minimum of 1,611 spaces cycle spaces in accordance with London Plan requirements. • Provision of new pedestrian and cycle paths aimed to promote walking, cycling and the use of public transport • Provision of Electric Vehicle Charging Points at least in accordance with London Plan standards. • Reconfiguration to the Chalkers Corner junction to alleviate the transport and traffic implications associated with the operation of the Development including the alignment of the Lower Richmond Road arm to be moved approximately 12 m to the north east to allow: – the provision of a short additional left turn lane (flare) from Lower Richmond Road into the junction (26 m long or about 5 car lengths); – provision of an extended queuing reservoir between the main junction of Lower Richmond Road (this would accommodate about 9 extra cars south

	Mitigation Measures
	westbound), which would also provide extra storage for north east bound vehicles including those waiting to turn right into Lower Richmond Road; – provision of a wider pedestrian island within the Lower Richmond Road arm to 4 m wide to sufficiently cater for cyclists crossing as well as pedestrians; – an extended, dedicated lane for traffic turning left from Clifford Avenue into Lower Richmond Road; – retaining 28 trees and the removal of 22 trees along Lower Richmond Road, Clifford Avenue and within Chertsey Gardens. It is proposed to add a total of 33 new trees, resulting in an overall increase in 10 trees at Chalkers Corner to assist in air pollution. A new 2 m high wall would also replace the existing wall and fence to screen the vehicles at the junction; – A new cycle lane would be provided as part of Application C (Chalkers Corner). The highway improvements at Chalkers Corner would benefit cyclists and help Transport for London (TfL) to achieve their "Quietway" proposals for the A316 corridor by creating: • advance cycle stop lines at the main junction; • wider islands to make them suitable for cycle use; and • improved cycle links into Lower Richmond Road.
	• Other highways works, secured by S278 works: – Improvements to Ship Lane, which would continue as a public highway but would be enhanced as a pedestrian route through the provision of a wider footway on the west side and a new footway (3 m) on the east side; – A new pelican crossing at the southern end of the Green Link along Lower Richmond Road directly north of Mortlake Green. The existing signalised crossing point adjacent to Ship Lane would be relocated to align better with the Green Link; and – A new crossing provided just to the west of the new access road to the school to improve access for pupils needing to cross Lower Richmond Road. This is currently shown as a zebra crossing but could potentially be upgraded to a pelican crossing. – Provision of a new zebra crossing to serve a desire line to the eastern portion of the development
3.Additional future measures that could be included / to be secured through S106 / s278 agreement.	• Enhancement of existing bus services. Based on the current service pattern, an increased frequency for the 419 service would be the preferred solution together with provision of special buses to meet the peak demands associated with the school. • Safeguarding of land at the corner of Lower Richmond Road/Williams Lane to allow TfL to provide in the future bus stands, driver facilities and a bus turn facility, • Safeguarding of land close to the Green Link to allow the future provision of a cycle hire facility. • A New 20mph speed limit enforced between Williams Lane and Bulls Alley including Sheen Lane, between the Mortlake High Street / Lower Richmond Road junction and the Sheen Lane level crossing. A number of physical measures are proposed to help manage speeds including junction entry treatments, carriageway narrowing and provision of a textured tarmac resin to differentiate the area of speed restraint. Potentially, table tops to comply with TfL requirements for buses could be installed at pedestrian crossing points by the school and on the Green Link. • Potential funding for a new controlled parking zone and/or modifications to existing parking zones to help manage potential overspill parking associated with the proposed development onto surrounding roads

Likely Residual Effects

8.202 The residual effects for severance, pedestrian delay, pedestrian and cycle amenity, fear and intimidation, and accident and road safety are considered to be **insignificant**.

8.203 However, although the assessment of driver delay has shown that the completed Development would result in no adverse, but some beneficial, effects on driver delay times, strategic traffic modelling has been undertaken for the Do Something with highway improvements scenario in order to demonstrate the effect of the proposed traffic calming measures.

8.204 However, it needs to be recognised that the traffic calming measures along Lower Richmond Road and Mortlake High Street represent a direct conflict between traffic speeds/driver delay and pedestrian and cycle safety along these links. The traffic calming measures have been introduced in favour of pedestrian and cycle safety, with the aim of managing traffic speeds which consequently results in increased journey times for vehicle drivers. By proposing the highway improvement measures in addition to the Chalkers Corner component of the Development it is sought to strike a balance between the needs of all highway users.

8.205 It should furthermore, be recognised that these measures will have a beneficial effect on severance, pedestrian delay and especially fear and intimidation and accidents and road safety. However, they consequently would have an adverse effect on driver delay times.

8.206 The Chalkers Corner component of the Development is proposed with the aim to create additional capacity at this junction to accommodate the additional vehicle trips generated by the Stag Brewery component, including the proposed secondary school, of the Development. Within the TA (**Appendix 8.1**) detailed junction capacity assessments have been undertaken to show the impact of the Stag Brewery component of the Development with and without the Chalkers Corner component of the Development. These assessments show that the Chalkers Corner component of the Development improves journey times in the surrounding area compared to the Development without the Chalkers Corner component scenario.

8.207 **Table 8.36** and **Table 8.** show the change in driver delay times between Do Something with local highways measures and Do Minimum scenarios for the morning and evening peak hour, respectively.

Table 8.36: Operational Development with Highways Improvements – Driver Delay Assessment (AM Peak Hour)

Route Number	Route Description	Direction	Journey Length (miles)	Change in Driver Delay (Do Something with Highway Works – Do Minimum) (Seconds / vehicle mile)
1a	Chalkers Corner -Sheen Lane/South Circular Road junction	EB	0.8	138
1b		WB		47
2a	Chalkers Corner – White Hart Lane/The Terrace roundabout	EB	0.9	62
2b		WB		-62
3a		EB	1.0	11

Route Number	Route Description	Direction	Journey Length (miles)	Change in Driver Delay (Do Something with Highway Works – Do Minimum) (Seconds / vehicle mile)
3b	Chalkers Corner – A316 Lower Mortlake Road/A307 Kew Road junction	WB		0
4a	Chalkers Corner – Staveley Road	NB	1.5	2
4b		SB		45

Table 8.37: Operational Development with Highways Improvements – Driver Delay Assessment (PM Peak Hour)

Route Number	Route Description	Direction	Journey Length (miles)	Change in Driver Delay (Do Something with Highway Works – Do Minimum) (Seconds / vehicle mile)
1a	Chalkers Corner -Sheen Lane/South Circular Road junction	EB	0.8	28
1b		WB		-20
2a	Chalkers Corner – White Hart Lane/The Terrace roundabout	EB	0.9	61
2b		WB		-21
3a	Chalkers Corner – A316 Lower Mortlake Road/A307 Kew Road junction	EB	1.0	-2
3b		WB		0
4a	Chalkers Corner – Staveley Road	NB	1.5	-1
4b		SB		24

8.208 **Table 8.36** shows that in the morning peak hour driver delay would increase in the Do Something with highway improvements scenario compared to the Do Minimum scenario along Routes 1a and 2a. These increases would result in a **long-term, local, adverse residual** effect of **moderate significance** on Route 1a and a **long-term, local, adverse residual** effect of **insignificant to minor significance** on Route 2a.

8.209 The table furthermore shows that in the morning peak hour driver delay would decrease in the Do Something with highway improvements scenario compared to the Do Minimum scenario along Route 2b. This decrease would result in a **long-term, local, beneficial residual** effect of **insignificant to minor** significance on Route 2b.

8.210 All remaining Routes presented in **Table 8.36** would be subject to an **insignificant** residual effect on driver delay during the morning peak hour.

8.211 **Table 8.37** shows that in the evening peak hour driver delay would increase in the Do Something with highway improvements scenario compared to the Do Minimum scenario along Route 2a. This increase would result in a **long-term, local, adverse residual** effect of **insignificant to minor significance** on Route 2a.

8.212 **Table 8.37** furthermore shows that in the evening peak hour all remaining Routes would be subject to an **insignificant** residual effect on driver delay.

8.213 Once the Development has been implemented, signal timings at the Chalkers Corner junction can be reviewed and adjustments made to improve the operation of the junction as a whole and in particular the delay times on the Lower Richmond Road arm.

8.214 Furthermore, it should be recognised that the effect of the non-highway improvement measures have not been taken account of in the assessment of residual driver delay effects, as the effectiveness of such measures is difficult to quantify.

Summary

8.215 **Table 8.38** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 8.38: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Severance	**Insignificant**	Not required	**Insignificant**
Driver Delay	**Insignificant**	Not required	**Insignificant**
Pedestrian Delay	**Insignificant**	Not required	**Insignificant**
Pedestrian and Cycle Amenity	**Insignificant**	Not required	**Insignificant**
Fear and Intimidation	**Insignificant**	Not required	**Insignificant**
Accidents and Road Safety	**Insignificant**	Not required	**Insignificant**
Completed Development			
Severance	**Insignificant**	Not required	**Insignificant**

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Driver Delay	AM Peak Hour: Chalkers Corner - Sheen Lane / South Circular Road junction: **minor** to **moderate beneficial** (WB) Chalkers Corner – White Hart Lane/The Terrace roundabout: **moderate** to **major beneficial** (WB) PM Peak Hour: Chalkers Corner -Sheen Lane/South Circular Road junction: **minor** to **moderate beneficial** (WB) Chalkers Corner – White Hart Lane/The Terrace roundabout: **insignificant** to **minor beneficial** (WB)	Traffic calming measures along Lower Richmond Road and Mortlake High Street to improve conditions for pedestrians and cyclists at the cost of driver delay effects. However, signal timings at the Chalkers Corner junction could be adjusted post Development implementation to ease driver delay especially along the Lower Richmond Road arm.	AM Peak Hour: Chalkers Corner -Sheen Lane/South Circular Road junction: **moderate adverse** (EB) Chalkers Corner – White Hart Lane / The Terrace roundabout: **insignificant** to **minor adverse** (EB), **insignificant** to **minor beneficial** (WB) PM Peak Hour: Chalkers Corner – White Hart Lane/The Terrace roundabout: **insignificant** to **minor adverse** (EB)
Pedestrian Delay	**Insignificant**	Not required	**Insignificant**
Pedestrian Amenity	**Insignificant**	Not required	**Insignificant**
Cycle Amenity	**Insignificant**	Re-configuration of Williams Lane, resulting in an improved cycle environment	**Insignificant**
Fear and Intimidation	**Insignificant**	Not required	**Insignificant**
Accidents and Road Safety	**Insignificant**	Not required	**Insignificant**

8.216 As outlined above, it should be recognised that the residual adverse driver delay effects, presented in **Table 8.38**, are the results of the proposed traffic calming measures rather than an increase in traffic volumes resulting from the operational Development.

8.217 Regarding the public transport assessment included within this Chapter, during the Works it is not anticipated that the increased number of contractors in the local area who will use the public transport services would cause an adverse effect on existing public transport network, as those trips tend to occur outside of the peak hours, are split between bus and rail modes and would be largely counter-directional to resident trips in the local area.

8.218 Once the Development is operational, bus services would be subject to driver delay times as outlined in the above assessment of driver delay times. The effects of a failure to provide buses have not been modelled because the scenario is unrealistic and any bus subsidy required will be secured via planning conditions once planning consent has been granted.

References

1 Institute of Environmental Management and Assessment (2004); 'Guidelines for Environmental Impact Assessment'.

2 Institute of Environmental Assessment (1993); 'Guidelines for the Environmental Assessment of Road Traffic'.

3 Department for Transport (2008); 'Design Manual for Roads and Bridges, Volume 11, Environmental Assessment'.

9. Noise and Vibration

Introduction

9.1. This Chapter, prepared by Waterman Infrastructure & Environment (Waterman IE), presents an assessment of the likely significant noise and vibration effects on surrounding sensitive receptors associated with the proposed demolition, alteration, refurbishment and construction works (the Works), and in respect of noise once the Development is completed and operational.

9.2. This Chapter provides a description of the methods undertaken for the assessment. This is followed by a description of the relevant baseline conditions of the Site and surrounding area, and an assessment of the likely significant effects of the Development during the Works and once the Development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset any adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects are described.

9.3. Supporting information relating to the noise assessment is contained within the following appendices:

- **Appendix 9.1**: Acoustic Terminology;
- **Appendix 9.2**: Baseline Noise Monitoring;
- **Appendix 9.3:** Demolition and Construction Noise Assessment; and
- **Appendix 9.4:** Road Traffic Assessment.

9.4. As agreed via the EIA scoping process (refer to **Chapter 2: EIA Methodology**) no assessment was undertaken (or is, indeed necessary) in relation to vibration once the Development is completed and operational. This is owing to the fact that there are no significant vibration generating sources (e.g. London Underground Limited, or Mainline Rail Lines) within approximately 195m of the Site. Furthermore, no significant sources of vibration would be introduced as part of the Development. Accordingly, there would be no vibration effects associated with the completed and operational Development.

9.5. Further to the above, and also agreed via the EIA scoping process, an assessment of the acceptability of internal noise levels within the Development itself is a design issue and should not form part of the EIA. As such, an assessment of the suitability of the Site for residential and school development does not form part of this Chapter and has been submitted as a standalone report by Hoare Lea for planning.

Assessment Methodology and Significance Criteria

Assessment Methodology

9.6. The assessment of likely significant noise and vibration effects has involved the following:

- identifying potentially sensitive existing and future sensitive receptors (SRs) on and within the surrounding area of the Site;

- establishing the baseline noise and vibration conditions currently existing at the Site and at existing SRs surrounding the Site using appropriate noise and vibration surveys;
- assessing likely noise and vibration levels generated during the Works associated with the Development;
- establishing design aims for plant and services associated with the Development;
- assessing likely noise levels from the completed and operational Development;
- formulating proposals for mitigation (where appropriate); and
- assessing the likely significance of any residual noise and vibration effects.

Baseline Noise Surveys

9.7. A comprehensive environmental noise survey was undertaken from Friday 24th June to Wednesday 29th June 2016, covering a typical weekday and weekend period, to establish and quantify the existing noise climate at and within the vicinity of the Site. Further to the above additional surveys were completed adjacent to Chalkers Corner on the 25th April 2017 in order to inform the assessment for this area.

9.8. The noise monitoring locations are shown on **Figure 9.1** and described below in **Table 9.1**.

Table 9.1: Noise Monitoring Locations

Monitoring Location (Figure 9.1)	Description	Observations and Predominant Noise Sources
LT1	Free-field measurement at the south-western Site boundary overlooking Lower Richmond Road (the A3003). Microphone located 1.2 m AGL.	Noise climate dominated by constant vehicular traffic on Lower Richmond Road / Mortlake High Street. Although intermittent in comparison, noise from low flying aircraft movements in to Heathrow Airport (located approx. 11 km to the east) was significant, with approximately one plane every minute going over the Site. Contributory noise from human activities, distant road noise and distant aircraft also influence the noise climate to some extent.
LT2	Façade measurement on the second floor of the Stag Brewery Co. building at the south-eastern Site boundary overlooking Mortlake High Street. Microphone located 6.0 m AGL.	
LT3	Façade measurement on the boundary wall to the north-east of the Site overlooking the River Thames. Microphone located 4.0 m AGL.	Noise climate dominated by aircraft noise, as detailed above. Contributory noise from local and distant road traffic and occasional passing cyclists and joggers on the footpath over the river.
LT4	Free-field measurement at the south-western boundary of the Site orientated towards Clifford Avenue / Chiswick Bridge (the A316). Microphone located 2.5 m AGL.	Noise climate influenced by constant vehicular traffic on Clifford Avenue. Contributory noise from domestic activities from nearby residential dwellings.

Monitoring Location (Figure 9.1)	Description	Observations and Predominant Noise Sources
ST1	Free field measurement at the centre of existing sports ground.	Noise climate influenced by distant road traffic noise and some intermittent low flying aircraft noise.
ST 2	Free field measurement north western corner of existing sports ground adjacent to Williams Lane.	Noise climate influenced by distant road traffic noise associated with Clifford Avenue and some intermittent low flying aircraft noise.
ST 3	Free field measurement north western corner of existing sports ground adjacent to Williams Lane.	Noise climate influenced by constant vehicular traffic on Clifford Avenue.
ST 4	Free field measurement adjacent to Ship Lane.	Noise climate influenced by distant road traffic noise and some intermittent low flying aircraft noise.
ST 5	Free field measurement adjacent to Ship Lane.	Noise climate influenced by distant road traffic noise and some intermittent low flying aircraft noise.
ST 6	Free field measurement on southern site boundary adjacent to Lower Richmond Road.	Noise climate influenced road traffic noise associated with Lower Richmond Road.
ST 7	Free field measurement on eastern site boundary with Bulls Alley.	Noise climate influenced road traffic noise associated with Lower Richmond Road.
ST 8	Fee field noise measurement on Lower Richmond Road at Chalkers Corner.	Noise climate influenced road traffic noise associated with Lower Richmond Road.

The Works

Noise

9.9. As noted in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, construction would occur in phases. Exact timing will be determined dependant on a number of external factors, however, it is anticipated that Works required to facilitate the Development would be carried out over a period of approximately eight years. The works are anticipated to commence in June 2019 and complete in September 2027. An indicative outline programme is set out in **Table 6.1** of **Chapter 6**.

9.10. Noise levels associated with the Works have been estimated based upon the plant typically used for such a development and are based on source noise levels contained within BS 5228-1:2009+A1:2014[1] '*Code of practice for noise and vibration control on construction and open sites –Part 1: Noise*'.

9.11. The Works which are considered to be the nosiest can be divided into five specific activities:

- demolition;
- site preparation;

- substructure works
- superstructure works;
- landscaping and external works; and
- road paving.

9.12. Noise levels associated with these works were predicted based upon the typical source noise levels contained within BS 5228-1:2009+A1:2014.

9.13. To assess the likely significant effects of the Works on both existing SRs and future SRs which may be occupied whilst construction works are taking place on adjacent phases and plots the 'ABC Method' provided in BS 5228-1:2009+A1:2014, has been used. This method defines category threshold values, which are determined by the time of day and existing prevailing ambient noise levels. The noise generated by demolition and construction activities is compared with the threshold value. If the demolition and construction noise level exceeds the 'threshold value', a significant effect is deemed to occur.

9.14. Noise threshold levels have been established for the relevant existing SRs based upon the prevailing baseline noise levels. Noise levels associated with the Works have been predicted using the calculation methodology detailed within BS 5228-1:2009+A1:2014. Calculations representing a worst-case scenario over a one-hour period with plant operating at the closest point to the nearest SR and in the absence of mitigation are presented. In practice, noise levels would tend to be lower owing to greater separation distances, screening effects and periods of plant inactivity.

9.15. Full details of the predictions and assumptions of the assessment of likely noise associated with the demolition and construction works are contained within **Appendix 9.4**.

Vibration

9.16. There are two aspects of vibration that require consideration:

- potential vibration effects on people or equipment within buildings; and
- potential vibration effects on buildings.

9.17. There are currently no British Standards that provide a methodology for predicting levels of vibration from construction activities other than BS 5228-2[2] '*Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'*, which relates to percussive, or vibratory, rolling and piling only. As stated in BS 5228-2, and as generally accepted, the threshold of vibration perception for humans in residential environments is typically in the PPV range 0.15 to 0.3 mm/s at frequencies between 8 Hertz (Hz) and 80Hz with complaints likely at 1 mm/s. Based on historical field measurements undertaken by Waterman and having regard to information contained within BS 5228-2, **Table 9.2** details the distance at which certain activities may give rise to 'just perceptible' levels of vibration.

Table 9.2: Distance at Which Vibration May Just be Perceptible

Construction Activity	Distance from Activity when Vibration may Just be Perceptible (metres)[1]
Heavy vehicles	5 – 10
Excavation	10 – 15
CFA Piling	15 – 20
Rotary Bored Piling	20 – 30
Vibratory Piling	40 – 60
Sheet Piling (driven)	40 - 60

Note: [1]Distances for perceptibility are only indicative and dependent upon a number of factors, such as the radial distance between source and receiver, ground conditions, and underlying geology.

9.18. **Table 9.3** presents typical levels of vibration with distance from CFA and rotary bored vibration.

Table 9.3: Typical Levels of Vibration Resultant from CFA/Rotary Bored and Sheet Piling (Driven)

Distance (m)	Peak Particle Velocity[1] (PPV) mm/s	
	CFA Rotary Bored Piling	Sheet Piling (Driven)
5	0.54	≤13.5
10	0.38	≤4.0
20	0.30	No equivalent data in BS5228-2
30	0.03	≤3.0

Note: [1]Indicative derived from BS5228-2:2009. Dependent on ground conditions and underlying geology.

9.19. The vibration arising from sheet piling using ‘pressed’ method rather than driven, would however give rise to vibrations levels lower than those presented within Table 9.3 which are based on ‘driven’ sheet piles.

9.20. It is a widely held belief that if vibration can be felt, then damage to property is inevitable. However, vibration levels at least an order of magnitude higher than those for human disturbance are required to cause damage to buildings. It is generally accepted that building damage would not arise at PPV levels below 12.5 mm/s.

9.21. Vibration from piling operations has the potential to affect utilities and will be a function of the distance of the works from the utility location. Some statutory undertakers have introduced criteria governing the maximum level of vibrations to which their services should be subjected. In the absence of specific criteria from the undertakers BS5228-2 recommends the following limits:

- maximum PPV for intermittent or transient vibrations 30 mm/s; and
- maximum PPV for continuous vibrations 15 mm/s.

9.22. In the event of encountering elderly and dilapidated brickwork sewers, the base data should be reduced by 20% to 50%. For most metal and reinforced concrete service pipes however, BS85228-2 consider that the values stated within BS5228-2 should be tolerable.

9.23. At this stage the detail of the methods and equipment to be used during the construction works is unconfirmed as they will be established in detailed design stages. Therefore, a detailed assessment cannot be undertaken. Consequently, the significance of vibration effects from the Works cannot be assessed quantitatively and was therefore assessed qualitatively based on

typical plant used and distance of works to the SRs. Vibration level data was drawn from BS5228 Part 2.

Construction Traffic Noise

9.24. Assessment of noise level changes arising from construction traffic was undertaken using the calculation methodology detailed within the Calculation of Road Traffic Noise[3] (CRTN). This involved the use of the forecast construction traffic flow data (for the peak construction phase anticipated to be the year 2022) and the baseline traffic data provided by the Applicant's transport consultant (Peter Brett Associates) as detailed in **Chapter 8: Transport and Access**.

Completed Development

Building Services Plant Noise

9.25. The significance of sound of an industrial and / or commercial nature depends upon a number of factors including the margin by which a sound exceeds the background sound level, its absolute level, the time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood.

9.26. BS 4142:2014 provides an assessment and rating method to assess adverse effects from a range of industrial and/or commercial noise sources, including fixed building services plant. The measured or predicted noise level from the source in question, the 'specific noise' level ($L_{Aeq,T}$), immediately outside the dwellings was compared with the 'background noise' level ($L_{A90,T}$). Where the sound contains certain acoustic features at the assessment location (e.g. tones, impulses, intermittency etc.), then a scaled character correction was added to the specific noise level to obtain the 'rating noise' level ($L_{Ar,Tr}$). The significance of effect is dependent on the context, having consideration to pertinent factors such as the sensitivity of the receptor, the absolute level of sound to the character and level of the residual sound compared to the character and level of the specific sound.

9.27. Based on the noise monitoring data detailed in **Appendix 9.2**, maximum plant emission levels were set in controlling fixed building services plant to an acceptable level. Noise limits apply at a position 1m from the façade of the nearest noise sensitive receptors and include the total contribution of noise from all plant items associated with the Development that may run during any particular period.

Road Traffic Noise

9.28. The changes in noise levels, attributable to changes in operational road traffic flows and volumes resulting from the Development, were calculated using traffic data provided by the Applicant's transport consultant (PBA). Traffic flow data was provided for the 'with' and 'without' Development scenarios for a future year of the completion and operation of the Development (2027).

9.29. Basic Noise Levels (BNLs) were calculated for the road links covered by the PBA (refer to **Appendix 9.3**). The calculations used the 18-hr Average Annual Weekday Traffic (AAWT) flow, % HGV composition and average vehicle speed for each road link. The BNLs were calculated at positions 10 m from the road using the guidance provided in the CRTN. The likely effects of

changes in road traffic noise were evaluated by consideration of the estimated changes in $L_{A10,(18\ hour)}$ road traffic noise level on the local highway network as a result of the operation of the completed Development for the future year 2027.

Retail, Commercial, Community Flexible Space Uses and Servicing Noise

9.30. Specific details concerning the end users of the commercial elements of the Development are not known at this stage and would be dependent on the future tenants. As such, a qualitative assessment has been undertaken of noise sources associated with the commercial elements of the development which includes:

- delivery and servicing;
- noise breakout from units including gym, cinema, community units and proposed restaurant / bar / café uses; and
- basement car parking.

Noise from Proposed School and Play Space

9.31. In the absence of guidelines for assessing the effects of noise generated by schools including playground and outdoor activity noise, the potential noise effects have been assessed by calculating the increase in ambient noise levels from those currently experienced on and in the vicinity of the Development.

Significance Criteria

The Works

Construction Noise & Vibration

9.32. As outlined above, to assess the significance of effects from construction noise on existing SRs, 'The ABC Method' provided in BS 5228-1:2009+A1:2014 was used. The vibration assessment has been made against the criteria for human perception as presented in BS 5228-2:2009.

9.33. The criteria in **Table 9.4** were adopted to provide transparency in the definition of the significance of identified effects. Full details are provided in **Appendix 9.4**.

Table 9.4: Significance Criteria for the Assessment of Construction Noise and Vibration

Significance	Level Above Threshold Value dB(A)	Level of Vibration	Definition
Insignificant	≤ 0 to 2.9	< 0.14 mm/s	The effect is not of concern.
Adverse effect of minor significance	3.0 to 4.9	>0.14 mm/s to <1mm/s	The effect is undesirable but of limited concern.
Adverse effect of moderate significance	5.0 to 9.9	1 mm/s to 3mm/s	The effect gives rise to some concern but is likely to be tolerable depending on scale and duration.

Significance	Level Above Threshold Value dB(A)	Level of Vibration	Definition
Adverse effect of major significance	≥10	>3mm/s	The effect gives rise to serious concern and it should be considered unacceptable.

9.34. With regard to potential damage to utilities and grade II listed buildings / structures, provided vibration is ≤7.5 mm/s (derived from BS5228-2 advice) the potential effect is negligible. For all other buildings a vibration level of ≤10 mm/s is negligible with regard to building damage.

Construction Traffic

9.35. The criteria proposed for Development generated road traffic noise as detailed in **Table 9.5** would also be appropriate for construction road traffic noise and has accordingly been adopted in this assessment.

Building Services Plant Noise

9.36. The guidance provided in BS 4142: 2014 and the requirements of LBRuT have been used to determine noise limits for items of fixed plant introduced as part of the Development.

9.37. LBRuT require that the rated noise level from any fixed plant and building services shall be at least 10 dB(A) below the prevailing background noise level at the nearest noise sensitive premises.

Retail, Commercial Uses and Servicing Noise

9.38. In the absence of published guidelines for assessing the effects of noise from retail, delivery, servicing, and car parks, the significance criteria in **Table 9.5,** which are based on the predicted change in the prevailing noise level have been adopted. The criteria are widely used by acoustic practitioners throughout the UK.

Table 9.5: Significance Criteria for Non-Residential and Servicing Noise Assessment

Significance	Change in Prevailing Noise Level dB(A)	Definition
Insignificant	< 3.0	The effect is not of concern.
Adverse effect of minor significance	3.0 to 4.9	The effect is undesirable but of limited concern.
Adverse effect of moderate significance	5.0 to 9.9	The effect gives rise to some concern but is likely to be tolerable depending on scale and duration.
Adverse effect of major significance	≥ 10	The effect gives rise to serious concern and it should be considered unacceptable.

9.39. Where specific details are unknown then a qualitative assessment is undertaken based on available information.

Noise from Proposed School and Play Space

9.40. In the absence of published guidelines for assessing the effects of noise from schools and play space the significance criteria in **Table 9.5,** which are based on the predicted change in the prevailing noise level, have been adopted. The criteria are widely used by acoustic and are based on human perception and response to changes in environmental noise levels.

9.41. Where SRs have no prior knowledge of the existing noise climate i.e. new receptors introduced as part of the proposed Development assessment would be completed against guidance provided by Sports England in their document *'Artificial Grass Pitches (AGP) – Acoustics – Planning Implications'*[4] which suggests a noise limit of 50dB L_{Aeq} at 1m from any residential façade.

Road Traffic Noise

9.42. The Design Manual for Roads and Bridges, Volume 11 Section 3 Part 7-'*Traffic Noise and Vibration*' (DMRB)[5] provides significance criteria for changes in road traffic noise levels which are reproduced in **Table 9.6** and have been used in this assessment.

9.43. DMRB state that: "*a change in road traffic noise of 1 dB $L_{A10,18h}$ in the short term (e.g. when a project is opened) is the smallest that is considered perceptible*". Notwithstanding this, it is generally accepted by acoustic practitioners that subjectively an increase of 3dB in environmental noise is just noticeable, whereas an increase of 10dB, a tenfold increase in intensity is judged by most people as a doubling of loudness.

Table 9.6: Significance Criteria for Road Traffic Noise Assessment

Significance	Change or Difference in Noise Level, dB(A)
Insignificant	0 to 0.9
Adverse effect of minor significance	1.0 to 2.9
Adverse effect of moderate significance	3.0 to 4.9
Adverse effect of major significance	≥ 5

Limitations and Assumptions

The Works

9.44. The BS 5228 calculation methodology allows accurate noise levels to be determined for various demolition and construction activities. However, at this stage specific detail on the construction plant and machinery to be used (make / model) is not known. A number of assumptions have therefore been made regarding the number and type of plant to be utilised, their location, and detailed operating arrangements. Some of this information would be clarified as the detailed design progresses and later when resources are mobilised and the contractor is appointed, but other information (such as exactly where the plant operates and for how long) would remain uncertain, even after works have commenced. As such, construction noise levels have been based on generic plant detail contained within BS5228-1:2009+A1:2014 and as detailed in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**. The available information is considered sufficient to undertake a noise

assessment of the demolition and construction work, focussing on key activities operating at the Site, with the aim of identifying whether a significant, albeit temporary, adverse noise effect is likely to arise at the nearest sensitive receptors. In this respect, a medium to high degree of confidence is assigned to the predicted significance of the potential effects.

Fixed Plant & Building Services

9.45. At this stage of the Development, the specific type and configuration of fixed plant are not defined although locations are indicated for the detailed element of the Development. Consequently, it is not possible to undertake predictions to determine whether appropriate standards would be met, so instead appropriate plant noise emission limits have been set.

Baseline Conditions

The Site and Surrounding Area

Sensitive Receptors

9.46. The area surrounding the Site is urban in nature predominantly consisting of residential and commercial uses. Existing receptors within the vicinity of the Site are identified in **Table 9.7** and illustrated in **Figure 9.1**.

Table 9.7: Significance Criteria for Road Traffic Noise Assessment

Sensitive Receptor Number	Type of Receptor	Address / Name	Approximate Distance from Site Boundary
SR A	Existing residential	5-68 Watney Road	20 m west of Stag Brewery Site Boundary.
SR B	Existing residential	4-24 Williams Lane	20 m north-west of Stag Brewery Site Boundary.
SR C	Existing residential	1-69 Lower Richmond Road	25 m south of Stag Brewery Site Boundary.
SR D	Existing Residential	Chertsey Court	20 m from Chalkers Corner.
SR E	Existing Residential Receptors	139 Lower Richmond Road	15 m from Chalkers Corner.

9.47. Where a number of sensitive receptors are located close to each other, the nearest sensitive receptor is given to represent the immediate area.

9.48. Given the phased nature of the Works associated with the Development some of the new residential / school elements of the Development could be occupied whilst construction continues on other plots. As such, when considering the Works in relation to the Development consideration has also been given to potential future noise sensitive receptors which form part of the Development.

9.49. In addition to the sensitive receptors outlined above, there would be a number of structures retained as part of the Works. These include the Maltings, the Former Hotel (façade retention only) and the Former Bottling Building, retained historic elements of the boundary wall, railway tracks, paving and moorings. Potential effects in terms of construction vibration upon these receptors has also been considered. The memorial plaques and historic gates would be stored for protection in containers on the Site during the Works and re-instated post-construction.

Baseline Noise Monitoring

9.50. A summary of the measured daytime (07:00 to 19:00), evening (19:00 to 23:00) and night-time (23:00 to 07:00) noise levels at these locations are presented in **Table 9.8** and **Table 9.9**, with full results displayed graphically in time-history format in **Appendix 9.2**.

Table 9.8: Summary of Unattended (Long Term) Baseline Noise Measurements (free-field)

Monitoring Location (Figure 9.1)	Period	Duration	$L_{Aeq,T}$ dB	$L_{A10,T}$ dB	$L_{A90,T}$ dB		$L_{AFmax,5min}$ dB	
			Ave[1]	Ave[2]	Range	Ave[2] (mode)	Range	90th %tile[3]
LT1	Day	12hr	71	74	47 - 67	59 (61)	76 - 104	86
	Evening	4hr	69	73	43 - 62	52 (53)	74 - 98	83
	Night	8hr	65	65	33 - 63	42 (40)	56 - 98	83
LT2	Day	12hr	70	71	48 - 68	62 (63)	72 - 107	89
	Evening	4hr	68	69	43 - 66	57 (58)	70 - 102	85
	Night	8hr	63	63	32 - 64	43 (39)	57 - 99	80
LT3	Day	12hr	61	63	42 - 59	50 (51)	62 - 100	78
	Evening	4hr	59	61	38 - 53	47 (48)	50 - 98	75
	Night	8hr	55	51	34 - 54	42 (41)	46 - 82	73
LT4	Day	12hr	60	64	42 - 60	48 (48)	61 - 89	76
	Evening	4hr	58	61	38 - 52	46 (47)	49 - 83	74
	Night	8hr	55	50	31 - 54	39 (36)	43 - 79	73

Notes: [1] Logarithmic average over the daytime/evening/night-time survey periods; [2] Arithmetic average over the daytime/evening/night-time survey periods. [3] The 90th percentile L_{AFmax} value (equivalent to the 10th highest measured L_{AFmax} level) is presented for the long term noise monitoring results and is considered to fairly represent typical L_{AFmax} levels being experienced, within the spirit of WHO and BS 8233 guidance. All figures rounded to nearest whole decibel.

Table 9.9: Summary of Attended (Short Term) Baseline Noise Measurements (free-field)

Monitoring Location (Figure 9.1)	Period	Duration	$L_{Aeq,T}$ dB	$L_{A10,T}$ dB	$L_{A90,T}$ dB	$L_{AFmax,5min}$ dB
			Ave[1]	Ave[2]	Ave[2]	Ave[2]
ST1	Day	30mins	61	64	54	74
ST2	Day	30mins	66	63	53	76
ST3	Day	25mins	75	78	65	88
ST4	Day	20mins	61	65	51	72
ST5	Day	20mins	61	64	50	77
ST6	Day	30mins	69	71	64	80
ST7	Day	20mins	65	68	57	76
ST8	Day	3hrs	72	76	62	84

Notes: [1] Logarithmic average over the daytime survey periods; [2] Arithmetic average over the daytime survey periods. All figures rounded to nearest whole decibel.

9.51. The highest ambient ($L_{Aeq,T}$) noise levels, were measured to the south (LT1) of the Site adjacent to Lower Richmond Road. Average ambient noise levels of 71 dB $L_{Aeq,12hr}$, 69 dB $L_{Aeq,4hr}$, and 65 dB $L_{Aeq,8hr}$, were recorded during the day, evening and night-time periods respectively. All long-term locations exhibited typical diurnal variation in environmental noise levels, with lower noise levels during the night-time period when traffic volumes are reduced together with reduction human activity.

Likely Significant Effects

The Works

Demolition and Construction Noise

9.52. **Table 9.10** presents the predicted un-mitigated noise levels at the selected receptors (**Table 9.6**) during the Works associated with the Development. Noise levels presented are representative of a worst-case scenario when works are undertaken at the closest point to the receptors, taken as being either the Site boundary, or the closest existing structure to be demolished / dismantled or piling location.

9.53. Given the Works associated with the Development is phased, and as indicated within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction,** there is the potential that the school (Plot 3) could be occupied whilst latter parts of Plot 1, and all of Plot 2 are being constructed, and Plot 1 could be occupied whilst Plot 2 is being constructed.

9.54. To take account of this, calculations for future receptors which form part of the Development were based on a minimum distance of 15 m from construction works to determine the likely significant effects. This is considered to be a reasonable conservative approach as in most cases it is likely that works would be undertaken at greater distance.

9.55. Full details of the calculations undertaken are presented in **Appendix 9.3**.

Table 9.10: Predicted Demolition & Construction (un-mitigated) Noise Levels dB L_{Aeq}

Fig 9.1 Ref	Description	Demolition	Enabling	Sheet Piling (substructure)	Excavation (substructure)	CFA (substructure)	Concreting (substructure)	Steel Frame (superstructure)	Floor Slab (superstructure)	Public Realm & Landscaping	Highways Pavement
A	5-68 Watney Road	67	79	77	65	67	67	67	68	85	80
B	4-24 Williams Lane	83	87	67	81	82	82	82	83	85	80
C	1-69 Lower Richmond Road	84	87	76	76	77	78	77	79	85	80
D	Chertsey Court	65	87	60	60	61	62	61	62	85	80
E	139 Lower Richmond Road	63	87	62	63	64	65	64	65	85	80
F	Future SR Within the Development	n/a	84	85	81	82	82	82	83	81	77

9.56. **Table 9.11** presents the level of significance of noise effects at the nearest receptors resultant from demolition and construction noise. It should be noted that the significance of effects presented are when works are being undertaken at the shortest distance to the SRs and would therefore reduce as works are undertaken at greater distance. The construction threshold noise level for SRs A and B as well as future SRs to be introduced as part of the Development is taken as 65dB L_{Aeq} and is taken as 75dB L_{Aeq} based on monitored baseline noise levels for SRs C, D and E.

Table 9.11: Significance of Demolition & Construction Noise Effects (un-mitigated)

Fig 9.1 Ref	Description	Demolition	Enabling	Sheet Piling (substructure)	Excavation (substructure)	CFA (substructure)	Concreting (substructure)	Steel Frame (superstructure)	Floor Slab (superstructure)	Public Realm & Landscaping	Highways Pavement
A	5-68 Watney Road	Insig	Maj	Maj	Insig	Insig	Insig	Insig	Min	Maj	Maj
B	4-24 Williams Lane	Maj	Maj	Insig	Maj	Maj	Maj	Maj	Maj	Maj	Maj
C	1-69 Lower Richmond Road	Mod	Maj	Insig	Insig	Insig	Min	Insig	Min	Maj	Mod
D	Chertsey Court	Insig	Maj	Insig	Insig	Insig	Insig	Insig	Insig	Maj	Mod

Fig 9.1 Ref	Description	Demolition	Enabling	Sheet Piling (substructure)	Excavation (substructure)	CFA (substructure)	Concreting (substructure)	Steel Frame (superstructure)	Floor Slab (superstructure)	Public Realm & Landscaping	Highways Pavement
E	139 Lower Richmond Road	Insig	Maj	Insig	Insig	Insig	Insig	Insig	Insig	Maj	Mod
F	Future SR Within the Development	n/a	Maj	Maj	Maj	Maj	Maj	Maj	Maj	Maj	Maj

Note: Insig – insignificant; Min – minor; Mod – moderate; Maj – major:

9.57. Insignificant effects are predicted when works are being undertaken at distance from SRs. The distance at which insignificant effects are predicted to occur varies with type of works and the adopted threshold noise level.

9.58. At SR A (Watney Road), the effects are predicted to be predominantly insignificant with major adverse effects when works are being undertaken proximate to the Site boundary, such as enabling, landscaping and highways pavement works.

9.59. At SR B (Williams Lane), the effects are predicted to be predominantly major adverse due to the assumed proximate location of works to these SRs.

9.60. At SRs C and E on Lower Richmond Road and SR D (Chertsey Court), the effects are predicted to be predominantly insignificant due to distance from works and higher construction threshold noise level based on higher prevailing noise levels dominated by road traffic noise. Major adverse effects are predicted when enabling and landscaping works are undertaken proximate to the Site boundary. During highways pavement works moderate adverse effects are predicted.

9.61. When works are being conducted within 15m of future SR within the Development, there are the potential for temporary, short-term local adverse effects of up to major significance.

9.62. Overall, effects are identified as **insignificant** to **temporary, short-term local adverse** effects of **minor** to **major significance**. It should be noted that, in reality, construction works would be transient in nature, with works for the most part taking place at locations significantly removed from the SRs. Nonetheless, given that some major adverse effects have been predicted, mitigation measures would be required to reduce noise levels from the demolition and construction phase of the proposed Development.

Construction Traffic Noise

9.63. Construction traffic flow data as provided by PBA show that for this Development there is anticipated to be a peak in construction vehicle movements in 2022 of 82 one-way vehicle trips accessing the Site per day, of which 57 one-way trips are likely to be undertaken by Heavy Goods Vehicles (HGVs) and 25 one-way trips by Light Goods Vehicles (LGVs). During the peak construction period, access to the Site for construction vehicles would be taken via two access points off Lower Richmond Road, opposite Waldeck Road, and Mortlake High Street, adjacent to

Bulls Alley. The AAWT 18-hour baseline traffic flows along the construction route reveals construction traffic accounts for less than 1% as a proportion of 2022 forecast do-minimum base flows. This equates to a noise level increase of less than 1dB, which is not large enough to cause any discernible effect. As such, the likely effect of construction traffic noise generated by the Development on existing and future sensitive receptors is concluded to be **insignificant**.

Demolition and Construction Vibration

9.64. The primary source of vibration associated with the Works is likely to be sheet piling and to a lesser extent CFA piling, although some vibration may arise during both demolition, Site preparation works and construction works. It is understood that sheet piling would be required as part of the substructure works to form a retaining wall for the basement structure and for sections of the river wall. Whilst where piled foundations are required rotary bored / CFA piling would be used to minimise noise and vibration effects.

9.65. With regard to the human perception of vibration levels, **Table 9.2** indicates that PPV levels arising from sheet piling can occur up to 40-60 m depending on ground conditions. Based on distance of sheet piling from SRs, this is only likely to affect SRs A, C and potentially future residential SRs which form part of the Development. Existing SRs A (Watney Road) and C (1-69 Lower Richmond Road) are located 35 and 40m respectively from potential sheet piling works. Based on information within Table 9.3 (derived from BS5228-2), this could give rise to PPV levels of up to 3 mm/s, subject to ground conditions. On this basis there is the potential for **temporary**, **short-term**, **local adverse** effects up to **moderate significance** when sheet piling works are undertaken within 40m for SRs. At all other SRs, excepting future SR within Development, the potential effects are predicted to be **insignificant** due to distance from works.

9.66. With regards to potential vibration levels arising from CFA / rotary bored piling, due to distance from works and SRs, all significance of effects are predicted to be **insignificant** in the absence of mitigation up to **temporary, local** effects up to **minor adverse** significance.

9.67. Vibration arising from activities other than piling are anticipated to be predominantly **insignificant** due to distance separation, with the potential of some **temporary**, **local effects** up to **minor adverse** significance when works are undertaken proximate to the Site boundary.

9.68. As previously discussed with regards to building damage vibration levels at least an order of magnitude higher than those for human disturbance are required to cause damage to buildings. It is generally accepted that building damage would not arise at PPV levels below 12.5 mm/s. Notwithstanding this for existing structures that are to be retained within the Development some consideration to vibration control would be required, in particular during sheet piling if driven method is used. Potential vibration control measures are discussed in the relevant mitigation section of this Chapter.

9.69. At all building receptors due to distance separation, potential building damage effects from CFA / rotary bored piling would be **insignificant** in the absence of mitigation.

9.70. It is not possible at this stage to accurately predict the significance of the effect from vibration on underground utilities such as the main water mains sewer which Thames Water has identified runs immediately adjacent to the Site. Nonetheless, a comparative study has been carried out comparing measured values of ground vibration from similar piling activities with British Standard

guideline values for underground structures and buildings. Empirical models for the estimation of piling vibration levels were discounted for this assessment as they are considered to be highly variable over short propagation distances. British Standard BS 5228-2 offers guidance on vibration levels from piling activities and provides a summary of measured levels from particular sites, a selection of which is included as **Table 9.12**.

Table 9.12: Summary of measured vibration levels (BS5228:2009)

Piling Methodology	Location and source	Activity	Measured Level (Peak Particle Velocity mm/s)
Effect	C1 1972, London EC2 in overburden and London Clay	Driving Casing	12.5 mm/s at 1 m
	C8 1971, London WC2 in overburden and London Clay	Diesel hammer	20 mm/s at 1 m
	C8 1972, London WC2 in overburden and London Clay	Air hammer	10 mm/s at 1 m
	C53 1979, Molesey (Surrey) in gravel over London Clay	Driving Sheets	4.3 mm/s at 5 m
	C56 1979 Bromley (Greater London) in gravel	Driving Sheets	42 mm/s at 3 m
Pressed In/CFA/Rotary Bored Piling	2000 New Orleans	Pressed in steel sheet piles	4.3 mm/s at 5 m
	1992 Utrecht	Pressed in steel sheet piles	0.7 mm/s at 7 m
	1971 London EC2 in made ground/gravel and London Clay	Rotary Bored Pile	1 mm/s at 4 m
	1981 London EC3 Fill dense ballast and London Clay	Auguring	0.23 mm/s at 20 m
Excavation and Breaking Out[1]	Hydraulic breakout of concrete	Hydraulic Breaker	2.3 mm/s at 8 m
	Excavation of materials	Excavator	1 mm/s at 8 m

9.71. As can be seen from the selected data presented as **Table 9.12**, vibration levels can vary significantly based on site conditions and driving methods. It should also be noted that the above measurements are of PPV in soil; PPV values at the sewer / pipe wall itself are likely to be lower due to imperfect vibration coupling between the soil and the sewer / pipe.

9.72. Based on the above data, it can be concluded that the magnitude of the ground vibration resulting from the Works, if effect piling is to be used is likely to be of the order of 10 mm/s and for the more likely CFA solution vibration levels of no greater than 1 mm/s would be expected. With regards to excavation and breaking out of existing concrete a maximum PPV level of 2.3 mm/s would be expected.

[1] Source: Federal Transit Association

9.73. As previously discussed, Annex B.4 of BS 5228-2 considers the effect of vibration on underground services and recommends a vibration limit of 30 mm/s PPV for intermittent or transient vibration and 15 mm/s for continuous vibration. This limit is conservative as far as the integrity of the pipe/sewers concerned. Even a PPV of 30 mm/s gives rise to a dynamic stress which is equivalent to only 5% of the allowable working stress in typical pipe work. As such, in light of the above the potential effects of the Works on underground utilities is considered to be **insignificant**. Despite this, vibration monitoring would be advised where piling works are proposed proximate to underground services and utilities.

Completed Development

Building Services Plant Noise

9.74. At this stage of the Development, the specific type, configuration (or location for the outline area) of fixed plant are not defined and therefore appropriate plant noise emission limits have been set, as detailed later in the relevant mitigation section of this Chapter.

9.75. As part of the detailed element of the Development within the Stag Brewery component of the Site (Application A – Development Area 1), plant areas are to be provided throughout the single level basement area as well as at roof level for each individual block. Roof level plant will predominantly consist of smoke extract and heat rejection plant whilst basement plant is likely to include air handling units, boilers and pumps as required.

9.76. At this stage in the design, plant specification would be sufficiently flexible to ensure that suitably quiet, non-tonal plant can be procured and / or mitigation options such as screening (e.g. acoustic louvres) could be installed as necessary to ensure that the plant noise criteria is met. In the absence of not setting maximum plant noise levels or the stipulated noise levels not achieved, the likely effect on existing surrounding receptors and future receptors within the Development from building services noise would be **long term, local adverse** and up to **moderate significance**.

Retail Commercial Uses and Services

9.77. The detailed element of the Development within the Stag Brewery component of the Site (Application A – Development Area 1) includes a mix of uses, including employment, retail, community and leisure uses, sui generis uses, a hotel and residential units. Basement car park and servicing area also forms part of the detailed development and would be located to the east of Ship Lane. Vehicular access and egress to the eastern basement would be via dedicated access points on Ship Lane and Mortlake High Street between Blocks 5 and 10 of the Development. The outline element of the Development located to the west of Ship Lane (Application A – Development Area 2) includes areas of residential and accommodation which is being applied for flexibly as assisted living accommodation or residential. This area also includes basement level car parking for these uses.

9.78. During future design stages of the Development, the sound insulation performance requirements of the external building fabric would be appropriately specified to control noise break-out, having regard to the nature of future uses and occupants of each unit. This is to ensure internally generated noise would be attenuated to a level as to be unobtrusive at the nearest residential areas. Standard controls, secured through planning conditions relating to the noise emissions,

building construction, opening hours and use of outside space would be used to minimise likely noise effects. Therefore, noise effects associated with non-residential, retail / commercial uses of the Development on existing receptors surrounding the Development and future sensitive receptors within the Development are expected to be **insignificant**.

9.79. The majority of service vehicles would enter the Site from Mortlake High Street onto the new high street via a controlled access. The number of delivery vehicles associated with non-residential retail / commercial uses would be largely dependent upon the final occupants, however it is currently predicted by PBA that there would be 48 trips per day to the Site east of Ship Lane and 12 trips per day to Development west of Ship Lane. Vehicle movement on the highway network are accounted for in the road traffic assessment below. However, consideration of delivery activities is required. It is considered that standard controls, secured through planning conditions relating to hours of delivery, combined with acoustic attenuation measures, would be used to minimise likely noise effects. Therefore, noise effects associated with servicing and deliveries on existing receptors surrounding the Development and future sensitive receptors within the Development would be **insignificant** to at worst **long-term**, **local**, **intermittent**, **adverse** effects of up to **minor significance.**

9.80. Mitigation would be required to reduce the effect from this source should it occur during the night-time period.

9.81. With regard to bedrooms located directly above the main access points to the basement car parking there is the potential for **long-term**, **local**, **intermittent**, **adverse** effects of up to **minor significance** to arise during peak hours or if large numbers of vehicles enter or exist the car park during the night-time period.

Road Traffic Noise

9.82. The likely change in road traffic noise resulting from operational traffic associated with the Development was determined in accordance with CRTN; the results of which are presented in **Table 9.13**. The 2027 baseline scenario '*without Development'* includes traffic increases due to natural traffic growth and committed developments. The '*with Development'* scenario (which includes the Chalkers Corner works) is intended to identify the likely effects solely as a result of the Development. Full details of the road traffic noise assessment are provided within **Appendix 9.4**.

Table 9.13: Summary of Road Traffic Noise Assessment

Road Link	Difference in dB $L_{A10,18hr}$ BNL (Base + Development) - (Base)		
	2027 - Without Development (Base)	2027 - With Development (Base + Development)	Change
A316 Clifford Ave	75.1	75.1	0.0
A316 Lower Richmond Road	73.2	73.3	0.1
South Circular (north of A316)	69.4	69.5	0.1
South Circular (south of A316)	70.3	70.3	0.0
A3003 Lower Richmond Road (Watney's Sports Ground)	70.8	71.1	0.2
A3003 Lower Richmond Road (Mortlake Green)	70.9	71.1	0.2
Williams Lane	51.6	56.7	5.1
Mortlake High Street	71.3	71.4	0.1
The Terrace (west of Barnes Bridge Station)	71.0	71.1	0.1
White Hart Lane (south of Mortlake High Street)	64.8	64.9	0.1
Sheen Lane (north of Level Crossing)	64.8	65.1	0.3
Sheen Lane (south of Level Crossing)	64.4	64.7	0.3
Sheen Lane (south of South Circular)	63.3	63.5	0.2
South Circular Road (west of Sheen Lane)	71.1	71.1	0.0

9.83. For all road links assessed presented as **Table 9.13**, the difference in operational road traffic noise (considering the 2027 baseline situation both 'with' and 'without' Development) is less than 1dB(A) and therefore **insignificant**, except along Williams Lane. When considering vehicle movements along Williams Lane there is expected to be an increase in noise levels of around 5.1dB which with reference to the significance criteria presented in **Table 9.6** would give rise to at worst long-term, local adverse effect of major significance. The predicted noise level 'without' Development should however be treated with caution, as the AAWT-18 hour flow on this link is below the range of the predictive CRTN methodology. Further to this, the noise climate at this location is likely to be dominated by road traffic noise from Lower Richmond Road with BNL predicted noise levels of 71dB $L_{A10,18h}$ and A316 Clifford Avenue with BNL predicted noise levels of 75dB $L_{A10,18h}$. Noise from these major roads is likely to mask any noise increase resultant from increase traffic flow along Williams Lane, which is some 20 to 25dB lower. On this basis the potential effect from changes in road traffic noise along Williams Lane is anticipated to be **insignificant** up to **long-term**, **local adverse** effect of **minor** significance.

Noise from Proposed School and Play Space

9.84. Up to 4,084 m^2 GEA would be children's play space for future residents and 10,305 m^2 GEA including the sports hall and roof top play space which would be provided as part of the proposed school Play facilities for different age groups are positioned within residential courtyards, parks, plazas and open space areas.

9.85. Play elements and facilities are provided in a range of forms within the public and private realms of the Development, including designated and fenced playgrounds, unfenced but contained play spaces with a range of play elements and carer seating, topographic variation and play opportunities in the landscape (within planting areas) and 'play on the way' elements within circulation spaces and public realm areas. Refer to Parameter Plan P10736-00-001-123 for the location of play space provision in the outline component of the Development (Application A – Development Area 2) and the Landscape Design and Access Statement for the detailed component of the Development (Application A – Development Area 1).

9.86. Although there would be the potential for local play facilities to generate a degree of noise, the levels generated would be relatively low and would in general not be of concern to local residents. Of primary concern would be noise effects associated with larger more formalised play space and sports pitches such as those associated with the proposed school.

9.87. The proposed school would provide semi enclosed play space at roof level (refer to planning applications drawing C645_Z3_P_RF_001), an indoor sports hall and activity studio on the first floor (refer to planning application drawing C645_Z3_P_01_001), an external MUGA to the south of the school building and a full sized artificial all weather playing pitch with spectator facilities to the west of the school building.

9.88. With regards to noise effects there would be the potential for noise associated with the proposed school facilities to effect upon both existing receptors surrounding the Development and future sensitive receptors within the Development. The primary sources of noise associated with the school are likely to include the semi-enclosed play space at roof level, the external MUGA and the full sized artificial all weather pitch.

9.89. In order to assess the potential effects associated with this school element of the Development noise levels have been predicted based on noise source measurements during use of similar sized sports pitches. When considering existing SRs the change in ambient noise levels has been assessed.

9.90. For those receptors introduced as part of the Development which have no prior knowledge of the existing noise climate assessment against the absolute criteria of 50dB L_{Aeq} as recommended by Sports England has been undertaken. The assessment has been completed for the closest SRs to the sports pitches only. The assessment results are presented as **Table 9.14**.

Table 9.14: Assessment of Noise Effects Associated with Sports Pitches

SR (Figure 9.1)	Existing Ambient Noise Level (dB(A))	Predicted Noise Level from Sports Pitches (3G sports pitch & MUGA)	Combined Ambient and Predicted 3G sports pitch & MUGA Noise Level (dB(A))	Change in Noise Level (dB)
SR A – Watney Road	60 day	61	64	4
	58 evening	61	63	5
SR B – Williams Lane	60 day	63	65	5
	58 evening	63	64	6
SR C – Lower Richmond Road	71 day	63	72	1
	69 evening	63	70	1
Closest Future SR	n/a	63	n/a	n/a

Note: Daytime period 07:00-19:00; evening period 19:00-23:00, although this does not necessarily reflect operational (usage) times of 3G sports pitch and MUGA.

9.91. With reference to the assessment in **Table 9.14** it can be seen that there would be a maximum increase in noise levels of 4dB for SR A – Watney Road and 5dB for SR B – Williams Lane, as a result of noise from use of 3G sports pitch and MUGA sports facilities. A 1dB increase is predicted for SR C – Lower Richmond Road. These temporary increases in noise levels, during usage of the facilities, would give rise to **insignificant** effects at receptors on Lower Richmond Road. This is in part due to the relatively high prevailing noise levels at this location due to road traffic on Lower Richmond Road. At SR A the effect is considered to be **long-term, local, intermittent adverse** of **minor** to **moderate adverse** significance and at SR B **long-term, local, intermittent adverse** of **moderate adverse** significance, based on predicted change in prevailing noise levels. It should be noted however that a noise level of 63dB(A) is within the noise level range for normal conversations, which ranges from 55 to 65dB(A).

9.92. With regards to future noise sensitive receptors, noise levels associated with the sports pitches would be in the region of 63 dB at the nearest future SRs, thereby above the recommendations set out by Sport England, however consideration should be given to the future prevailing noise climate when assessing the significance of this. Based on measured prevailing noise levels, it is likely that an increase in noise level would be experienced by the nearest future SRs which are distant from Lower Richmond Road. The increase is likely to be comparable to that predicted from SRs A and B. On this basis, the effect during usage of 3G sports pitch and MUGA facilities is anticipated to be **long-term, local, intermittent adverse** of **minor** to **moderate adverse** significance.

Mitigation Measures and Likely Residual Effects

The Works

9.93. As detailed in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, a Construction Environmental Management Plan (CEMP) would be formulated in consultation with LBRuT, relevant legislation and other relevant guidance. The CEMP would set out a range of mitigation measures and environmental controls which would include the management of demolition and construction related noise and vibration. The Site

would also be registered for the Considerate Constructors Scheme. Control measures to minimise noise would include:

- use of hoarding to the required height and density appropriate to the noise sensitivity of the Site;
- use of modern, quiet and well maintained machinery such as electric powered plant, where possible and hoists should use the Variable Frequency Converter drive system;
- vehicles and mechanical plant used for the works would be fitted with exhaust silencers, which would be maintained in good and efficient working order and operated in such a manner as to minimise noise emissions in accordance with the relevant EU / UK noise limits applicable to that equipment or no noisier than would be expected based the noise levels quoted in BS 5228. Plant should be properly maintained and operated in accordance with manufacturers' recommendations. Electrically powered plant would be preferred, where practicable, to mechanically powered alternatives;
- establish noise and vibration target levels (a Section 61 agreement under the Control of Pollution Act 1974[6] (COPA)) to reduce noise and vibration to a minimum in accordance with best practicable means, as defined in Section 72 of COPA;
- where required, monitoring of noise and vibration levels;
- changing where possible methods and processes to keep noise levels low;
- positioning plant as far away from residential property as physically possible;
- works would be limited to the specified hours and would be subject to agreement with LBRuT and hours worked on noisy operations would be limited; and
- liaison with the occupants of adjacent properties most likely to be affected by noise or vibration from activities on the Application Site should also take place. The occupants should be informed of the nature of the works, proposed hours of work and anticipated duration prior to the commencement of activities.

9.94. With regards to traffic management during the Works, as detailed in **Chapter 8: Transport and Access**, all traffic logistics would be agreed between LBRuT, contractors and the Applicant. Such measures would be set out within a Construction Logistics Plan. Consideration would also be given to the avoidance (or limited) use of road during peak hours, where practicable.

Noise

9.95. Accounting for the implementation of mitigation, as set out above, which should afford 10 dB(A) reduction, the likely residual noise levels associated with the Works are presented in **Appendix 9.3** and summarised in **Table 9.15** with significance of residual effects, which would be localised short-term and temporary in nature, presented as **Table 9.16**.

Table 9.15: Predicted Demolition & Construction (mitigated) Noise Levels dB L_{Aeq}

Fig 9.1 Ref	Description	Demolition	Enabling	Sheet Piling (substructure)	Excavation (substructure)	CFA (substructure)	Concreting (substructure)	Steel Frame (superstructure)	Floor Slab (superstructure)	Public Realm & Landscaping	Highways Pavement
A	5-68 Watney Road	<65	69	67	<65	<65	<65	<65	<65	<75[1]	70
B	4-24 Williams Lane	73	<75[1]	<65	71	72	72	72	73	<75[1]	70
C	1-69 Lower Richmond Road	74	77	66	66	67	68	67	69	75	70
D	Chertsey Court	<65	77	<60	<60	<61	<62	<61	<62	75	70
E	139 Lower Richmond Road	<63	77	<62	<63	<64	<65	<64	<65	75	70
F	Future SR Within the Development	n/a	74	<75[1]	71	72	72	72	73	71	67

Note: [1] Additional mitigation assumed when works proximate to site boundary thereby allow up to 15dB attenuation to be achieved. This would be achieved either by additional shielding, change in method of working. Reducing on-time etc.

Table 9.16: Significance of Demolition & Construction Noise Effects (mitigated)

Fig 9.1 Ref	Description	Demolition	Enabling	Sheet Piling (substructure)	Excavation (substructure)	CFA (substructure)	Concreting (substructure)	Steel Frame (superstructure)	Floor Slab (superstructure)	Public Realm & Landscaping	Highways Pavement
A	5-68 Watney Road	Insig	Min	Insig	Insig	Insig	Insig	Insig	Insig	Mod	Mod
B	4-24 Williams Lane	Mod	Mod	Insig	Mod	Mod	Mod	Mod	Mod	Mod	Mod
C	1-69 Lower Richmond Road	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig
D	Chertsey Court	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig
E	139 Lower Richmond Road	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig	Insig
F	Future SR Within the Development	n/a	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Insig

Note: Insig – insignificant; Min – minor; Mod – moderate; Maj – major: [1] Receptor within 20m of work therefore deconstruction method assumed.

9.96. With mitigation, residual effects are predicted to reduce to **insignificant**, to **temporary, short-term**, **local**, **adverse** effects of up **minor** to **moderate significance**. It should be borne in mind that the assessment is worst case based on when works are being undertaken at the shortest distance to the receptors.

Vibration

9.97. With the implementation of the vibration related mitigation measures as detailed above, human perception residual effects are likely to be predominantly **insignificant** and at worst, **temporary, short-term**, **local, adverse** effects of **minor significance.** The residual effect on buildings to be retained would remain **insignificant.**

Traffic

9.98. As insignificant effects as a result of construction traffic are predicted mitigation measures are not proposed and residual effects would remain **insignificant**.

Completed Development

Building Services Plant Noise

9.99. Based upon BS4142 and requirements of LBRuT, noise emissions from fixed mechanical plant would be limited to at least 10 dB below background at the nearest identified noise receptor with a minimum value of 45 and 40 dB $L_{Ar,Tr}$ (as defined by BS4142:2014) recommended during the day and night-time periods respectively for non-residential receptors, taking account of prevailing noise levels. With regard to residential receptors a minimum night-time noise limit of 35dB $L_{Ar,Tr}$ is recommended where prevailing background noise levels are less than 45dB $L_{A90,T}$ with a maximum daytime noise limit of 45dB $L_{Ar,Tr}$ where prevailing background noise levels are greater than 55dB L_{A90}. **Table 9.17** presents the recommended plant noise limits based on the establish prevailing noise levels to safeguard the existing amenity.

Table 9.17: Recommended Plant Noise Limits

Location (Ref Figure 9.1)	Period	Representative $L_{A90,5min}$	Plant Noise Emission Limit ($L_{Ar,Tr}$ as defined by BS4142:2014)
NSR A & B (noise limit inferred from LT4)	Daytime (07:00 and 23:00)	48 (mode 48)	38
	Night-time (23:00 and 07:00)	39 (mode 36)	35
NSR C (noise limit inferred from LT1)	Daytime (07:00 and 23:00)	59 (mode 61)	45
	Night-time (23:00 and 07:00)	42 (mode 40)	35

9.100. With regard to future residential properties within the Development, plant noise levels should not exceed 40 dB $L_{Ar,Tr}$ at 1 m from the façade of the nearest property. This would result in an IANL of 25-30 dB L_{Aeq}, thereby satisfying the BS8233 night-time criteria with windows open. Typical mitigation includes the following measures:

- procurement of 'quiet' non-tonal plant;
- locate plant and air vents away from sensitive receptors;
- acoustic enclosures;
- in-duct attenuators;
- acoustic louvres; and
- isolation of plant from building structures.

9.101. Should the recommended plant noise limits be achieved, the likely residual effects of noise from fixed plant and building services on the nearest sensitive receptors would be **insignificant.**

Retail Commercial Uses & Services

9.102. During the detailed design stages of the Development, the sound insulation performance requirements of the external building fabric would be appropriately specified to control noise break-out, having regard to the nature of future uses. As stated previously, noise from non-residential uses would be subject to standard controls that could be secured through planning conditions. The likely residual noise effects associated with non-residential uses of the Development on existing and future sensitive receptors are expected to be **insignificant**.

9.103. At this stage, it has not been possible to quantify the noise effect from deliveries and servicing as details regarding the final tenants and associated servicing and delivery areas are not known. Prior to the occupation of each Development area, a detailed Delivery and Servicing Plan (DSP) (based on the outline DSP submitted for planning) should be prepared to include:

- managing the deliveries (including by courier) and servicing requirements of retail, office and leisure tenants;
- hours of operation of the for any servicing areas and loading bays; and
- refuse and recycling collections.

9.104. With the implementation of the DSP, the likely residual effects of noise from the servicing and deliveries within the Development to existing receptors surrounding the Development and future sensitive receptors within the Development is likely to be **insignificant.**

9.105. Potential adverse effects from ingress/egress of cars to the basement carpark to residential units located above could be mitigated through internal layouts so bedrooms do not directly overlook the access point, or provision of enhanced glazing to potentially affected rooms thereby rendering residual potential effects **insignificant**.

Road Traffic Noise

9.106. Potential effects are insignificant. Therefore, mitigation is not proposed and residual effects remain **insignificant**.

Noise from Proposed School and Play Space

9.107. Predicted effects associated with noise from the proposed school and play space range from insignificant to long-term local, intermittent adverse of minor to moderate adverse significance. Provision of boundary treatment to the west and north of the 3G sports pitch could be considered, however given the intermittent use of the 3G sports pitch and MUGA and with overall predicted noise levels being within the range of normal conversation, temporary increases in the prevailing noise levels should be acceptable. Mitigation is therefore not proposed and residual effects remain **insignificant to long-term local, intermittent adverse of minor to moderate adverse significance**. Further to this, it should be noted that the view between SRs A, B and sports pitches would be visually screened by trees. Although this would not have a direct acoustic benefit in reducing noise levels, psychologically it would have a positive benefit.

Summary

9.108. **Table 9.18** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 9.18: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Temporary increase in noise levels from work activities affecting receptors close to the Site.	**Temporary, short-term local** effects of **major adverse significance**.	Implementation of a CEMP.	**Insignificant** to t**emporary, short-term, local residual effect** of **minor** to **moderate adverse**.
Vibration generated during sheet piling operations affecting receptors close to the Site.	**Insignificant** to **temporary, short-term, local adverse** effects of **moderate significance**.		**Insignificant** to **temporary, short-term, local adverse** effects of **minor significance**.
Vibration effects on building structures and underground utilities (assuming CFA or rotary bored piling techniques).	**Insignificant**.	None required.	**Insignificant**.
Increase in heavy plant movements on strategic roads.	**Insignificant**.	None required, however a Construction Traffic Management Plan would also be implemented.	**Insignificant**.
Completed Development			
Noise from fixed plant and building services.	**long-term, local adverse effects** of up to **moderate significance**.	Inherent mitigation would allow plant and building services noise to meet the required plant noise limit of LBRuT.	**Insignificant**.
Noise from non-residential land-uses.	**Insignificant**. **Long-term, local, intermittent adverse effects** up to **minor significance** from ingress / egress of vehicles to the basement parking areas during peak hours or should this occur during the night-time period.	Control through planning conditions and implementation of Delivery and Servicing Plan.	**Insignificant**.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Noise from changes in road traffic.	**Insignificant**.	None required.	**Insignificant**.
Noise from proposed school and play space.	**Insignificant** to. long-term, local, **intermittent adverse effects** up to **minor** and **moderate** significance	None proposed.	**Insignificant to long-term, local, intermittent adverse effects** up to **minor significance** during usage of 3G sports pitch and MUGA.

References

1 British Standards Institution (2014); 'BS 5228:1: 2009 +A1 2014: Code of practice for noise and vibration control on construction and open sites. Noise', BSI, Great Britain.

2 British Standards Institution (2009); 'BS 5228:2 2009: Code of practice for noise and vibration control on construction and open sites, Vibration', BSI, Great Britain.

3 DoT (1988); 'Calculation of Road Traffic Noise', HMSO.

4 Sports England (2015); 'Artificial Grass Pitch (AGP) Acoustics – Planning Implications', Sports England.

5 Highways Agency (2011); 'Design Manual for Road and Bridges, Volume 11 Environmental Assessment, Section 3, Environmental Assessment Techniques, Part 7 Noise and Vibration', The Stationery Office.

10. Air Quality

Introduction

10.1. This Chapter, prepared by Waterman Infrastructure and Environment (Waterman IE), presents an assessment of the likely significant effects of the Development on local air quality. In particular, consideration is given to the likely effects of potential emissions from the demolition, alteration, refurbishment and construction works (the Works), as well as emissions from operational road traffic and the proposed heating plant associated with the completed and operational Development on existing sensitive receptors surrounding the Site, and at receptors within the Development itself. The assessment includes the potential air quality effect from changes to the Chalkers Corner junction layout, which are being made as part of the Development.

10.2. This Chapter describes the methods used to assess these effects and the baseline conditions currently existing at the Site and in the surrounding area. The likely significant direct and indirect effects of the Development arising from the Works and from the Development once completed and operational.

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

10.4. This Chapter is supported by:

- **Appendix 10.1:** Air Quality Modelling Study;
- **Appendix 10.2:** Air Quality Neutral Assessment;
- **Appendix 10.3**: Modelled Results; and
- **Appendix 10.4:** Chalkers Corner Junction Interim Design Assessment.

Assessment Methodology and Significance

Assessment Methodology

10.5. Specific consultation with the Environmental Health Officer (EHO) at LBRuT was undertaken to agree the following approach for the air quality assessment (refer to Appendix B of **Appendix 2.1** and **Appendix 10.1**):

- identification of potentially sensitive existing and future receptor locations which could be affected by changes in air quality resulting from the Works, as well as the operation of the completed Development;
- review of LBRuT's Air Quality Updating and Screening Assessment and Progress Reports published as part of the Local Air Quality Management (LAQM) regime in order to determine baseline conditions in the area of the Site;
- application of the ADMS-Roads[1] and AMDS 5[2] air quality dispersion models using data from the project Transport Consultant (Peter Brett Associates) and the project Building Services Consultant (Hoare Lea), to assess the likely effects of emissions from traffic generated by the completed and operational Development and emissions from the Energy Centre within the

Development on local air quality. The latest NO_2 from NO_x Calculator available from the LAQM Support website[3] has been applied to derive the road-related NO_2 concentrations from the modelled NO_x concentrations and the Environment Agency[4] conversion of NO_x to ground level NO_2 associated with the emissions from the Energy Centres;

- comparison of the predicted pollutant concentration with the Air Quality Strategy Objectives (UK AQS);
- comparison of the predicted air pollutant concentrations with LBRuT monitored concentrations for the year 2016, and adjustment of modelled results where necessary (model verification details are provided in **Appendix 10.1**);
- determination of the likely significant effects of the Works, and consideration of the environmental management controls likely to be employed during the Works;
- determination of the likely significant effects of the completed and operational Development on air quality, based on the application of the Environmental Protection UK Guidance and Institute of Air Quality Management[5] (EPUK/ IAQM) significance criteria to modelled results;
- consideration of the effect on air quality associated with the changes to Chalkers Corner proposed (details are provided in **Appendix 10.4**);
- identification of mitigation measures where appropriate. This includes inherent measures which would have a beneficial effect on local air quality; and
- establishment of the likely residual effects of the Development upon air quality taking into account mitigation measures.

10.6. The UK AQS identifies the pollutants associated with road traffic emissions and local air quality as:

- nitrogen oxides (NO_x);
- particulate matter (as PM_{10} (particles with a diameter up to 10µm) and $PM_{2.5}$ (particles with a diameter up to 2.5µm));
- carbon monoxide (CO);
- 1, 3-butadiene (C_4H_6); and
- benzene (C_6H_6).

10.7. Emissions of total NO_x from motor vehicle exhausts comprise nitric oxide (NO) and nitrogen dioxide (NO_2). NO oxidises in the atmosphere to form NO_2.

10.8. The most significant pollutants associated with road traffic emissions, in relation to human health, are NO_2 and PM_{10}. LBRuT has declared an Air Quality Management Area (AQMA) for the entire Borough for annual mean NO_2 and 24-hour mean PM_{10}, attributable to road traffic emissions (referred to later in this Chapter). This assessment therefore focuses on NO_2 and particulate matter (PM_{10} and $PM_{2.5}$).

10.9. As agreed via the EIA scoping process (refer to **Chapter 2: EIA Methodology**) no assessment was undertaken (or is, indeed necessary) in relation to odour. Any ventilation extracts associated with the café and restaurant uses within the Development would be designed in accordance with best practice design and appropriate regulations. This would be secured by a suitably worded

planning condition. As such, it is not anticipated that odours generated by café and restaurant uses within the Development would give rise to significant environmental effects.

The Works

10.10. The major influences on air quality throughout the Works would most likely be dust generating activities and vehicle emissions from plant and vehicles both on, and accessing / egressing, the Site.

Dust Emissions

10.11. The effects of dust emissions from the Works has been based on the guidance published by the IAQM (2014)[6].

10.12. The approach to the assessment includes:

- consideration of planned construction activities and their phasing; and
- a review of the sensitive uses in the area immediately surrounding the Site in relation to their distance from the Site.

10.13. Following the IAQM Guidance, construction activities can be divided into the following four distinct activities:

- demolition – any activity involved in the removal of an existing building;
- earthworks – the excavation, haulage, tipping and stockpiling of material, but may also involve levelling a site and landscaping;
- construction – any activity involved with the provision of a new structure; and
- trackout – the movement of vehicles from unpaved ground on a site, where they can accumulate mud and dirt, onto the public road network where dust might be deposited.

10.14. The IAQM considers three separate dust effects, with the proximity of sensitive receptors being taken into consideration for:

- annoyance due to dust soiling;
- potential effects on human health due to significant increase in exposure to PM_{10}; and
- harm to ecological receptors.

10.15. A summary of the four-step process which has been undertaken to determine the effect of the Works as set out in the IAQM guidance is presented in **Table 10.1**.

Table 10.1: Summary of the IAQM Guidance for Undertaking a Construction Dust Assessment

Step		Description
1	Screen the Need for a Detailed Assessment	Simple distance based criteria are used to determine the requirement for a detailed dust assessment. An assessment will normally be required where there are 'human receptors' within 350 m of the boundary of the site and / or within 50 m of the route(s) used by construction vehicles on public highway, up to 500 m from the site entrance or 'ecological receptors' within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on public highway, up to 500 m from the site entrance.

Step		Description
2	Assess the Risk of Dust Effects	The risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological effects should be determined using four risk categories: negligible, low, medium and high based on the following factors • the scale and nature of the works, which determines the risk of dust arising (i.e. the magnitude of potential dust emissions) classed as small, medium or large; and • the sensitivity of the area to dust effects, considered separately for ecological and human receptors (i.e. the potential for effects) defined as low, medium or high.
3	Site Specific Mitigation	Determine the site-specific measures to be adopted at the site based on the risk categories determined in Step 2 for the four activities. For the cases where the risk is 'negligible' no mitigation measures beyond those required by legislation are required. Where a local authority has issued guidance on measures to be adopted these should be considered.
4	Determine Significant Effects	Following Steps 2 and 3, the significance of the potential dust effects should be determined, using professional judgement, considering the factors that define the sensitivity of the surrounding area and the overall pattern of potential risks.

Construction Vehicle Exhaust Emissions

10.16. The IAQM guidance on assessing construction impacts states that:

"*Experience of assessing the exhaust emissions from on-site plant and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed*".

10.17. The IAQM guidance states that a detailed air quality assessment should be undertaken where there is a change in Heavy Duty Vehicles (HDV) greater than an annual average daily trip of 25. The Works would result in 57 HDVs during the peak construction period and as such detailed dispersion modelling using ADMS-Roads of the peak construction phase has been undertaken (for the year 2022) to determine the impact of exhaust emissions from construction traffic.

10.18. As discussed later in this report, the Chalkers Corner Junction amendments results in an improvement to individual receptors along Lower Richmond Road as the road is realigned away from these properties and congestion reduces. As a worst-case assessment for properties on Lower Richmond Road, the Chalkers Corner Junction amendments are not considered in this scenario and construction vehicles are expected to use the existing junction layout.

Construction Plant Emissions

10.19. In accordance with the London Plan[7] all plant used during the Works would need to adhere to the emissions standards for NO_2 and PM_{10} set out for Non-Road Mobile Machinery (NRMM). As such it is considered that a quantitative assessment of plant exhaust emissions is not required.

Completed Development

ADMS Models

10.20. The likely effects on local air quality from traffic movements and heating plant emissions generated from the completed and operational Development have been assessed using the atmospheric dispersion model ADMS-Roads and ADMS 5 respectively. **Appendix 10.1** presents the details of the dispersion modelling.

10.21. For the purposes of modelling, traffic data for the relevant local road network, has been provided by PBA. Further details are provided in **Appendix 10.1**. The baseline year of 2016 has been assessed together with the 'without Development' and 'with Development' scenarios for the year 2027, the anticipated first year of operation of the Development (as the Development is anticipated to be completed in December 2026).

10.22. The ADMS-Roads dispersion model predicts how emissions from roads combine with local background pollution levels, taking account of meteorological conditions, to affect local air quality. The model has been run for the completion year, using background data and vehicle emission rates for 2027 as inputs. For the verification assessment (referred to later in this Chapter), background data and vehicle emission rates for 2016 have been used, which would be higher than the 2027 data. Pollutant concentrations have been modelled at a number of locations representative of nearby sensitive receptors.

10.23. Data relating to the proposed heating plant for the Development has been provided by the Applicant's Building Services Engineers (Hoare Lea). As outlined in **Chapter 5: The Proposed Development**, the proposed heating and energy strategy includes two energy centres to serve the eastern and western parts of Application A within the Development, split by Ship Lane, and a separate energy centre would be provided for the school, in Application B (collectively referred to as the 'Energy Centres'). The Energy Centres include a mix of gas-fired Combined Heat and Power (CHP) plants and boilers. The stack parameters provided by Hoare Lea do not represent the final parameters for each plant to be used once the Development is complete and operational but are indicative based on similar plant. As such, with the granting of any planning permission, it is considered that a suitably wording planning condition requesting an air quality assessment of the final plant would be provided by LBRuT.

10.24. Full details of the dispersion modelling study, including the road traffic, and heating plant data used in the assessment, are presented within **Appendix 10.1**.

Nitrogen Dioxide (NO_2) Sensitivity Analysis

10.25. Analyses of historical monitoring data by Defra[8] have identified a disparity between actual measured NO_x and NO_2 concentrations and the expected decline associated with emission forecasts which form the basis of air quality modelling as described above. This disparity is related to the on-road performance of certain vehicles compared to calculations based on Euro emission standards which inform emission forecasts.

10.26. A note on Projecting NO_2 Concentrations[9] published by Defra provides a number of alternative approaches that can be followed in air quality assessments, in relation to the modelling of future NO_2 concentrations, considering that future NO_x / NO_2 road-traffic emissions and background

concentrations may not reduce as previously expected. This includes the use of revised background pollution maps, alternative projection factors and revised vehicle emission factors. However, the Defra note does not form part of statutory guidance and no prescriptive method is recommended for use in an air quality assessment.

10.27. This air quality assessment has been based on current guidance, i.e. using existing forecast emission rates and background concentrations to the completion year of 2027, which assumes a progressive reduction compared to the baseline year 2016. However, in addition, a sensitivity analysis has been undertaken on the basis of no future NO_x and NO_2 reductions by 2027 (i.e. considering the likely significant effect of the Development against the baseline 2016 conditions, assuming no reduction in background concentrations or road-traffic emissions rates between 2016 and 2027). The sensitivity approach presented in this air quality assessment has been agreed with the EHO at LBRuT, and provides a clear method to account for the uncertainty in future NO_X and NO_2 concentrations in air quality assessments. The results of this sensitivity analysis, which represent a more conservative assessment scenario, are presented in this Chapter and in **Appendix 10.3**.

10.28. For conservatism, the assessment of construction vehicle exhaust emissions considers NO_x and NO_2 emissions and background concentrations for the year 2016 rather than the year of peak construction works (as 2022).

Background Pollutant Concentrations

10.29. To estimate the total concentrations due to the contribution of any other nearby sources of pollution, background pollutant concentrations need to be added to the modelled concentrations. During consultation, the EHO at LBRuT requested that urban background concentrations from the Wetlands Centre, Barnes are used in this air quality assessment. Full details of the background pollution data used within the air quality assessment are included in **Appendix 10.1**.

Model Verification

10.30. Model verification is the process of comparing monitored and modelled pollutant concentrations and, if necessary, adjusting the modelled results to reflect actual measured concentrations, to improve the accuracy of the modelling results. The model has been verified by comparing the predicted annual mean NO_2 concentrations for the baseline 2016 (the latest year for which LBRuT air quality monitoring data is available), with the monitored annual mean NO_2 concentrations from LBRuT's diffusion tubes located at:

- Site 21 (Lower Richmond Road);
- Site 51 (Sheen Lane); and
- Site 52 (Clifford Avenue).

10.31. These locations are the nearest LBRuT monitors to the Site, and have been identified by the EHO at LBRuT for use in the model verification. It is noted that whilst Site 36 (Upper Richmond Road West (URRW) Sheen Lane); Diffusion Tube 49: URRW War Memorial (Sheen Lane); 50 (URRW, near Clifford Avenue) are located close to the Site, they have not been used as they are located outside of the road domain used in the ADMS-Roads dispersion model. The use of the above

diffusion tubes was agreed with the EHO at LBRuT. The approach to the verification and adjustment process is described in detail in **Appendix 10.1**.

Chalkers Corner Junction

10.32. Highway works are proposed at Chalkers Corner to include amendments and reconfiguration to the junction to alleviate the transport and traffic implications associated with the operation of the Development within the Stag Brewery component of the Site. The reconfiguration of the Chalkers Corner junction includes:

- the provision of a short additional left turn lane (flare) from Lower Richmond Road into the junction (26 m long or about 5 car lengths);
- provision of an extended queuing reservoir between the main junction of Lower Richmond Road (this would accommodate about 9 extra cars south westbound) and would also provide extra storage for north east bound vehicles including those waiting to turn right into Lower Richmond Road); and
- provision of a wider pedestrian island within the Lower Richmond Road arm to 4 m wide to sufficiently cater for cyclists crossing as well as pedestrians.

10.33. In addition, an extended, dedicated lane for traffic turning left from Clifford Avenue into Lower Richmond Road would also be provided.

10.34. As discussed in **Chapter 5: The Proposed Development**, the Chalkers Corner Junction forms part of the Development and as such the amendments have been considered within the 'with Development' scenario of this air quality assessment. However, during consultation LBRuT requested additional information on the potential air quality impacts associated with the junction amendments in isolation. As such **Appendix 10.4** considers the following scenarios:

- **Scenario 1**: 2027 Baseline compared against 2027 'with Development but without highway works to Chalkers Corner Junction';
- **Scenario 2**: 2027 'with Development but without highway works to Chalkers Corner Junction' compared against 2027 'with Development and with highway works to Chalkers Corner Junction'; and
- **Scenario 3**: 2027 Baseline compared against 2027 'with Development and with highway works to Chalkers Corner Junction'.

10.35. Whilst the above scenarios have been considered to inform the design and to understand the impacts of the junction highway works in isolation, only Scenario 3 constitutes the assessment of the whole Development which this ES is based on and which is reported in this ES Chapter. Further details on the potential air quality impacts associated with the junction amendments in isolation / other scenarios can be found in **Appendix 10.4**.

UK Air Quality Strategy Objectives and Limit Values

10.36. Air pollutants at high concentrations can give rise to adverse effects on the health of humans and ecosystems. European Union (EU) legislation on air quality forms the basis for UK legislation and policy on air quality. The EU Framework Directive[10] on ambient air quality assessment and management came into force in May 2008 and was implemented by Member States, including the

UK, by June 2010. The Directive aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants.

10.37. The current UK AQS, which was published in July 2007[11], sets out objectives for local authorities in undertaking their Local Air Quality Management (LAQM) duties. The 2007 AQS introduced a national level policy framework for exposure reduction for fine particulate matter. Objectives in the AQS are in some cases more onerous than the Limit Values set out within the EU Framework Directive and the Air Quality Standards Regulations 2010[12]. In addition, objectives have been established for a wider range of pollutants. Currently it is a local authority's responsibility to determine the effect of a development against the UK AQS objectives, as such the UK AQS objectives of air pollutants relevant to this assessment are summarised in **Table 10.2**.

Table 10.2: Selected Receptor Locations

Pollutant	Objective		Date by Which Objective is to be Met
	Concentration	Measured as	
Nitrogen Dioxide (NO_2)	200µg/m^3	1-hour mean not to be exceeded more than 18 times per year.	31/12/2005.
	40µg/m^3	Annual Mean.	31/12/2005.
Particulate Matter (PM_{10}) (a)	50µg/m^3	24-hour mean not to be exceeded more than 35 times per year.	31/12/2004.
	40µg/m^3	Annual Mean.	31/12/2004.
Particulate Matter ($PM_{2.5}$) (b)	Target of 15% reduction in concentrations at urban background locations.	Annual Mean.	Between 2010 and 2020.
	25µg/m^3	Annual Mean.	01/01/2020.

Notes:
(a) Particulate Matter with a mean aerodynamic diameter of less than 10µm (micrometres or microns).
(b) Particulate Matter with a mean aerodynamic diameter of less than 2.5µm.

10.38. With regard to the EU Limit Values, as set by the Air Quality Standards Regulations, whilst the Development has not been assessed against these (as it is the UK Government's responsibility for their implementation), the Limit Values have been considered along with appropriate mitigation in relation to the Development not delaying compliance.

Potentially Sensitive Receptors

10.39. The approach adopted by the UK AQS is to focus on areas at locations at, and close to, ground level where members of the public (in a non-workplace area) are likely to be exposed over the averaging time of the objective in question (i.e. over 1-hour, 24-hour or annual periods). Objective exceedences principally relate to annual mean NO_2 and PM_{10}, and 24-hour mean PM_{10} concentrations, so that associated potentially sensitive locations relate mainly to residential

properties and other sensitive locations (such as schools) where the public may be exposed for prolonged periods.

10.40. **Table 10.3** presents existing sensitive receptors selected due to their proximity to the road network likely to be affected by the Development. These existing receptors are located closest to road traffic impacts (i.e. at junctions) and / or the users are highly sensitive to air pollution (such as schools and residential users). **Appendix 10.4** considers the air quality impacts of the Development at an additional 140 selected sensitive receptors located at Chalkers Corner Junction and for receptors within the Air Quality Focus Area (AQFA) (discussed in the Baseline Section below). This includes residential receptors located in Chertsey Court at heights above ground level. The two locations identified in **Appendix 10.4** which are predicted by the air quality modelling to have the largest adverse and beneficial impacts have been presented in this Chapter as well for completeness.

10.41. **Table 10.3** also presents future sensitive receptor locations which are representative of sensitive uses (i.e. residential care homes, school) within the Development itself. The future sensitive receptor locations in **Table 10.3** represent the areas of the Development that would likely be exposed to the worst-case air quality conditions, i.e. the lowest residential / school levels of the Development that would be closest to road and the residential locations closest to the Energy Centre emissions. All other onsite receptors locations, for all other floor level considered, are presented in **Appendix 10.3**.

10.42. To take account of the predicted emissions from the Energy Centres in the local area a 1 km by 1 km grid has been modelled centred on the Development.

10.43. The location of the selected existing and future receptors assessed are presented in **Figure 10.1**.

Table 10.3: Selected Receptor Locations

ID (Refer to Figure 10.1)	Receptor Location	Receptor Type	OS Grid Reference		Height Above Ground (m)
1	1 Varsity Flow	Residential	520212	176221	0
2	6 Watney Cottages	Residential	520078	175845	0
3	1 Watney Cottages	Residential	520122	175846	0
4	1-3 Parliament Mews	Residential	520296	176185	0
5	Ship Lane	Residential	520390	176117	0
6	Lower Richmond Road	Residential	520365	175939	0
7	Lower Richmond Road	Residential	520359	175914	0
8	Lower Richmond Road	Residential	520238	175832	0
9	13 Sheen Lane	Residential	520503	175882	0
10	40 Mortlake High Street	Residential	520582	175939	0
11	Boat Race Court	Residential	520734	175984	0
12	Little Paradise Nursery	Child Care	520300	175870	0

ID (Refer to Figure 10.1)	Receptor Location	Receptor Type	OS Grid Reference		Height Above Ground (m)
13	Thomas House Primary School	School	520510	175816	0
14	Richmond Training and Development Centre	Child Care	520123	175809	0
15	St Mary Magdalen's Catholic Primary School	School	520831	175901	0
16	Proposed Residential Building 10 – Ground Floor Level*		520575	175965	0
17	Proposed School – Ground Floor Level[a]		520271	175998	0
18	Proposed Residential Building 3 – Floor Level 5[b]		520410	176079	15
19	Proposed School Building – Floor Level 2[b]		520271	175998	6
20	Chalkers Corner Junction - Receptor 57 (Chertsey Court)[c]		519919	175872	0
21	Chalkers Corner Junction -Receptor 22[d] (139 Lower Richmond Road)		519871	175843	0

Note: Ground floor assumed to be 0 m to represent worst-case assessment of exposure as it is the closest location of the receptor to the tailpipe vehicle emissions.
[a] Maximum impact within the Development at ground floor.
[b] Maximum impact within the Development above ground level because of emissions from the Energy Centre.
[c] Receptor identified as having the largest adverse impact in NO_2 concentrations as presented in **Appendix 10.4**.
[d] Receptor identified as having the largest beneficial impact in NO_2 concentrations as presented in **Appendix 10.4**
At the proposed buildings, each façade has been modelled and the maximum predicted concentration reported.
See **Appendix 10.4** with regards to impacts at the Chalkers Corner Junction.

Significance Criteria

The Works

Dust Emissions

10.44. The significance of likely effects of the Works on air quality have been assessed based on professional judgement and with reference to the criteria set out in the IAQM guidance. Appropriate Site-specific mitigation measures that would need to be implemented to minimise any adverse effect have also been considered. Details of the assessor's experience and competence to undertake the dust assessment is provided in **Appendix 10.1**.

10.45. The assessment of the risk of dust effects arising from each of the construction activities as part of the Works, as identified by the IAQM guidance, is based on the magnitude of potential dust emission and the sensitivity of the area. The risk category matrix for each of the construction activity types, taken from the IAQM guidance, are presented in **Table 10.4** to **Table 10.7**. Examples of the magnitude of potential dust emissions for each construction activity and factors defining the sensitivity of an area are provided in **Appendix 10.1**.

Table 10.4: Risk Category from Demolition Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 10.5: Risk Category from Earthworks Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 10.6: Risk Category from Construction Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 10.7: Risk Category from Trackout Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

10.46. The risk category determined for each of the likely construction activity types was used to define the appropriate, Site-specific, mitigation measures that should be applied. The IAQM's construction dust guidance recommends that significance is only assigned to the impact after considering mitigation and assumes that all actions to avoid or reduce the impacts are inherent within the design of the Development. Construction mitigation (secured through planning conditions, legal requirements or required by regulations), would ensure that likely significant adverse residual effects will not occur. However, to maintain consistency with the structure of the Environmental Statement (ES), as outlined in **Chapter 2: EIA Approach and Methodology**, pre-mitigation significance criteria based on professional judgement was applied (see **Table 10.8**).

Table 10.8: Pre-Mitigation Significance Criteria for Demolition and Construction Assessment

Significance Criteria	Definition
Adverse effect of major significance.	Receptor is less than 10 m from a major active construction or demolition site.
Adverse effect of moderate significance.	Receptor is 10 m to 100 m from a major active construction or demolition site, or up to 10 m from a minor active construction or demolition site.
Adverse effect of minor significance.	Receptor is between 100 m and 200 m from a major active construction or demolition site or 10 m to 100 m from a minor active construction site or demolition site.
Insignificant.	Receptor is over 100 m from any minor active construction or demolition site or over 200 m from any major active construction or demolition site.

10.47. IAQM outlines that experience of implementing mitigation measures for construction activities demonstrates that total mitigation is normally possible such that likely residual impacts would not be 'significant'.

Construction Vehicle Exhaust Emissions

10.48. The methodology for determining the magnitude and significance of effects associated with vehicle emissions from the peak construction period is the same as the methodology detailed below for the Completed Development.

Construction Plant Emissions

10.49. Given all construction plant used during the Works would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM professional judgment has been used to determine the significance of effects.

Completed Development

10.50. The aforementioned EPUK / IAQM Guidance provides an approach to assigning the magnitude of change as a result of a development as a proportion of a relevant assessment level, followed by examining this change in the context of the new total concentration and its relationship with the assessment criterion to provide a description of the impact at selected receptor locations.

10.51. **Table 10.9** presents the IAQM framework for describing the impacts (the change in concentration of an air pollutant) at individual receptors. The term Air Quality Assessment Level (AQAL) is used to include air quality objectives or limit values, where these exist.

Table 10.9: Impact Descriptors for Individual Receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Note: AQAL may be an air quality objective, EU limit value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers. Changes of 0% (i.e. less than 0.5%) are described as Negligible.
The table is only to be used with annual mean concentrations.

10.52. The approach set out in the EPUK / IAQM Guidance provides a method for describing the impact magnitude at individual receptors only. The Guidance outlines that this change may have an effect on the receptor depending on the severity if the impact and other factors that may need to be taken into account. The assessment framework for describing impacts can be used as a starting point to make a judgement on significance of effect. However, whilst there may be 'slight', 'moderate' or 'substantial' impacts described at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

10.53. Following the approach to assessing significance outlined in the EPUK / IAQM Guidance, the significance of likely residual effects of the completed Development on air quality has been established through professional judgement and the consideration of the following factors:

- the geographical extent (local, district or regional) of effects;
- their duration (temporary or long term);
- their reversibility (reversible or permanent);
- the magnitude of changes in pollution concentrations;
- the exceedance of standards (e.g. AQS objectives); and
- changes in pollutant exposure.

Baseline Conditions

London Borough of Richmond upon Thames Review and Assessment Process

10.54. In accordance with the UK Air Quality Strategy[13] and Part IV of the 'Environment Act[14], LBRuT has and will continue to review the ambient air quality within its administrative boundary. In 2000 LBRuT concluded that the Borough-wide levels of nitrogen dioxide (NO_2) and fine particulate matter (PM_{10}) are not expected to meet the Air Quality Strategy Objectives. As such, LBRuT have declared the entire Borough an AQMA attributed to localised vehicle emissions.

10.55. The LBRuT 2015 Updating and Screening Assessment[15] states that the results for NO_2 continue to exceed one or more of the Government's air quality objectives within the Borough, therefore it

is necessary to continue to maintain the AQMA. The LBRuT Air Quality Annual Status Reports completed in 2016[16] and 2017[17] show annual mean NO_2 concentrations have remained similar to previous results and findings, and the AQMA should remain.

10.56. In addition to the above declaration of the Borough wide AQMA, the Site is situated adjacent to the GLA Air Quality Focus Area (AQFA). An AQFA is an area identified by a London Borough that is exceeding the annual mean Limit Value for NO_2 coupled with high human exposure. There are four AQFA in LBRuT, which includes the Chalkers Corner AQFA.

London Borough of Richmond upon Thames Air Quality Action Plan

10.57. The currently adopted LBRuT Air Quality Action Plan[18] sets out 33 measures to improve air quality in the Borough through London wide and regional measures; borough wide measures; and local measures. The following measures are relevant to the Development:

- Measure 8 - Continue to pursue land use policies within the saved UDP and Local Development Framework to encourage travel choice with the aim of reducing emissions and to ensure that major new developments are accessible to public transport. The LDF will take such policies forward;
- Measure 8 - Promote Travel Plans to businesses;
- Measure 11 - Promote Travel Plans for schools;
- Measure 14 - To ensure new buildings are energy efficient;
- Measure 16 - To continue to press for and promote travel choice through improvements for pedestrians, cyclists and to public transport in terms of increased capacity, reliability, accessibility and quality;
- Measure 19 - Encourage the use of alternative fuel vehicles in the Borough;
- Measure 22 - Cooperate on implementation of traffic management policies to reduce traffic at the pollution 'hot spots' and improve air quality;
- Measure 23 - Consider use of parking concessions to encourage the use of alternatively fuelled and more fuel-efficient vehicles;
- Measure 29 - Refuse planning consent for activities, which are likely to lead to a significant worsening of air pollution in 'hot spot' areas; and
- Measure 30 - Where practical, undertake changes at congestion hotspots to seek to avoid tailbacks of queuing vehicles.

London Borough of Richmond upon Thames Air Quality Action Plan, 2017-2022 – Consultation Document

10.58. LBRuT has produced an updated Air Quality Action Plan[19] which sets out the actions that LBRuT will deliver for the period 2017-2022 to reduce concentrations of, and exposure to, ambient pollution. Whilst consultation of the report completed in October 2017, and therefore the updated Action Plan is not yet adopted, the draft measures relevant to the Development include:

- Draft Action 2: Adoption of AQ Supplementary Planning Guidance to ensure emissions from new development is minimised and effective mitigation is integrated in scheme design;

- Draft Action 3: Enforcement of Non-Road Mobile Machinery air quality policies;
- Draft Action 4: Low Emission Construction Partnership;
- Draft Action 6: Enforcing CHP and biomass air quality policies;
- Draft Action 7: Enforcing Air Quality Neutral policies;
- Draft Action 20: Detailed assessment of traffic management solutions for GLA Focus Areas and AQ 'hotspots'; and
- Draft Action 33: Provision of infrastructure to support walking and cycling across the borough.

Local Monitoring

10.59. LBRuT currently undertakes monitoring of NO_2 and PM_{10} at four automatic monitoring locations and NO_2 at 62 locations using diffusion tubes within the Borough.

10.60. The only static roadside automatic monitor within the Borough is located at Castelnau Library, Barnes, approximately 2.4km to the northeast of the Site (OS Grid Reference 522845, 177904). The most recent (2012 to 2015) NO_2 monitored concentrations at this roadside monitor are presented in **Table 10.10**.

Table 10.10: Annual Mean Monitored Concentrations at the LBRuT Castelnau, Library Road Automatic Monitor (µg/m^3)

Pollutant	Averaging Period	AQS Objective	2012	2013	2014	2015	2016
NO_2	Annual Mean (µg/m^3)	40µg/m^3	37	39	37	34	36
	1-Hour Mean (No. of Hours)	200µg/m^3 not to be exceeded more than 18 times a year	0	2	0	0	0
PM_{10}	Annual Mean (µg/m^3)	40µg/m^3	21	22	20	22	20
	24-Hour Mean (No. of Days)	50µg/m^3 not to be exceeded more than 35 times a year	14	10	4	5	7

Notes: Data obtained from 2015 Updating and Screening Assessment for the London Borough of Richmond upon Thames and from LBRuT 2017 Air Quality Annual Status Report
Exceedances of the AQS Objectives shown in **bold** text.

10.61. The monitoring results in **Table 10.10** indicate that the annual mean NO_2 and PM_{10} objectives were met in all years.

10.62. NO_2 is was also measured at 62 locations using diffusion tubes. The results for the 10 NO_2 diffusion tube roadside and kerbside locations within 1 km of the centre of the Site are presented in **Table 10.11**.

Table 10.11: Measured Concentrations at the LBRuT Diffusion Tubes Within 1 km of the Site

Site ID	Location	Distance to Site	Classification	2015	2016
51	Sheen Lane (railway crossing), Sheen	0.3 km	Kerbside	28	32
21	Lower Richmond Road, Mortlake (Nr. Kingsway)	0.4 km	Roadside	37	39
55	Mortlake Rd (adj. to cemetery gates), Kew	0.6 km	Kerbside	**55**	**50**
58	London Road, Twickenham	0.6 km	Kerbside	**46**	**50**
36	Upper Richmond Road West (URRW), Sheen Lane	0.6 km	Kerbside	**49**	**50**
49	URRW War Memorial, Sheen Lane, Sheen	0.6 km	Kerbside	39	44
52	Clifford Avenue, Chalkers Corner	0.7 km	Kerbside	**55**	**57**
50	URRW (Nr. Clifford Avenue, Sheen)	0.8 km	Kerbside	**57**	**55**
54	Mortlake Rd (adj. to West Hill Rd) Kew	0.9 km	Kerbside	**51**	**51**
25	URRW (Nr. Sheen School)	0.9 km	Roadside	**45**	**56**

Notes: Data obtained from directly from LBRuT
Exceedances of the AQS Objectives shown in **bold** text.

10.63. The monitoring results in **Table 10.09** indicate that in 2015 and 2016 the annual mean NO_2 objective of 40µg/m^3 was exceeded at seven of the 10 diffusion tube monitoring locations closest to the Site.

Likely Significant Effects

The Works

Nuisance Dust

10.64. Construction activities in relation to the Development have the potential to affect local air quality through Demolition, Earthworks, Construction and Trackout activities. A description of these activities is presented earlier in this Chapter.

10.65. The surrounding area is mixed-use, including residential and commercial uses. Additionally, the River Thames bounds the north east of the Stag Brewery component of the Site and Mortlake Green is located on the other side of Lower Richmond Road to the south of the Stag Brewery component of the Site. The nearest residential properties to the Site are located on Mortlake High Street, located approximately 10 m to the east of the Site. In addition, St. Mary Magdalen's Catholic Primary School is located approximately 180 m to the south east of the Site.

10.66. In addition to the above, the River Thames and Tidal Tributaries SINC is located adjacent to the north east boundary of the Stag Brewery component of the Site and has the potential to be impacted by dust deposition.

10.67. Should the Development be granted permission, it is likely that there would be air quality sensitive uses associated with occupiers of the early phases whilst other later phases are constructed. As such there is likely to be future receptors in proximity to the Works.

10.68. As there are existing and proposed receptors within 350 m of the boundary of the Site and within 50 m of the routes that would be used by construction vehicles on the public highway, it is therefore considered that a detailed assessment is required to determine the likely dust impacts, as recommended by the IAQM guidance on construction dust. Results of this assessment are provided for each main activity (Demolition, Earthworks, Construction and Trackout) below.

10.69. In addition, given the distance to the River Thames and Tidal Tributaries SINC the detailed qualitative assessment considers potential ecological impacts.

10.70. The qualitative assessment considers the sensitivity of the area to each main set out in Tables A1.2 to A1.5 in **Appendix 10.1**.

Demolition

10.71. As described in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, Site-wide demolition would be undertaken apart from a small number of key buildings to be retained. Given the details in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, it was estimated that the total volume of buildings to be demolished could be over 100,000m^3. Based on this, and considering the criteria in Table A1.1 in **Appendix 10.1**, the potential dust emissions during demolition would be of a **large** magnitude.

Earthworks

10.72. As previously noted, the area of the Site is approximately 8.6 hectares (ha), or 86,000m^2. Based on this, and considering the criteria in Table A1.1 in **Appendix 10.1**, the potential dust emissions during earthworks activities would be of **large** magnitude.

Construction

10.73. In the absence of the total volume of buildings to be constructed, it was estimated that the total volume of buildings to be constructed is over 100,000m^3. Based on this, and considering the criteria in Table A1.1 in **Appendix 10.1**, the potential dust emissions during construction activities would be of **large** magnitude.

Trackout

10.74. As detailed in **Chapter 8: Transport and Access**, the number of Heavy Duty Vehicles (HDVs) associated with the Development during the peak construction works is predicted to be 57 trips. Based on this, and considering the criteria in Table A1.1 in **Appendix 10.1**, the potential for dust emissions due to trackout activities would be of **large** magnitude.

10.75. The dust risk categories, based on the potential magnitude of dust emissions and the sensitivity of the area to dust, are presented in **Table 10.12**.

Table 10.12: Summary of Risk from the Works

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

10.76. As outlined in **Table 10.12**, the Site is considered to be a **medium** to **high risk site** with regard to the Works. In line with the assessment methodology described earlier in this Chapter, no significance criteria is prescribed to pre-mitigation effects. However, such effects would likely be **temporary**, **short to medium term**, **local** and of **adverse significance**. Consequently, mitigation would be required to ensure that adverse effects be minimised, reduced and, where possible, eliminated.

Construction Vehicle Exhaust Emissions

10.77. Likely effects on local air quality associated with construction of the Development would result from changes to traffic flows on the local road network. To present a worst-case assessment of construction, vehicle emission rates and background concentrations for 2016 have been used. The results of the ADMS-Roads modelling of construction traffic at existing sensitive receptors are presented in **Table 10.13**.

Table 10.13: Results of the ADMS-Roads Construction Traffic Modelling at Sensitive Receptors

	NO_2 Annual Mean ($\mu g/m^3$)			PM_{10} Annual Mean ($\mu g/m^3$)			PM_{10} Number of Days >50$\mu g/m^3$			$PM_{2.5}$ Annual Mean ($\mu g/m^3$)		
Receptor ID	Without Construction	With Construction	Change	Without Construction	With Construction	Change	Without Construction	With Construction	Change	Without Construction	With Construction	Change
1	30.4	30.5	0.1	20.8	20.8	0.0	4	4	0	10.8	10.8	0.0
2	37.0	37.4	0.4	21.1	21.1	0.0	4	4	0	12.6	12.6	0.0
3	32.6	32.8	0.2	20.9	20.9	0.0	4	4	0	12.5	12.5	0.0
4	27.1	27.1	0.0	20.3	20.3	0.0	3	3	0	10.5	10.5	0.0
5	26.7	26.7	0.0	20.2	20.2	0.0	3	3	0	12.0	12.0	0.0
6	34.0	34.0	0.0	21.3	21.3	0.0	5	5	0	12.7	12.7	0.0
7	34.0	34.0	0.0	21.3	21.3	0.0	5	5	0	12.7	12.7	0.0
8	33.7	33.9	0.2	21.2	21.2	0.0	5	5	0	12.6	12.7	0.1
9	32.1	32.1	0.0	20.8	20.8	0.0	4	4	0	12.4	12.4	0.0

Receptor ID	NO_2 Annual Mean (µg/m³)			PM_{10} Annual Mean (µg/m³)			PM_{10} Number of Days >50µg/m³			$PM_{2.5}$ Annual Mean (µg/m³)		
	Without Construction	With Construction	Change	Without Construction	With Construction	Change	Without Construction	With Construction	Change	Without Construction	With Construction	Change
10	35.9	35.9	0.0	21.5	21.5	0.0	5	5	0	12.8	12.8	0.0
11	33.3	33.3	0.0	21.1	21.1	0.0	4	4	0	12.6	12.6	0.0
12	34.2	34.2	0.0	21.4	21.4	0.0	5	5	0	12.7	12.7	0.0
13	30.4	30.4	0.0	20.6	20.6	0.0	4	4	0	12.3	12.3	0.0
14	31.9	32.1	0.2	20.8	20.8	0.0	4	4	0	12.4	12.4	0.0
15	26.9	26.9	0.0	20.3	20.3	0.0	3	3	0	12.1	12.1	0.0
20*	41.6	42.3	0.7	21.2	21.3	0.1	5	5	0	12.1	12.1	0.0
21*	48.3	49.1	0.8	21.7	21.8	0.1	5	5	0	12.4	12.5	0.1

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS-Road and ADMS model rather than the rounded numbers within Table 10.11. This explains where there may be a slight difference in the calculated change in concentrations from the 'without' and 'with' Development scenarios.
* Results presented for the Receptor with the greatest adverse and beneficial impact of NO_2 during the operational phase, as presented in Appendix 10.4.

10.78. As shown in **Table 10.13**, apart from Receptors 20 and 21 located on Chalkers Corner, for the peak construction period (in 2022) with the Development construction vehicles on the local road network, concentrations are predicted to meet the respective AQS objectives for all pollutants assessed. For the receptors located on Chalkers Corner the annual mean NO_2 AQS Objective of 40µg/m³ is exceeded without the Development construction vehicles.

10.79. Using the impact descriptors outlined in **Table 10.9**, the Development is predicted to result in a 'negligible' impact at all receptors apart from at the Chalkers Corner where a 'moderate adverse' impact is predicted at Receptor 20 and a 'substantial adverse' impact is predicted at Receptor 21. These impacts are predicted mainly due to the existing poor air quality in this area as a result of the poor performance of the junction and congestion.

10.80. As discussed in **Appendix 10.1**, the 1-hour mean AQS objective for NO_2 is unlikely to be exceeded at a roadside location where the annual mean NO_2 concentration is less than 60µg/m³. Given the maximum predicted annual mean NO_2 concentration is 49.1µg/m³ it is considered that with the Development construction vehicles on the local road network there would be a 'negligible' impact on hourly NO_2 concentrations.

10.81. Using the impact descriptors outlined in **Table 10.9** with the Development construction vehicles on the local road network for PM_{10} and $PM_{2.5}$ the predicted impact is 'negligible' at all existing receptors.

10.82. The predicted impacts above are worst-case, as the assessment has used the peak construction trips operating throughout an entire year (which would not occur in reality) and does not consider any improvements in NO_x and NO_2. Nonetheless, using professional judgement, based on the severity of the impact and the concentrations predicted at the sensitive receptors, it is considered that the effect of construction vehicles associated with the Development would be **significant** at Chalkers Corner for annual mean NO_2 of a moderate to substantial effect (based on the predicted impacts at the two receptor locations) but **insignificant** at all other receptors and for all other pollutants assessed.

Construction Plant Emissions

10.83. All construction plant would meet the Emissions Standard set out in the London Plan. As such it is considered the impact from construction plant emissions would be **insignificant**.

10.84. To ensure compliance, as per the guidance in the London Plan, all construction plant would be registered and the emission ratings recorded.

Completed Development

Changes in Local Air Quality from Traffic and Heating Plant

10.85. Likely impacts on local air quality when the Development is completed and operational in 2027 would result from changes to traffic flows on the local road network and emissions from the Energy Centre associated with the Development. The results of the ADMS-Roads modelling of operational traffic (based on current guidance, i.e. with reduced emission rates and background concentration to the completion year of 2027) combined with the ADMS modelling of the emissions from the Energy Centre are presented in **Table 10.14**. Full details are provided within **Appendix 10.1**.

Table 10.14: Results of the Traffic and the Energy Centre Modelling at Select Sensitive Receptors

	NO_2 Annual Mean ($\mu g/m^3$)				PM_{10} Annual Mean ($\mu g/m^3$)				PM_{10} Number of Days >50$\mu g/m^3$				$PM_{2.5}$ Annual Mean ($\mu g/m^3$)			
Receptor ID	2016 Baseline	2027 Without Development	2027 With Development	2027 Change	2016 Baseline	2027 Without Development	2027 With Development	2027 Change	2016 Baseline	2027 Without Development	2027 With Development	2027 Change	2016 Baseline	2027 Without Development	2027 With Development	2027 Change
1	30.1	25.6	25.9	0.3	20.8	19.1	19.1	0.0	4	2	2	0	10.3	9.9	9.9	0.0
2	36.4	28.2	28.5	0.4	21.0	19.2	19.3	01	4	2	2	0	11.9	11.4	11.4	0.0
3	32.2	26.5	26.8	0.3	20.8	19.1	19.1	0.0	4	2	2	0	11.9	11.3	11.4	0.1
4	27.0	24.5	24.7	0.2	20.3	18.5	18.6	0.1	3	1	1	0	10.3	9.6	9.7	0.1
5	26.6	24.3	24.7	0.3	20.2	18.5	18.6	0.1	3	1	1	0	11.9	11.0	11.0	0.0

Receptor ID	NO_2 Annual Mean ($\mu g/m^3$)				PM_{10} Annual Mean ($\mu g/m^3$)				PM_{10} Number of Days >50$\mu g/m^3$				$PM_{2.5}$ Annual Mean ($\mu g/m^3$)			
	2016 Baseline	2027 Without Development	2027 With Development	2027 Change	2016 Baseline	2027 Without Development	2027 With Development	2027 Change	2016 Baseline	2027 Without Development	2027 With Development	2027 Change	2016 Baseline	2027 Without Development	2027 With Development	2027 Change
6	33.5	26.8	27.2	0.4	21.2	19.5	19.6	0.1	5	2	2	0	11.9	11.5	11.6	0.1
7	33.5	26.9	27.2	0.4	21.3	19.5	19.6	0.1	5	2	2	0	11.9	11.6	11.6	0.0
8	33.2	26.9	27.2	0.3	21.2	19.4	19.5	0.1	4	2	2	0	11.9	11.5	11.5	0.0
9	31.7	26.4	26.7	0.3	20.8	19.0	19.0	0.0	4	2	2	0	11.9	11.3	11.3	0.0
10	35.3	27.4	27.7	0.3	21.4	19.6	19.7	0.1	5	2	3	0	11.9	11.6	11.7	0.1
11	32.8	26.5	26.8	0.3	21.1	19.3	19.3	0.0	4	2	2	0	11.9	11.4	11.5	0.1
12	33.7	27.0	27.3	0.3	21.3	19.5	19.6	0.1	5	2	2	0	11.9	11.6	11.6	0.0
13	30.1	26.0	26.3	0.3	20.5	18.8	18.8	0.0	4	2	2	0	11.9	11.2	11.2	0.0
14	31.5	26.3	26.6	0.3	20.8	19.0	19.0	0.0	4	2	2	0	11.9	11.3	11.3	0.0
15	26.8	24.4	24.5	0.2	20.2	18.5	18.5	0.0	3	1	1	0	11.9	11.0	11.0	0.0
16			27.8				19.4				2				11.5	
17			24.9				18.6				1				9.7	
18			25.7				18.8				2				11.1	
19			24.8				18.6				1				9.6	
20*	40.1	31.5	31.7	0.2	21.1	20.9	21.0	0.1	4	4	4	0	12.0	10.8	10.8	0.0
21*	46.3	35.1	35.5	0.4	21.5	21.3	21.4	0.1	5	5	5	0	12.3	11.1	11.1	0.0

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS-Road and ADMS model rather than the rounded numbers within Table 10.14. This explains where there may a slight difference in the calculated change in concentrations from the 'without' and 'with' Development scenarios.
* Results presented for the Receptor with the greatest adverse and beneficial impact of NO_2, as presented in Appendix 10.4.

Nitrogen Dioxide (NO_2)

10.86. The results in **Table 10.14** indicate that for 2016 the annual mean NO_2 objective is met all existing receptor locations, apart from the Receptors 20 and 21 located at Chalkers Corner. The predicted concentrations at Receptors 20 and 21 are consistent with the designation of the AQFA. The predicted concentration at all other modelled receptors are in line with the existing LBRuT diffusion tube monitoring results for the two closest diffusion tubes (within 500 m) to the Site as presented in **Table 10.10**.

10.87. The highest concentration is predicted at Receptor 21 (46.3$\mu g/m^3$). As discussed in **Appendix 10.1**, the 1-hour mean AQS objective for NO_2 is unlikely to be exceeded at a roadside location where the annual mean NO_2 concentration is less than 60$\mu g/m^3$. As shown in **Table 10.14**, the

predicted annual mean NO_2 concentrations in 2016 are below 60µg/m^3 at all receptor locations. Accordingly, the 1-hour mean objective is likely to be met at these locations.

10.88. In 2027, both 'without' and 'with' the Development, concentrations are predicted to meet the NO_2 annual mean objective value at all receptor locations assessed. Therefore, the 1-hour mean objective is also predicted to be met at all existing receptor locations.

10.89. Using the impact descriptors outlined in **Table 10.9**, the Development is predicted to result in an 'negligible' impact at all existing receptors assessed. It is also considered that the Development would have an 'negligible' impact on hourly NO_2 concentrations.

Particulate Matter (PM_{10} and $PM_{2.5}$)

10.90. As shown in **Table 10.14**, the annual mean concentrations of PM_{10} are predicted to be well below the objective of 40µg/m^3 in 2016 and in 2027 both 'without' and 'with' the Development at all the existing receptor locations considered. These 2016 predicted annual mean PM_{10} concentrations are consistent / in line with the existing LBRuT automatic monitor results. The maximum predicted annual mean PM_{10} concentration is 21.5µg/m^3 at Receptor 21 in 2016. Using the impact descriptors outlined in **Table 10.9**, the Development is predicted to result in an 'negligible' impact at all existing receptors assessed.

10.91. The results in **Table 10.14** indicate that in 2016 and in 2027 for both 'without' and 'with' the Development, all existing receptor locations are predicted to be below the 24-hour mean PM_{10} objective value of 35 days exceeding 50µg/m^3. The maximum predicted concentration in all scenarios tested is 5 days at Receptors 6, 7, 10, 12 and 21 in the 2016 scenario.

10.92. The results in **Table 10.14** indicate that in 2016 and in 2027 for both 'without' and 'with' the Development, all existing receptor locations are predicted to be below the annual mean $PM_{2.5}$ objective value of 25µg/m^3.

10.93. Using the impact descriptors outlined in **Table 10.9** the Development is predicted to result in an 'negligible' impact at all existing receptors.

Changes in Local Air Quality at Chalkers Corner

10.94. As discussed in **Chapter 5: The Proposed Development**, the Chalkers Corner Junction forms part of the Development and as such the proposed highway amendments have been considered within the 'with Development' scenario of this air quality assessment and the results for the two receptors with the greatest change have been reported above.

10.95. **Appendix 10.4** presents the results of the potential air quality effect of the Development at the 140 residential properties assessed at the Chalkers Corner Junction, including at height above ground level in Chertsey Court. This is shown as Scenario 3 in **Appendix 10.4 (**see **Tables 1** and **2** of **Appendix 10.4)**.

10.96. In 2027 with the Development (including the highway works), at Chalkers Corner there are two receptors predicted to be above the annual mean NO_2 AQS objective of 40µg/m^3 located at 1 and 2 Lower Richmond Road. These receptors are the closest properties to the centre of the Chalkers Corner Junction. However, the Development (including the highway works) does not result in any new exceedances of the NO_2 AQS objective. Using the impact descriptors outlined in **Table 10.9**,

the impact of the Development at the Chalkers Corner Junction is predicted to result in an 'negligible' impact at all existing receptors assessed.

Overall Predicted Effects of the Development (including the highway works)

10.97. Using professional judgement, based on the severity of the impact discussed above and the concentrations predicted at all the sensitive receptors considered in the air quality assessment (including those selected at Chalkers Corner), it is considered that the effect of the Development on local NO_2, PM_{10} and $PM_{2.5}$ concentrations would be **insignificant**.

Conditions within the Development

10.98. As shown by the results in **Table 10.14** and **Appendix 10.3** for other floor levels, the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations for locations within the Development with relevant exposure are below the relevant objectives in 2027 for all floor levels. As such, it is considered that the effect of introducing future residential and school uses to the Site is **insignificant**.

10.99. **Figure 10.2** presents the predicted dispersion of NO_2 emissions from the Energy Centre across the 1 km by 1 km grid centred on the Development. As noted above, the combined results from the Energy Centre and the predicted road emissions are presented in **Table 10.12**. The maximum contribution from the Energy Centre, as 2.39µg/m^3 of NO_2, is predicted within the Site between Building 17, Building 21 and Building 3.

Nitrogen Dioxide (NO_2) Sensitivity Analysis Results

Changes in Local Air Quality from Traffic and Heating Plant

10.100. The results of the sensitivity analysis in relation to NO_2 (i.e. considering the potential impact of the Development against the current baseline, 2016, conditions) are presented in **Table 10.15**.

Table 10.15: Results of the ADMS-Roads Assessment for 2016 Assuming No Improvement in NOx and NO2

ID	Receptor Location	Without Development	With Development	µg/m^3 Change	Significance
1	1 Varsity Flow	30.6	31.2	0.5	Negligible
2	6 Watney Cottages	37.5	38.2	0.7	Moderate Adverse
3	1 Watney Cottages	33.0	33.6	0.6	Slight Adverse
4	1-3 Parliament Mews	27.2	27.6	0.4	Negligible
5	Ship Lane	26.8	27.2	0.5	Negligible
6	Lower Richmond Road	34.4	35.1	0.8	Slight Adverse
7	Lower Richmond Road	34.4	35.0	0.7	Slight Adverse
8	Lower Richmond Road	34.1	34.7	0.6	Negligible
9	13 Sheen Lane	32.4	33.0	0.6	Negligible

ID	Receptor Location	Without Development	With Development	µg/m³ Change	Significance
10	40 Mortlake High Street	36.3	36.9	0.5	Negligible
11	Boat Race Court	33.6	34.1	0.5	Negligible
12	Little Paradise Nursery	34.6	35.2	0.6	Slight Adverse
13	Thomas House Primary School	30.6	31.1	0.5	Negligible
14	Richmond Training and Development Centre	32.2	32.7	0.5	Negligible
15	St Mary Magdalen's Catholic Primary School	27.0	27.2	0.2	Negligible
16	Proposed Residential Building 10 – Ground Floor Level	-	35.2	-	-
17	Proposed School – Ground Floor Level	-	28.4	-	-
18	Proposed Residential Building 3 – Floor Level 5	-	29.4	-	-
19	Proposed School Building – Floor Level 2	-	28.2	-	-
20	Chalkers Corner Junction - Receptor 57*	41.6	42.6	1.0	Substantial Adverse
21	Chalkers Corner Junction - Receptor 22*	48.3	45.2	-3.1	Substantial Beneficial

Note: For accuracy, the changes arising from the Development have been calculated using the exact output from the ADMS-Road and ADMS model rather than the rounded numbers within Table 10.13. This explains the slight difference in the calculated change in concentrations from the 'without' and 'with' Development scenarios.
* Results presented for the Receptor with the greatest adverse and beneficial impact of NO_2, as presented in Appendix 10.4.

10.101. The overall predicted concentrations in **Table 10.15** are higher than those presented in **Table 10.14** for 2016 due to higher background concentrations and vehicle emissions rates currently occurring in 2016 compared to 2027. The results in **Table 10.15** show that the annual mean concentrations of NO_2 are predicted to be below the annual mean NO_2 AQS objective value of 40 µg/m³ 'without' and 'with' the Development at all receptor locations, when assuming no improvements to NO_x and NO_2, apart from Receptors 20 and 21 located at Chalkers Corner.

10.102. The predicted annual mean NO_2 concentrations are below 60 µg/m³ at all receptor locations both 'without' and 'with' the Development when assuming no improvement to NO_x and NO_2, and as such the 1-hour mean objective is likely to be met at these locations.

10.103. **Table 10.15** shows the impact of the Development using the impact descriptors outlined in **Table 10.7**. Consequently, the Development is predicted to result in:

- a 'substantial adverse' impact at Receptor 20;
- an 'moderate adverse' impact at Receptor 2;
- a 'slight adverse' impact at Receptors 3, 6, 7 and 12;

- a ‘substantial beneficial’ impact at Receptor 21; and
- a ‘negligible’ impact at all other 11 existing receptors.

10.104. Whilst this section presents the greatest adverse and beneficial impact at Chalkers Corner, the section below presents the full range of predicted impacts.

Changes in Local Air Quality at Chalkers Corner

10.105. As above, **Appendix 10.4** presents the results of the potential air quality effect of the Development at 140 residential properties at Chalkers Corner assuming no improvement in NO_x and NO_2 (see the results for Scenario 3 included in **Tables 3** and **4** of **Appendix 10.4**) and the results for the two receptors with the greatest change have been reported above.

10.106. In this scenario, the results show the Development results in a worsening of annual mean NO_2 concentrations at 40 residential locations and has the potential to create eight new exceedances of the annual mean NO_2 AQS objective. However, the junction highway works also result in an improvement of annual mean NO_2 concentrations at 17 locations all of which already exceed the annual mean NO_2 AQS objective.

10.107. When considering the impact of the Development (with junction highway works) against the 2027 baseline (without Development), using the impact descriptors outlined in **Table 10.9**, the impact of the Development at the Chalkers Corner assuming no improvement in NO_x and NO_2 is predicted to result in a:

- ‘substantial’ adverse impact at four receptor locations;
- ‘moderate’ adverse impact at 31 receptor locations;
- ‘slight’ adverse impact at 22 receptor locations,
- ‘moderate’ beneficial’ impact at four receptor locations;
- ‘substantial’ beneficial impact at 13 receptor locations; and
- ‘negligible’ impact at the remaining 66 receptor locations.

10.108. The beneficial impacts are located at properties on Lower Richmond Road and relate to the realignment of the Lower Richmond Road 12m to the north east, resulting in these properties being located further away from vehicle tail pipe emissions. However, adverse impacts are predicted for properties in Chertsey Court as, with the junction highway works, these properties would be located closer to vehicle tail pipe emissions.

10.109. Whilst adverse impacts are predicted at Chalkers Corner, as part of the Development a new wall and new intensive green planting (which includes denser planting and vegetation species selected to filter and capture ambient pollutants) are proposed as part of the landscape strategy outside Chertsey Court. These inherent measures cannot be quantified (in $\mu g/m^3$) by the air quality model but will improve the predicted air quality concentrations at Chertsey Court.

10.110. To understand the impact of the junction highway works at residential receptors at Chalkers Corner, **Appendix 10.4** considers two hypothetical scenarios (discussed above in the Assessment Methodology and Significance Section) as:

- Scenario 1 - assuming the Stag Brewery element was implemented without changes to the Chalkers Corner Junction; and

- Scenario 2 – assessing the Stag Brewery element of the Development without and with changes to the Chalkers Corner Junction in the operational year (of 2027).

10.111. The results are discussed in **Appendix 10.4**, but overall these scenarios show the highways works have a beneficial effect on air quality, and act as mitigation against the impact of the Stag Brewery element of the Development on air quality at Chalkers Corner.

Overall Predicted Effects of the Development (including the highway works) in the NO_2 sensitivity analysis

10.112. As described in the Significance Criteria Section, when using professional judgement to determine the overall impact of the Development consideration is given to the following factors:

- the geographical extent (local, district or regional) of effects;
- their duration (temporary or long term);
- their reversibility (reversible or permanent);
- the magnitude of changes in pollution concentrations;
- the exceedance of standards (e.g. AQS objectives); and
- changes in pollutant exposure.

10.113. Using professional judgement, and considering the above, the overall effect of the Development on local air quality is considered to be **insignificant**, given that:

- whilst 'substantial' adverse impacts are predicted at four receptors at Chalkers Corner, 'substantial' beneficial impacts are also predicted at 13 receptors at Chalkers Corner;
- the majority of receptors experience a 'negligible' impact (as 66 out of 140 receptors at Chalkers Corner and at 10 out of 15 of the selected receptors elsewhere);
- at receptors located away from Chalkers Corner:
  - 'with the Development' predicted annual mean NO_2 concentrations are below the AQS objective at all receptors considered;
  - the Development does not result in any new exceedences of the annual mean NO_2 AQS objective;
  - overall the contribution of NO_2 at all receptors considered is relatively small;
- as found in **Appendix 10.4**, the highways works have a beneficial effect, and act as mitigation against the impact of the Stag Brewery element of the Development on air quality at Chalkers Corner;
- the air quality benefits inherent to the design of the Development cannot be quantified in $\mu g/m^3$ (details of the air quality benefits are described below in the Mitigation Section); and
- whilst the amount of filtration or absorption from the new intensive green planting proposed at Chertsey Court cannot be quantified, **Appendix 10.4** has considered the changes in the effective travel distance of air and predicts the 2m wall and 6m trees will have a reduction in the predicted NO_2 concentrations presented in this Chapter.

Conditions within the Development

10.114. During the detailed design stages, the Development has been designed to minimise exposure of future occupants of the Development, including the citing of less air quality sensitive uses (e.g. commercial, retail and leisure facilities) at ground level and in proximity to the roads where air quality concentrations would be the highest. As shown in **Table 10.15** and in **Appendix 10.3**, when assuming no improvements in future NO_X and NO_2 concentrations, the predicted NO_2 concentrations for locations within the Development itself where there is an air quality sensitive use, are below the relevant objectives in 2027. As such, it is considered that the effect of introducing future residential and school uses to the Site is **insignificant**.

Mitigation Measures and Likely Residual Effects

The Works

Nuisance Dust

10.115. The Site is considered to be a medium to high risk site (refer to earlier in this Chapter), and therefore a range of environmental management controls (implemented through a Construction Environmental Mitigation Plan) would be developed with reference to the IAQM guidance for High Risk sites. The management controls would prevent the release of dust entering the atmosphere and / or being deposited on nearby receptors, including the River Thames and Tidal Tributaries SINC. The management controls would include:

- develop and implement a stakeholder communications plan, including community engagement before demolition and construction works commence on the Site;
- record all dust and air quality complaints, identify causes, take appropriate measures to reduce emissions in a timely manner, and record the measures taken, make the log available to the local authority;
- hold regular liaison meetings with other high-risk construction sites within 500 m of the Site boundary to ensure plans are coordinated and emissions minimised;
- plan the Site layout so that machinery and dust causing activities are located away from receptors, as far as possible;
- erect barriers around dusty activities that are at least as high as any stockpiles;
- fully enclose specific operations where there is a high potential for dust production and the area is active for an extensive period;
- avoid Site runoff of water or mud;
- keep hoarding, 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 the Site;
- cover, seed or fence stockpiles to prevent wind whipping, where practicable;
- 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 Traffic Management Plan to manage the sustainable delivery of goods and materials and that supports and encourages sustainable travel;
- use cutting, grinding or sawing equipment fitted, or in conjunction, with suitable dust suppression techniques such as water sprays or local extraction;
- ensure adequate water supply on the Site for effective dust/particulate matter suppression / mitigation, using non-potable water, where possible and appropriate;
- used 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 the Site to clean any dry spillages. Clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- use water -assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the Site;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving the Site are covered to prevent escape of materials during transport;
- 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;
- 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 possible; and
- access gates to be located at least 10 m from sensitive receptors, where possible.

10.116. Such measures are routinely and successfully applied to major construction projects throughout the UK, and are proven to reduce significantly the potential for adverse nuisance dust effects associated with the various stages of demolition and construction work. Therefore, it is considered that the likely residual effects during the demolition and construction works due to fugitive emissions on all sensitive receptors (human and ecological) would be **insignificant**.

Construction Vehicle Exhaust Emissions

10.117. The effect of construction vehicles has been assessed using ADMS-Roads and the impacts predicted as being **significant** at Chalkers Corner for annual mean NO_2 of a moderate to substantial effect (based on the predicted impacts at the two receptor locations) but **insignificant** at all other receptors and for all other pollutants assessed. To reduce impacts, as part of the CEMP and as a matter of good practice, measures to control construction traffic are proposed. Such measures would include:

- establishment of the most suitable construction traffic routes;

- limiting the use of 'sensitive' roads (to include residential roads, congested roads etc.); and
- timing large-scale vehicle movements outside of peak hours.

10.118. Taking account of the above CEMP measures, the likely residual effect of construction traffic on local air quality would be **insignificant**.

Construction Plant Emissions

10.119. As described above, all construction plant would meet the Emissions Standard set out in the London Plan. On this basis, it is considered that the likely residual effect from construction plant emissions on local air quality would be **insignificant**.

Completed Development

10.120. As identified earlier in this Chapter the effect of operational traffic and emissions from the Energy Centre for the Development is predicted to have an **insignificant** potential effect on local air quality at relevant receptors surrounding the Site, and therefore the residual effect would remain **insignificant**.

10.121. **Table 10.16** presents the measures inherent to the Development and additional mitigation measures to be included during the construction and operational phases of the Development which are likely to benefit local air quality. However, there is no standard or recognised methodology to enable the reduction in pollutant concentrations that these measures would result in to be quantified within an air quality assessment. However, these measures are consistent with those identified by LBRuT within their Air Quality Action Plan.

Table 10.16: Summary of Air Quality Mitigation Measures

	Mitigation Measures
1.Demolition and Construction Phase	• Environmental management controls developed and set out in the Framework Construction Management Plan and subsequent Construction Environmental Management Plans this would include dust suppression, hoarding, monitoring etc. • All construction plant would adhere to the emissions standards for NO_2 and PM_{10} set out for Non Road Mobile Machinery (NRMM) in the London Plan. • Avoidance, or limited use, of traffic routes in proximity to sensitive routes (i.e. residential roads etc.). All construction traffic logistics would be agreed with LBRuT. • Avoidance, or limited use, of roads during peak hours, where practicable. • Provision of a Construction Worker Travel Plan and a Construction Transport Management Plan. • Dust monitoring and dust controls to be agreed with LBRuT.
2. Inherent – Measures included in the design of the Development	• Detailed dispersion modelling completed (using ADMS) and results used to ensure that the Energy Centre flues are designed and located for adequate dispersion of flue gases to avoid adverse impacts at existing receptor locations and receptors within the Development. A carefully worded planning condition would ensure that an air quality assessment is undertaken for the final plant; • Energy centre to use low NOx technology and to meet the London Plan Emission Standards;

Mitigation Measures
• School set back from Lower Richmond Road and interim dispersion modelling completed (using ADMS-Roads) and results to ensure this location is acceptable; • Up to 1,611 spaces cycle spaces in accordance with London Plan requirements. • Reduction of the ratio indicated by the Planning Brief of 1 car parking space per residential unit to 0.75 of a space per residential unit. • The amount of Electric Vehicle Charging Points on the Stag Brewery component of the Site, both active and passive, is still to be agreed but would as a minimum be provided in accordance with London Plan standards. • Provision of new pedestrian and cycle paths aimed to promote walking, cycling and the use of public transport. • Extensive public and private realm and landscaping including: – Up to 39,430m^2 GEA of public amenity space including playscape would be provided throughout the Development; – Up to 5,912m^2 GEA of private amenity space is proposed. – Green link between Mortlake Green via the Site to the riverside; – Public park; and – Pedestrianised High Street. • Reconfiguration to the Chalkers Corner junction to alleviate the transport and traffic implications associated with the operation of the Development including the alignment of the Lower Richmond Road arm to be moved approximately 12 m to the north east to allow: – the provision of a short additional left turn lane (flare) from Lower Richmond Road into the junction (26 m long or about 5 car lengths); – provision of an extended queuing reservoir between the main junction of Lower Richmond Road (this would accommodate about 9 extra cars south westbound), which would also provide extra storage for north east bound vehicles including those waiting to turn right into Lower Richmond Road; – provision of a wider pedestrian island within the Lower Richmond Road arm to 4 m wide to sufficiently cater for cyclists crossing as well as pedestrians; – an extended, dedicated lane for traffic turning left from Clifford Avenue into Lower Richmond Road; – retaining 28 trees and the removal of 22 trees along Lower Richmond Road, Clifford Avenue and within Chertsey Gardens. It is proposed to add a total of 33 new trees, resulting in an overall increase in 10 trees at Chalkers Corner to assist in air pollution. A new 2 m high wall would also replace the existing wall and fence to screen the vehicles at the junction; – A new cycle lane would be provided as part of Application C (Chalkers Corner). The highway improvements at Chalkers Corner would benefit cyclists and help Transport for London (TfL) to achieve their “Quietway” proposals for the A316 corridor by creating: • advance cycle stop lines at the main junction; • wider islands to make them suitable for cycle use; and • improved cycle links into Lower Richmond Road. • Preparation and implementation of a Delivery and Servicing Plan that will set out how all types of freight vehicle movements to and from the Development will be managed; • Framework, School and Residential Travel Plan setting out how all Site users can access the Development by sustainable forms of transport.

	Mitigation Measures
	• Provision of new car club spaces, as part of the Residential Travel Plan; • Introduction of stop idling / switch engine off' signs at the Williams Lane and Ship Lane junctions with Lower Richmond Road and introduction of a traffic congestion / air quality information board.
3.Additional future measures that could be included / to be secured through s278 agreement.	• Other highways works, secured by S278 works: – Improvements to Ship Lane, which would continue as a public highway but would be enhanced as a pedestrian route through the provision of a wider footway on the west side and a new footway (3 m) on the east side; – A new pelican crossing at the southern end of the Green Link along Lower Richmond Road directly north of Mortlake Green. The existing signalised crossing point adjacent to Ship Lane would be relocated to align better with the Green Link; and – A new crossing provided just to the west of the new access road to the school to improve access for pupils needing to cross Lower Richmond Road. This is currently shown as a zebra crossing but could potentially be upgraded to a pelican crossing. • Enhancement of existing bus services. Based on the current service pattern, an increased frequency for the 419 service would be the preferred solution together with provision of special buses to meet the peak demands associated with the school. • Safeguarding of land at the corner of Lower Richmond Road/Williams Lane to allow TfL to provide in the future bus stands, driver facilities and a bus turn facility, • Safeguarding of land close to the Green Link to allow the future provision of a cycle hire facility • A New 20mph speed limit enforced between Williams Lane and Bulls Alley including Sheen Lane, between the Mortlake High Street / Lower Richmond Road junction and the Sheen Lane level crossing. A number of physical measures are proposed to help manage speeds including junction entry treatments, carriageway narrowing and provision of a textured tarmac resin to differentiate the area of speed restraint. Potentially, table tops to comply with TfL requirements for buses could be installed at pedestrian crossing points by the school and on the Green Link. • Potential funding for a new controlled parking zone and/or modification to existing parking zones to help manage potential overspill parking associated with the proposed development onto surrounding roads

Summary

10.122. **Table 10.17** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter. Refer to **Table 10.16** above for a full list of air quality mitigation measures.

Table 10.17: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Dust emissions on surrounding existing receptors and early occupiers of the Development.	**Temporary**, **short to medium term**, **local** and of **adverse significance.**	Implementation of CEMP and Framework Construction Management Plan.	**Insignificant**.
Exhaust emissions from construction traffic on surrounding existing receptors and early occupiers of the Development.	**Significant** at Chalkers Corner for annual mean NO_2 of a moderate to substantial effect (based on the predicted impacts at the two receptor locations) but insignificant at all other receptors and for all other pollutants assessed	None required, a Construction Traffic Management Plan would also be implemented.	**Insignificant**.
Emissions from construction plant on surrounding existing receptors and early occupiers of the Development.	**Insignificant**.	None required, all construction plant would meet the Emissions Standard set out in the London Plan.	**Insignificant**.
Completed Development			
Traffic related exhaust emissions on existing sensitive locations surrounding the Site and future residential and school users of the Development.	**Insignificant**.	None required, refer to **Table 10.16** above.	**Insignificant**.
Changes in local air quality from the proposed Energy Centre plant on existing sensitive locations surrounding the Site and future residential and school users of the Development.	**Insignificant**.	None required, refer to **Table 10.16** above.	**Insignificant**.
Introduction of future residential and school uses to the Site.	**Insignificant**.	None required, refer to **Table 10.16** above.	**Insignificant**.

References

1 Cambridge Environmental Research Consultants, ADMS-Roads, Version 4.1.1.0.

2 Cambridge Environmental Research Consultants, ADMS 5.2, Version 5.2.2.0.

3 AEA, NOx to NO2 Calculator, http://laqm1.defra.gov.uk/review/tools/monitoring/calculator.php Version 4.1, June 2014.

4 Environment Agency. Air Quality Modelling and Assessment Unit. 'Conversion Ratios for NOx and NO2.

5 Environmental Protection UK & Institute of Air Quality Management (2017); 'Land-Use Planning & Development Control: Planning for Air Quality', January 2017. IAQM, London.

6 Institute of Air Quality Management (2014); 'Assessment of Dust from Demolition and Construction'.

7 Greater London Authority (2016); The 2015 London Plan with Minor Alterations 2016, Spatial Development Strategy for Greater London, GLA, London.

8 http://laqm.defra.gov.uk/faqs/faqs.html.

9 Defra (2012); 'Local Air Quality Management: Note on Projecting NO2 Concentrations'.

10 Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.

11 Defra (2007); 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'.

12 Defra (2010); 'The Air Quality Standards (England) Regulations'.

13 Department of the Environment, Food and Rural Affairs (DEFRA) (2007); 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland. DEFRA'.

14 Office of the Deputy Prime Minister (ODPM) (1995); 'The Environment Act' 1995. OPA.

15 London Borough of Richmond upon Thames (2016); '2015 Updating and Screening Assessment for The London Borough of Richmond upon Thames'.

16 London Borough of Richmond upon Thames (2016); 'Air Quality Annual Status Report'.

17 London Borough of Richmond upon Thames (2016); 'Air Quality Annual Status Report'.

18 London Borough of Richmond upon Thames (2014); 'Air Quality Action Plan'.

19 London Borough of Richmond upon Thames (2017); 'Air Quality Action Plan 2017-2022 – Consultation Document'.

11. Ground Conditions and Contamination

Introduction

11.1. This Chapter, prepared by Waterman Infrastructure and Environment Ltd (Waterman IE) presents an assessment of the likely significant effects of the Development with respect to ground conditions and contamination. Particular consideration is given to the likely significant effects of any existing ground contamination on human health, controlled waters and other aspects of the environment.

11.2. This Chapter provides a description of the relevant baseline conditions of the Site and surrounding area, and an assessment of the likely significant effects of the Development during the demolition, alteration, refurbishment and construction works (the Works) and once the Development is completed and operational. Mitigation measures are identified, where appropriate to avoid, reduce or offset any likely adverse effects identified and / or enhance likely beneficial effects. Taking account of the mitigation measures, the nature and significance of the residual effects are described.

11.3. This Chapter is supported by a Preliminary Environmental Risk Assessment (PERA) prepared by Waterman IE in August 2016, and ground investigation report prepared by Waterman IE for the eastern part of the Stag Brewery component of the Site in November 2016. Such work is presented within **Appendix 11.1** and **Appendix 11.2** respectively.

Assessment Methodology and Significance Criteria

Assessment Methodology

Preliminary Environmental Risk Assessment

11.4. As noted above, a desk-based qualitative PERA of the Stag Brewery component of the Site was completed by Waterman IE in August 2016. This report was undertaken to establish the potential for significant ground contamination to exist and the likely risk posed to a range of sensitive receptors, including human health, property, controlled waters and flora.

11.5. Whilst the PERA focusses on the Stag Brewery component of the Site (and not the Chalkers Corner component of the Site), this is due to the fact that the highway works associated with Chalkers Corner relate to highway improvements and landscaping (refer to **Chapter 5: The Proposed Development**). Such works are not highly intrusive and would unlikely lead to any significant (if any) below ground works so that any pollution source-pathway-receptor linkages would be unlikely. Such works would also be implemented and designed according to best-practice and legislative requirements, so that significant contamination could not result (i.e. appropriate pollution prevention controls would be employed during the implementation of the works and as part of the inherent highway drainage design). In addition, the future end use of the Chalkers Corner component of the Site would be of low sensitivity. That is, vehicular drivers or other transient users who would not come into direct contact with the ground. Accordingly, and based on professional and expert judgement, the proposals at the Chalkers Corner component of the Site are unlikely to give rise to any significant ground conditions or contamination effects. The geographical coverage of the PERA is therefore considered to be appropriate and robust for the purposes of the assessment. Nonetheless, the assessment of likely significant effects, mitigation and likely residual effects reported in this Chapter do take consideration of the entire Site.

11.6. The PERA was undertaken in general accordance with the Model Procedure for Management of Land Contamination (Contaminated Land Report 11)[1] and was informed by:

- a Landmark Information Group Envirocheck Report for the Stag Brewery Component of the Site[2] which contains historical Ordnance Survey (OS) extracts, environmental data sheets and sensitivity plans;
- previous environmental assessments and reports prepared for the Stag Brewery Component of the Site:
  - Stag Brewery: Phase 1 Environmental Site Assessment, Aecom, July 2015;
  - Stag Brewery: Phase 2 Environmental Site Assessment Report, Aecom, September 2015; and
  - Stag Brewery, Mortlake: Groundwater Sampling Point decommissioning Report, Aecom, February 2016.
- tank decommissioning certificates for works by Bale Group between December 2015 to January 2016;
- a walkover and inspection of the Stag Brewery component of the Site undertaken by Waterman IE on Thursday 14 July 2016;
- a review of publicly available and relevant historical, geological and hydrogeological information sources;
- British Geological Survey (BGS) 1:50,000 Map Sheet 270 (South London, Solid and Drift Edition), BGS borehole records TQ27/NW-596 and TQ27/NW-597, and the BGS website;
- review of World War II ordnance impact mapping[3]; and
- information obtained from the London Borough of Richmond upon Thames (LBRuT) Environmental Health Officer (EHO) relating to potential historical sources of contamination at the Stag Brewery component of the Site.

11.7. The PERA includes a Conceptual Site Model (CSM) which identifies the likely significant potential pollutant linkages. Consideration is given in the CSM to the potential contamination sources, migration pathways and sensitive receptors. The likely effects of ground contamination upon human health, property, controlled waters and flora were assessed as part of the PERA using this source-pathway-receptor approach.

11.8. The findings of the PERA have been used to inform the qualitative assessment presented in this Chapter of likely effects to, and from, any potential ground contamination likely to exist at the Stag Brewery component of the Site. In accordance with guidance, the CSM of the likely significant pollutant linkages within the PERA were updated in this Chapter where necessary, to reflect the Works and the Development. Using information obtained from the above sources, an appraisal of the means by which sources might affect receptors (the pathways) was carried out.

Ground Investigation Report

11.9. Ship Lane runs from north to south, bisecting the Stag Brewery component of the Site into a western area (Development Area 2 and the School) and an eastern area (Development Area 1). The Applicant commissioned a preliminary ground investigation of the eastern part of the Stag Brewery component of the Site, as this was where there is the greatest potential for contamination to be present.

11.10. The investigation targeted potential contamination sources and pathways identified by the PERA, and involved drilling 10 window sample holes to depths between 0.5 m bgl (below ground level) and 5.5 m bgl, and two cable percussion boreholes to 30 m bgl. Soil samples were collected from all shallow strata encountered. Monitoring wells were installed for follow-up groundwater sampling, and ground gas / vapour monitoring. A single round of groundwater sampling and ground gas / vapour monitoring was completed.

11.11. Soil and groundwater samples collected were analysed for a range of inorganic and hydrocarbon contaminants including metals, total petroleum hydrocarbons (TPH), polyaromatic hydrocarbons (PAHs) volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs).

11.12. The ground investigation results were compared to Waterman IE Generic Assessment Criteria (GACs) for land with a residential end-use without plant uptake, and 1% soil organic matter. Results from the Aecom 2015 Ground Investigation within the eastern part of the Stag Brewery component of the Site were also considered within the Ground Investigation Report. The findings informed an assessment of the potential for all receptors to be affected by ground conditions at the Stag Brewery component of the Site. In turn, the CSM developed in the PERA was updated with the new assessment findings.

11.13. In respect of the assessment of the outline component of the Development, the assessment set out within this Chapter has considered the maximum allowable spatial parameters sought for approval. This would give rise to the most intrusive ground works and so can be considered to reflect a 'worst-case' assessment. That said, based on professional and expert judgement, it is unlikely that the minimum allowable spatial parameters sought for approval would give rise to materially different ground contamination effects. This is because the scale of Works that would be required for both the maximum and minimum allowable parameters would be similar and the sensitive receptors likely to be affected by ground contamination would be the same.

Significance Criteria

11.14. There are no published criteria for assessing the significance of effects from ground conditions and contamination. Significance criteria have therefore been developed using the criteria outlined in **Chapter 2: EIA Methodology**, contaminated land guidance, and professional expert judgement.

11.15. An adverse effect in respect of ground contamination relies on the presence of a source, pathway and receptor pollutant linkage. The significance of the effect depends on the value of the resource, the sensitivity of the receptor and the ways in which the Works and the Development can provide a pathway to the receptor. The significance of an effect partly depends on the timescales involved, i.e. short, medium or long term and the extent of the area affected.

11.16. The assessment of the likely significant effects and residual effects used in this assessment are set out in **Table 11.1**.

Table 11.1: Significance Criteria for Ground Conditions and Contamination Assessment

Significance Criteria	Description
Adverse effect of major significance	High risk site classification and acute or severe chronic effects to human health and / or animal / plant populations predicted. Effect to a potable groundwater or surface water resource of regional importance e.g. Principal aquifer, public water reservoir or inner Source Protection Zone (SPZ) of a public supply borehole.
Adverse effect of moderate significance	Medium risk site classification and proven pollutant linkages with human health and / or animal / plant populations, with harm from long-term exposure. Effect to a potable groundwater or surface water resource at a local level e.g. effect to an outer groundwater SPZ or Principal aquifer, which is not abstracted locally. Temporary alteration to the regional hydrological or hydrogeological regime or permanent alteration to the local regime.
Adverse effect of minor significance	Low risk site classification and potential pollutant linkages with human health and / or animal / plant populations identified. Reversible, localised reduction in the quality of groundwater or surface water resources used for commercial or industrial abstractions, Secondary A Aquifer.
Insignificant	Low risk site classification and no appreciable effects to human, animal or plant health, potable groundwater or surface water resources.
Beneficial effect of minor significance	Risks to human, animal or plant health are reduced to acceptable levels. Minor local scale improvement to the quality of groundwater or surface water resources used for commercial or industrial abstraction.
Beneficial effect of moderate significance	Risks to human, animal or plant health are reduced to acceptable levels. Moderate local improvement to the quality of potable groundwater or surface water resources. Significant improvement to the quality of groundwater or surface water resources used for public water supply.
Beneficial effect of major significance	Major reduction in risks to human, animal or plant health. Regional scale improvement to the quality of potable groundwater or surface water resources.

11.17. **Chapter 2: EIA Methodology** also sets out the general approach to temporal and geographical extent of effects, reproduced below.

- ‘short’ to ‘medium-term’ effects are considered to be those associated with the Site preparation and construction works;
- ‘long-term’ effects are those associated with the completed and operational Development;
- ‘local’ effects are those affecting neighbouring receptors;
- ‘district’ effects are those which are likely to occur to receptors within the wider Borough of the London Borough of Richmond upon Thames (LBRuT);
- ‘sub-regional’ effects are those affecting Boroughs adjacent to LBRuT;
- ‘regional’ effects are those affecting receptors across Greater London; and
- ‘national’ effects are those that affecting receptors within the UK.

Baseline Conditions

Historical Land Uses on-Site and in the Surrounding Area

11.18. A review of historical maps indicates the eastern part of the Stag Brewery component of the Site was in brewery use since the 15th Century. The brewery expanded to occupy the majority of the eastern part of the Stag Brewery component of the Site by 1868. Circa 1933, further brewery structures were constructed within the western part of the Stag Brewery component of the Site, and in 1961 these buildings were reshaped to the current layout. The Stag Brewery occupied the entire Stag Brewery Component of the Site with exception of the playing fields by 1974. The Stag Brewery ceased operations in late 2015 and decommissioning of brewery infrastructure was undertaken following cessation of brewery activities. Most recently, works on-Site have been undertaken in respect of removal of brewery fixtures and fittings.

11.19. Historical contamination sources at the Stag Brewery component of the Site include an engine room, pump room, paint shop, garages, silos and large storage tanks. Historically, the area surrounding the Stag Brewery Component of the Site has primarily been residential. However, some industrial uses including a coal wharf, smithy, works and garages, incinerator and electrical substations have also been noted.

Existing Land Uses on Site and in the Surrounding Area

11.20. The Stag Brewery component of the Site comprises land predominately occupied by the former Stag Brewery. The former Stag Brewery includes 16 industrial buildings surrounded largely by hardstanding. Numerous electrical substations and tanks are located throughout the Stag Brewery component of the Site. All tanks with potentially contaminative contents such as oil, diesel, caustic soda, hydrochloric acid or effluent have been decommissioned and certified clean and gas-free.

11.21. Watney's Sports Ground playing fields are located within the south west of the Stag Brewery component of the Site.

11.22. The River Thames and River Thames towpath are located immediately to the north of the Stag Brewery component of the Site. Residential properties are also located immediately to the north, west and east of the Site. The predominant land uses to the south of the Site are retail and residential.

11.23. The Chalkers Corner component of the Site comprises highway and associated landscaping, which includes the junction with the A316 (Clifford Avenue), A3003 (Lower Richmond Road) and A205 (South Circular). The Chalkers Corner component of the Site also includes a small informal car park and landscaping on the south west corner of Lower Richmond Road. The Chalkers component of the Site is surrounded by residential uses with Fulham (North Sheen) Cemetery located immediately to the north.

11.24. Further information relating to the existing land uses on and off the Site are provided in **Chapter 3: Existing Land Uses and Activities**.

11.25. The Landmark Group Information Envirocheck report (refer to **Appendix 11.1**) identified the following potentially contaminative uses within 1 km, of the Stag Brewery component of the Site (refer to **Table 11.2**).

Table 11.2: Potentially Contaminative Land Uses within 1km of the Stag Brewery Component of the Site.

Location	Summary Description
To the north of the Stag Brewery component of the Site.	• Four historical landfills, the closest is 127 m north west, named Dukes Meadow and accepted waste between 1945 and 1950. The other three landfills are between 233 m and 419 m north, and where recorded accepted inert and industrial waste. These landfills closed between 1934 and 1935. • One active Environmental Permit for a waste management facility, 519 m north west and managing household, commercial and industrial waste. This site is also a Registered Waste Transfer Site. • Single Part B Environmental Permit, 237 m north west and registered to a crematorium. • Four active Contemporary Trade Directory Entries, the closest 241 m north west and registered to a crematorium. Further entries are for a cleaning service, laboratory and a road hauliers.
To the east of the Stag Brewery component of the Site.	• Warehouses, residences. • Two Part B Environmental Permits, closest 74 m east and registered to a dry cleaner. The further entry 852 m west is also for a dry cleaners. • 10 active Contemporary Trade Directory Entries, the closest an optical goods manufacturer 42 m east. Further entries are for a range of industrial and commercial activities including garages, vehicle parts makers, car dealers, laundries, and glass pane makers.
To the south of the Stag Brewery component of the Site.	• Mortlake High Street, commercial premises and residences. • Five Part B Environmental Permits, the closest 246 m south and registered to a petrol filling station. Further entries are for a further petrol filling station and three dry cleaners. • 29 active Contemporary Trade Directory Entries, the closest a builders merchant 163 m south east. Further entries are for industrial and commercial activities including car dealers, garages, printers, petrol filling station and dry cleaners.
To the west of the Stag Brewery component of the Site.	• Williams Lane, residences. • Single Part B Environmental Permits, 810 m west and registered to a petrol filling station. • Seven active Contemporary Trade Directory Entries, the closest a car dealership 378 m west. Further entries are for a second car dealers, two petrol station, lampshade makers, distribution centre, and clothing maker.

Geology

11.26. The Site's geology summarised in **Table 11.3**, was established from previous ground investigations by Dames and Moore (1995), CRA (2003) and Aecom (September 2015), BGS records and the findings of the Waterman IE Ground Investigation undertaken in the eastern part of the Stag Brewery component of the Site. Further details of the geology are described in **Appendix 11.1**.

Table 11.3: Geological Sequence Beneath the Stag Brewery component of the Site

Stratum	Area Covered	Estimated Thickness (m)	Typical Description
Hardstanding.	Entire Stag Brewery component of the Site (excluding the playing fields).	0.25 - 0.8	Tarmac or reinforced concrete floor slab at surface level. Encountered as two or three separate layers up to 0.5 m thick, each separated by up to 0.5 m Made Ground in eastern area.
Made Ground.	Entire Stag Brewery component of the Site.	0.4 - 2.7	Predominantly coarse sand and gravel, including pieces of brick and minor amounts of black clinker. Rare pipe fragments.
Alluvium.	Entire Stag Brewery component of the Site.	0.3 - 1.5	Soft brown grey slightly gravelly clay. Gravel is fine to coarse flint.
Kempton Park Gravel Formation.	Entire Stag Brewery component of the Site.	1.4 - 3.9	Clayey, silty sand with varying gravel content with areas of soft, brown, sandy clay. Gravel is sub-angular to rounded, fine to coarse flint.
London Clay Formation.	Entire Stag Brewery component of the Site.	73	Stiff grey to brown clay, with occasional pockets of silt and sand.
Lambeth Group.	Entire Stag Brewery component of the Site.	15 - 20	Clay, some silty or sandy, with sands and gravels.
Thanet Formation.	Entire Stag Brewery component of the Site.	5 - 10	Fine grained sand that can be clayey and glauconitic. Flints at the base of the formation.
Chalk Group.	Entire Stag Brewery component of the Site.	Not proven.	Chalk and flints.

Hydrogeology

11.27. The Environment Agency's (EA) Aquifer Designation Map[4] indicates that the Alluvium and Kempton Park Gravel Formation underlying the Stag Brewery component of the Site are classified as a Secondary A Aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Based on available information, it is anticipated shallow groundwater in the Alluvium and Kempton Park Gravel Formation is in hydraulic continuity with the River Thames directly adjacent to the Stag Brewery component of the Site. Previous ground investigation infers that groundwater flows in a westerly direction across the Site.

11.28. The London Clay Formation is an Unproductive Stratum. The Lambeth Group and Thanet Formation are both also classed as Secondary A Aquifers, with the Chalk Formation at depth a Principal Aquifer. According to the EA, the Site is not located within a groundwater SPZ.

11.29. There are two recorded historical groundwater abstractions within the Stag Brewery component of the Site boundary, references TQ27/NW-596 and TQ27/NW-597. These wells were drilled circa 1830, extended to 101 m bgl and 121 m bgl and drew groundwater from the Chalk Group Principal Aquifer. Details of abstraction volumes were not recorded.

11.30. Two groundwater abstractions are recorded within a 1 km radius of the Stag Brewery component of the Site. The closest of these is located 228 m north at Dukes Meadow Golf Club, drawing 8,000 litres (l) per year from the Principal Aquifer in the Chalk Group for irrigation of the playing green. The other abstraction is located 663 m north east, also for irrigation purposes at Dukes Meadow Golf Club and drawing a further 5,000l per year.

11.31. There are no Environmental Permits for discharges to groundwater recorded within 1 km of the Stag Brewery component of the Site.

Hydrology

11.32. The nearest surface water to the Stag Brewery component of the Site is the River Thames, located directly to the north of the eastern part of the Stag Brewery component of the Site.

11.33. There are no surface water abstractions within 1 km of the Stag Brewery component of the Site. The closest is 1.3 km north east, drawing water from the River Thames to supply a lake / pond.

11.34. There are five recorded active Environmental Permits for discharges to surface waters within a 1 km radius of the Stag Brewery component of the Site. The closest is located 763 m north west, operated by Thames Water for discharge of public sewage overflow to the River Thames. The other four are also for sewage overflows. Sewer records on the Stag Brewery component of the Site indicate that some areas currently drain to the Thames Water surface water sewer network, ultimately discharging to the River Thames. Further details are set out within **Chapter 12: Surface Water Resources and Flood Risk**.

11.35. The EA records a single pollution incident to surface water from the Stag Brewery component of the Site, involving a spill of unknown chemicals. The spill was recorded as a Category 3 (minor incident). A further two Category 2 (significant incident) spills are recorded at Ship Lane, involving miscellaneous chemicals and unknown chemicals. Environmental Incident Reports for the Stag Brewery component of the Site by Aecom[5]) identified 15 spill incidents during operation between 2009 and 2015. These included spills to drainage of brewing substances (wort, beer, grain, yeast and sugar) and mechanical fluids (lubricant, hydraulic oil, oxafoam, diesel and unidentified substances).

11.36. Six pollution incidents to surface waters were recorded within 1 km of the Stag Brewery component of the Site. The closest of these occurred 475 m north west, involved a miscellaneous spill of oils to the River Thames and was a Category 2 (significant incident). The further pollution incidents involved oils, sewage and miscellaneous chemicals, with three classed as Category 3 and two classed as Category 2.

Unexploded Ordnance

11.37. There is a risk that unexploded bombs, anti-aircraft projectiles and / or incendiary bombs fell unnoticed and unrecorded within the Site. The Preliminary Unexploded Ordnance Risk Assessment[6] produced by Groundsure (refer to **Appendix 11.1**) identifies an overall medium risk classification for the Site. Historical records indicate that during WWII LBRuT sustained a high density of bombing and bomb risk maps have identified several high explosive bombs as having fallen on parts of the Stag Brewery component of the Site.

Potential Contamination Sources

11.38. The PERA (refer to **Appendix 11.1**) has identified historical land uses that could result in potential ground contamination within the Stag Brewery component of the Site, including the former Stag

Brewery itself, and nearby off-Site features such as landfills, a smithy, a coal depot and electrical substations. Based upon an appraisal of historical and current land uses, contaminants of concern are identified in **Table 11.4**.

Table 11.4: Contaminants of Concern

Contamination Source	Associated Contaminants
Within the Stag Brewery Component of the Site (Existing)	
Electrical substations.	Metals, PCBs.
Within the Stag Brewery Component of the Site (Historic)	
The Stag Brewery.	Diesel, waste oil, lubricant oils, hydrochloric acid, caustic soda, slurry, asbestos.
Outside the Stag Brewery Component of the Site (Existing)	
Garages and petrol filling stations.	Metals and metalloids, fuels, TPH, PAH, organic solvents, asbestos.
Outside the Stag Brewery Component of the Site (Historic)	
Landfill.	Clinker, brick, slate, pottery, mortar, wood, chert, concrete, metal, glass, flint, asbestos, ground gas and vapours.
Incinerator.	Ash and clinker, metals and metalloids, glass, flint, asbestos.
Smithy.	Metals and metalloids, organic solvents, asbestos.
Coal depot.	Metals and metalloids, sulphates, sulphides, cyanides.
Electricity works and electrical substations.	Metals and metalloids, PCBs, bitumen, detergents, organic solvents, TPH, mineral oil, asbestos.

11.39. Ground investigation by Aecom in 2015 and Waterman IE in 2016 identified the following elevated contaminants in the soil:

- petroleum hydrocarbons;
- arsenic; and
- asbestos.

11.40. Elevated contaminants in the groundwater included:

- chromium;
- copper;
- iron;
- vanadium;
- nickel;
- zinc; and
- sulphate.

11.41. Whilst elevated contaminants were recorded in the soil and groundwater they were not elevated across the eastern part of the Stag Brewery Component of the Site. As such, the result summarised above represent contamination hotspots. The Development would include substantial excavations to create the single level basement, and suitable for use material in areas of proposed soft landscaping. The Works would therefore inherently break the pollutant linkages

from contamination in the soil to future Site users. As such, the contaminants recorded do not represent a significant contamination risk to either residential or commercial future Site users.

11.42. In the absence of mitigation, materials brought onto the Site to facilitate the Development, including construction materials, fuels and oils could present a potential source of contamination during the Works. Furthermore, in the absence of mitigation measures stockpiled soils excavated for the proposed groundworks required to facilitate the Development have the potential to act as a source of windborne dust.

Potential Contamination Pathways

11.43. During the Works, in absence of mitigation, the potential pollutant linkages would be as follows:

- construction workers, visitors and off-site residents contacting contaminated soils and groundwater via dermal contact, ingestion, runoff from stockpiled soils and dust inhalation;
- remobilisation of contamination in soils by rainfall infiltration following removal of hardstanding the Works, with leaching to lower soils and the shallow Secondary A aquifer in the Alluvium and Kempton Park Gravel Formation;
- potential contamination of shallow groundwater and the River Thames from the release of existing contamination (for example, via surface run-off from stockpiled materials, via the drainage system discharging to the River Thames, or mobilisation of ground contamination by rainfall infiltration after removal of hardstanding during demolition), and introduction of new sources of contamination; and
- potential to encounter UXO.

11.44. Once the Development is completed and operational, in the absence of mitigation, the potential pollutant linkages would be as follows:

- structures contacting ground contamination via direct contact and chemical attack, and potential for ground gas and vapour ingress from Made Ground, Alluvium and hydrocarbon contamination within shallow groundwater;
- soft landscaping contacting contamination in Made Ground, shallow soils, and shallow groundwater via direct contact of roots;
- potential exposure of future residents and visitors of the Site to residual ground contamination via soft landscaping, and plant uptake in soft landscaped area;
- potential mobilisation of contamination via historical abstraction wells to the deep Secondary A aquifers in the Lambeth Group and Thanet Formation, and Principal Aquifer in the Chalk Group; and
- flora and fauna associated with the River Thames coming into direct contact with contamination originating from the Made Ground, and spills of construction materials.

Potential Contamination Receptors

11.45. During the Works, potential receptors in the absence of mitigation include;

- construction workers and visitors;
- off-site residents;
- occupants of completed Development phases, including staff and students of the new school;
- fauna and flora associated with the River Thames

- secondary A Aquifer in the Alluvium and Kempton Park Gravel Formation; and
- the River Thames.

11.46. In the absence of any mitigation, potential receptors of the completed and operational Development include;

- future Site residents, workers and occupiers (i.e. commercial occupiers and nursing staff), school students and staff and visitors;
- vegetation in soft landscaping;
- fauna and flora associated with the River Thames
- Secondary A Aquifer in the Lambeth Group, and Thanet Formation;
- Principal Aquifer in the Chalk Group; and
- the River Thames.

Likely Significant Effects

The Works

Effects to Human Health from Ground Contamination, Ground Gas, and Vapour

11.47. During the Works, workers on the Site would be more likely to be exposed to sources of contamination, as the areas comprising the Works would not be accessible to the public.

11.48. The Works, which would include the demolition of buildings, removal of hard standing, excavation of soils, basement excavation and piling could expose Site works to sources of contamination via plausible pollutant linkages including dermal contact, inhalation and / or ingestion. However, workers on the Site would be subject to mandatory health and safety requirements under the Construction (Design and Management) Regulations 2015[7], and the Control of Substances Hazardous to Health (COSHH) Regulations 2002[8]. In addition, workers, and Site visitors would be required to use Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE) as required, thereby minimising the risk of exposure to potential contamination from soils, dust, ground gas and other potential contamination sources.

11.49. Adherence to the legislative requirements described above would significantly reduce the risk to the demolition and construction workers such that the likely effect is considered to be **insignificant**.

11.50. Dust may be generated by the Works, particularly during dry and windy weather. Under these conditions, the public in areas adjacent to the Site and residents occupying the earlier phases of the Development could be temporarily exposed to contamination via the inhalation of potentially contaminated dust. Members of the public and occupants of the early phases of the Development would not be wearing PPE of RPE. As such, the likely significant effect to the public and early occupants of the Development is considered to be **short** to **medium-term**, **local**, **adverse** and of **minor significance**.

Effects to Controlled Waters from Ground Contamination

11.51. With reference to **Chapter 5: The Proposed Development** and **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, the bottom of the proposed basement slab within the east part of the Stag Brewery component of the Site (east of Ship Lane) would be set at 0.76m OD. The maximum extent of the proposed basement within the

west part of the Stag Brewery component of the Site (west of Ship Lane), would be set at 2.45m OD.

11.52. The proposed foundation design for all buildings within the detailed element of the Stag Brewery component of the Site would comprise a 1m deep piled raft, with the exception of the proposed cinema area which would be founded in 1m deep local pile caps with 1m deep ground beams. Below the foundations, all buildings would have an expanse of piles (3 to 5 per column) that would be 600mm in diameter and extending down 25m in length.

11.53. The piles would be formed using Continuous Flight Augur (CFA) cast in-situ methodologies. This is a non-displacement method, with material being brought to the surface. Contaminants in the Made Ground would therefore not be driven down into the Secondary A Aquifer in the Kempton Park Gravel Member. Furthermore, given the thickness of the London Clay Formation (73 m thick), the pile toes would not penetrate the base and therefore a preferential pathway for contaminants in the Made Ground to migrate to and affect the underlying sensitive aquifers would not be created. As such, the intrusive ground work associated with the works are likely to give rise to **insignificant** contamination effects to the Secondary A Aquifer beneath the Site.

11.54. In addition to the above, the new river wall would be formed within the north of the Stag Brewery component of the Site. This would comprise a sheet pile wall with an in-situ reinforced concrete capping beam. The toe level of the sheet pile wall would be set at -1m Above Ordnance Datum (AOD). Such intrusive works may mobilise contamination in the Made Ground, and create a pollutant pathway for contaminants to migrate to and impact the River Thames. Given the river wall piling works would be undertaken immediately next to the River Thames, there is no potential for contaminants to attenuate, disperse, or dilute within the groundwater. The risk to the River Thames is therefore increased for the piling river wall works, in comparison to activities undertaken within the wider Site. In the absence of mitigation measures the likely effect on the River Thames would be **temporary**, **short** to **medium-term**, **local**, **adverse** and of **moderate significance**.

11.55. During the Works, areas of existing hardstanding would be broken out. Such works would temporarily increase the permeable cover allowing increased rainwater and surface water infiltration to the ground and potentially to the underlying aquifer. Given that the shallow groundwater is in hydraulic continuity with the River Thames, there is a potential for ground contamination mobilised by rainwater to reach this water course. In the absence of mitigation, the likely effect to the River Thames is considered to be **temporary**, **short** to **medium-term**, **local**, **adverse** and of **minor significance**.

11.56. Two historical abstractions wells are recorded on the Stag Brewery component of the Site. The wells abstract from the Principal Aquifer in the Chalk Group. The exact location and status of these wells is not known. However, taking a precautionary and ‘worst-case’ approach, if these wells are still present and active, a preferential pathway may be present allowing ground contamination mobilised by rainwater to reach the Principal Aquifer. The likely effects, in the absence of mitigation, would be **temporary**, **short** to **medium-term**, **local, adverse** and of **moderate significance**.

11.57. During the Works, it is likely that new sources of contamination would be introduced and stored on the Site (for example, diesel fuel, oils, chemicals and other construction materials). As a result, there would be a risk of leaks and spills to occur directly or indirectly to the ground (Secondary A aquifer in the Kempton Park Gravel Formation) and the River Thames. Potential pathways include surface water drains, preferential pathways created by existing wells, surface water run-off, and migration within the groundwater.

11.58. Despite the above, the Works would be undertaken in accordance with the Control of Substances Hazardous to Human Health (COSHH) Regulations 2002[8], and in-line with best practice methods. This would act to reduce the potential for contamination leaks or spills. As such, the likely effect is considered to be **temporary**, **short** to **medium-term**, **local, adverse** and of **minor significance**.

Effects to Ecological Receptors from Ground Contamination

11.59. Similar to the likely effects to human health, ecological receptors adjacent to the Site and associated with the River Thames may temporarily expose to contamination via the inhalation or ingestion of potentially contaminated dust. This effect would likely give rise to **temporary**, **short** to **medium-term**, **local**, **adverse effects** of **minor significance**.

11.60. As previously noted, the physical Works would temporarily increase the permeable cover allowing increased rainwater and surface water infiltration to the ground and potentially to the underlying aquifer. Given that the shallow groundwater is in hydraulic continuity with the River Thames, there is a potential for ground contamination mobilised by rainwater to reach the River Thames. In addition, new sources of contamination would be introduced and stored on the Site (for example, diesel fuel, oils, chemicals and other construction materials). As a result, there would be a risk of leaks and spills to occur directly or indirectly to the ground and the River Thames. Potential pathways include surface water drains, preferential pathways created by existing wells, surface water run-off, and migration within the groundwater.

11.61. Despite the above, the Works would be undertaken in accordance with the Control of Substances Hazardous to Human Health (COSHH) Regulations 2002, and in-line with best practice methods. This would act to reduce the potential for contamination leaks or spills. As such, the likely effect to ecological receptors surrounding the Site is considered to be **temporary**, **short** to **medium-term**, **local, adverse** and of **minor significance**.

Unexploded Ordnance

11.62. Bomb risk maps (refer to **Appendix 11.1**) have identified several high explosive bombs as having fallen on parts of the Stag Brewery component of the Site. In addition, a risk exists for un-noticed or unrecorded bombs to have fallen within the Site. There is therefore a risk of potential UXO underneath the Site to detonate during the Works if disturbed, with possible severe consequences.

11.63. in the absence of mitigation, any encountered UXO retains the potential to detonate if disturbed during the Works. The likely effect would be **long-term**, **local**, **adverse** and of **major significance**.

Completed Development

Effects to Human Health from Ground Contamination

11.64. As described within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, it is proposed that the Development would be implemented in phases, with each phase being occupied as it is completed.

11.65. The basement excavation would remove the majority, if not all, Made Ground within the Stag Brewery component of the Site, thereby substantially reducing the hotspots of contamination associated with the Stag Brewery component of the Site. However, any residual Made Ground beneath the Site could contain organic material that could represent a potential source of ground

gas. In such instances, in the absence of mitigation, and taking a precautionary 'worst-case' approach, the likely effect to human health would be **long-term**, **local**, **adverse** and of **moderate significance**.

11.66. The majority of soft-landscaped areas associated with the Development in the Stag Brewery Component of the Site would be constructed over the proposed basement and so would be removed from any residual ground contamination and require the use of clean, inert imported soil. In such areas, the effects to human health would be **insignificant**.

11.67. Where soft-landscaping is proposed outside the footprint of the proposed basement areas (for example, the private gardens associated with Buildings 20 and 21 within the north west of the Stag Brewery component of the Site), residents of the Development, together with visitors and users of these areas could come into contact with ground contamination via dermal contact with contaminated soils, and by plant update in private garden areas. Again, in the absence of mitigation, and taking a precautionary 'worst-case' approach, the likely effect to human health would be **long-term**, **local**, **adverse** and of **moderate significance**

Effects to Controlled Waters from Ground Contamination

11.68. Made Ground present in the footprint of the proposed basements would be removed from the Site, thereby removing a potential source of contamination. The Development would change the land use of the Stag Brewery component of the Site from a former industrial use to a primarily residential land use with the comparatively minimal storage of hazardous materials. The reduction in the storage of hazardous materials in the Development would reduce the relative risk of spillages or leakages of hazardous material occurring.

11.69. Any hazardous materials kept on the Site would be stored and maintained in accordance with relevant legislation, which aims to reduce contamination risks. Whilst accidental spillages cannot be ruled out, spill kits would be provided and the Development would be drained by hand standing which would prevent the majority of rainwater and surface water runoff infiltrating into the ground. Furthermore, the drainage system would be designed to incorporate drainage solutions such as interceptors, filters or silt traps to avoid the discharge or any fuels of oils. This would be particularly important for the three proposed drainage outfalls to the River Thames (refer to **Chapter 12: Water Resources and Flood Risk**). The incorporation of green roofs, and the potential inclusion of rainwater harvesting and permeable paving would further improve surface water quality before it is discharged. If required, a biomat filtration system, downstream defender or other hard engineered solution could also be incorporated to ensure discharge is appropriately treated. Such inherent design features of the Development would likely reduce the silt and oil deposition into the River Thames when compared to the existing situation.

11.70. In view of the above, the likely effect of the completed and operational Development upon controlled waters is likely to be **long-term**, **local**, **beneficial** and of **minor significance**.

Effects to Building Structures and Services from Ground Contamination

11.71. Below ground Development infrastructure would be inherently suitably designed and specified for the ground conditions at the Site and to withstand the potential adverse effects from any residual contamination which could give rise to chemical attack. The likely effect is therefore considered to be **insignificant**.

Effects to Ecological Receptors from Ground Contamination

11.72. As noted earlier in this Chapter, the majority of soft-landscaped areas associated with the Development in the Stag Brewery Component of the Site would be constructed over the proposed basement and so would be removed from any residual ground contamination and require the use of clean, inert imported soil. In such areas, the likely effects to ecological receptors on the Site would be **insignificant**. However, where soft-landscaping is proposed outside the footprint of the proposed basement areas ecological receptors could come into contact with ground contamination via dermal contact with contaminated soils, and by plant update in private garden areas. Again, in the absence of mitigation, and taking a precautionary 'worst-case' approach, the likely effect to ecological receptors on the Site would be **long-term**, **local**, **adverse** and of **minor significance**

11.73. In respect of any ecological receptors surrounding the Site, including those associated with the River Thames, the likely effect in respect of contamination would likely range from **insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**. The latter would be representative of the likely reduction of silt and oil deposition into the River Thames.

Mitigation Measures and Likely Residual Effects

Intrusive Ground Investigation

11.74. Ground investigation was undertaken across the Stag Brewery component of the Site by Aecom in 2015, and within the eastern part of the Stag Brewery component of the Site by Waterman IE in 2016 (refer to **Appendix 11.2**). Further and more detailed ground investigations are currently being undertaken on the western area of the Stag Brewery component of the Site, which would also inform the Remediation Strategy.

11.75. As part of detailed design for the Development, geotechnical investigation would be required. In combination with the geotechnical ground investigation the following works would be undertaken in relation to the contaminated land risk:

- sampling of soils for contamination identified by previous ground investigations, and for preliminary waste classification purposes;
- installation of ground gas and vapour monitoring wells on the western part of the Stag Brewery component of the Site to screen the Made Ground, Alluvium and Kempton Park Gravel Formation;
- sampling and testing of shallow groundwater at the new wells for contamination identified by previous ground investigations, and to assess the risk of chemical attack to buried structures;
- six ground gas and vapour monitoring visits over a period of three months at the new wells, and also at the wells installed as part of the 2016 Waterman IE ground investigation (refer to **Appendix 11.2**) within the eastern part of the Stag Brewery component of the Site to confirm the ground gas and vapour regime; and
- preparation of a Generic Quantitative Risk Assessment (GQRA) report based on the results of the ground investigation to further assess the potential pollutant linkages identified in the PERA.

11.76. The findings of the GQRA would inform a Remediation Strategy, which would be agreed with the EA and LBRuT. The Remediation Strategy would outline the measures necessary to break

potential pollutant linkages at the Stag Brewery component of the Site. The purpose of the Remediation Strategy would be to ensure the Site would be 'suitable for the end use' (i.e. the completed and operational Development) and that no unacceptable contamination risk would remain. Remedial measures may include, but would not be limited to, the following:

- removal of contaminated material;
- treatment of soil prior to reuse or disposal;
- appropriate reuse of material beneath paved areas or cover systems;
- importation of clean soils for areas of soft landscaping;
- the use of ground gas / vapour membranes in basements; and
- appropriately designed buried concrete and service pipes.

11.77. Following the completion of any remedial works required, a Verification Report would be produced. This would detail the results of testing, audits, as-built plans and duty of care documents to demonstrate identified linkages have been broken.

11.78. If any unforeseen contamination is encountered during the Works, a strategy would be devised to ensure that any identified potential effects to receptors would be mitigated. This may include removal of the material from the Development or appropriate reuse of the material on the Development in such a way that the source-pathway-receptor linkage is broken.

The Works

Effects to Human Health from Ground Contamination, Ground Gas, and Vapour

11.79. The remediation of the Stag Brewery component of the Site (as necessary and informed by previous ground investigations and the proposed further ground investigation) would break all pathway linkages between any residual contamination and identified receptors not already broken by the presence of the Development. In addition, during the Works, precautions would be taken to minimise the exposure of Site workers and the public to potentially harmful substances.

11.80. Specific protection would be developed and implemented in accordance with a Construction Environmental Management Plan (CEMP) for the Development. As detailed within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, such protective measures would include:

- monitoring and preventive measures to control dust, which could include water spraying in dry weather, wheel washing facilities for vehicles leaving the Works;
- handling and storage of any potential hazardous liquids / materials not only in accordance with relevant legislation, but also in line with best practice including EA pollution prevention guidance;
- the use of appropriately tanked and bunded storage areas for fuels, oils and other chemicals;
- measures for preventing runoff from stockpiled soils reaching surface drainage, or the River Thames; and
- procedures for the management of construction materials, spillage response, use of best practice construction methods and monitoring.

11.81. Providing the above mitigation measures are implemented, the likely residual effect on human health during the Works for on-site workers, site visitors, occupants in the surrounding area, and occupants of the early phases of the Development would be **insignificant**.

Effects to Controlled Waters from Ground Contamination

11.82. The CEMP would include measures to minimise the potential risk to controlled waters during the Works. These would include:

- surface drainage would pass via settlement and oil interceptor facilities, within the proposed basements and where required, and discharge arrangements would be agreed with the EA and Thames Water;
- the provision of adequate drainage to manage surface water run-off and minimise contaminated water reaching the groundwater;
- stockpiling of contaminated materials would be avoided, wherever possible. Stockpiles would be located on areas of hardstanding or on plastic sheeting to prevent mobile contaminants infiltrating into the underlying ground and located away from the Thames and drains; and
- potentially hazardous liquids on the Site such as fuels and chemicals would be managed and stored in accordance with best practice guidance, such as that published by the EA. Storage tank and container facilities would be appropriately bunded with designated areas and located away from surface water drains. All drums and barrels would be fitted with flow control taps and would be properly labelled.

11.83. Post-demolition of the buildings on-Site, the work should be carried out to locate and decommission the historic abstraction wells in-line with best practices and EA guidance, to prevent them acting as preferential pathways to the Principal Aquifer in the Chalk Formation.

11.84. Following the implementation and adherence to the above measures, the contamination risk to the underlying aquifers and surface water features surrounding the Site would be mitigated, and thus the likely residual effect would be **insignificant**.

Effects to Ecological Receptors from Ground Contamination

11.85. During the Works, as noted earlier in this Chapter dust suppression methods would be implemented to minimise the dispersion of dust and associated contaminants during the Works. Furthermore, the measures summarised earlier in this Chapter to mitigate against the contamination of controlled waters would also serve to provide mitigation to ecological receptors associated with the River Thames.

11.86. Accounting for the above, the likely residual contamination effects of the Works to ecological receptors would be **insignificant**.

Unexploded Ordnance

11.87. Prior to commencement of the Works a detailed desk-based UXO assessment would be undertaken to identify and classify the actual on-Site risk posed by UXO. The desk-based UXO assessment would include recommendations for mitigation to be undertaken during the Works. Dependent on the Site's actual UXO classification, mitigation may include:

- safety and awareness training to all construction staff;
- UXO safety testing and appropriate clearance certification for each ground penetration; and / or

- UXO safety procedures where UXO is discovered.

11.88. Post implementation of the above, the likely residual effect from UXO would be **insignificant**.

Completed Development

Effects to Human Health from Ground Contamination

11.89. As previously highlighted, an appropriate Remediation Strategy would be formulated to ensure that the Site would be 'suitable for the end use' (i.e. the completed and operational Development) and that no unacceptable contamination risk would remain, particularly with respect to human health.

11.90. Gas monitoring would be undertaken and, depending on the results, gas and vapour protection measures would be implemented to mitigate any ground gas risks. Construction of the basement would remove Made Ground in such areas. The building design would include ventilation of the basement areas to provident the accumulation of car fumes and ground gas from adjacent residual sources. However, in areas where no basement is proposed, adequate ground gas protection measures would be implemented, as appropriate.

11.91. In all areas of soft landscaping, imported, clean and inert suitable for use soils would be utilised to break any pollutant linkages between residual contamination and vegetation.

11.92. In consideration of the above, all relevant contamination receptor linages would be broken as part of the Development or by mitigation measures. Furthermore, the operation of the Development would not give rise to any additional potential pollutant pathways to future occupants, users and visitors to the Site. Accordingly, the likely residual effect to such receptors would be **insignificant**.

Effects to Controlled Waters from Ground Contamination

11.93. As previously highlighted, an appropriate Remediation Strategy would be formulated to ensure that the Site would be 'suitable for the end use' (i.e. the completed and operational Development) and that no unacceptable contamination risk would remain to controlled waters.

11.94. In addition to the above, the assessment of likely significant effects identified that the completed and operational Development would likely give rise to long-term, local, beneficial effects of minor significance. This would be a result of the inherent design of the Development (including green roofs, interceptors and silt traps) which would reduce silt and oil deposition into the River Thames. The likely residual effect would therefore remain as the likely effect. That is, **long-term**, **local**, **beneficial** and of **minor significance**

Effects to Building Structures and Services from Ground Contamination

11.95. Although the likely significant effect of ground contamination on buried infrastructure has been assessed as being insignificant, foundations, together with services would be selected and designed using the results of the ground investigation. Potable water supply pipes would be selected in accordance with relevant guidance and in consultation with Thames Water. Providing these measures are adhered to, the likely residual effect would remain as **insignificant**.

Effects to Ecological Receptors from Ground Contamination

11.96. In all areas of soft landscaping, imported, clean and inert suitable for use soils would be utilised to break any pollutant linkages between residual contamination and vegetation.

11.97. In consideration of the above, all relevant contamination receptor linages would be broken as part of the Development or by mitigation measures. Furthermore, the operation of the Development would not give rise to any additional potential pollutant pathways to future occupants, users and visitors to the Site. Accordingly, the likely residual effect to ecological receptors on the Site would be **insignificant**.

11.98. In respect of any ecological receptors surrounding the Site, including those associated with the River Thames, the likely effect of the completed and operational Development in respect of contamination would likely range from insignificant to long-term, local, beneficial and of minor significance. The latter would be representative of the likely reduction of silt and oil deposition into the River Thames. The likely residual effect would therefore remain as the likely effect. That is, ranging from insignificant to **long-term**, **local**, **beneficial** and of **minor significance**.

Summary

11.99. **Table 11.5** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 11.5: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Effects to the human health of construction workers from ground contamination and dust.	**Insignificant**.	Implementation of a CEMP to manage the Works to effectively minimise contamination risks.	**Insignificant**.
Effects to the human health of the public surrounding the Site, and early occupants of the Development from dust.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **minor significance**.		**Insignificant**.
Installation of piles associated with the buildings of the Development, creating a pollutant pathway to the Secondary A Aquifer beneath the Site.	**Insignificant**.		**Insignificant**.
Installation of piles associated with the river wall, creating a pollutant pathway to the River Thames.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **moderate significance**.		**Insignificant**.
Removal of existing areas of hardstanding, thereby increasing the permeable cover of the Site, allowing for increased rainwater / surface water infiltration to the ground,	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **minor significance**.		**Insignificant**.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
underlying Secondary A Aquifer and River Thames.			
Removal of existing areas of hardstanding, thereby increasing the permeable cover of the Site, allowing for increased rainwater / surface water infiltration to the ground, underlying Principal Aquifer.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **moderate significance**.		**Insignificant**.
Introduction of potential contaminants on the Site which could increase the risk of leakages and spillages to the ground (Secondary A Aquifer) and the River Thames.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **minor significance**.		**Insignificant**.
Effects to ecological receptors on and off the Site from ground contamination and dust.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **minor significance**.		**Insignificant**.
Effects associated with UXO.	**Long-term**, **local**, **adverse** and of **major significance**.	Undertaking of a detailed desk-based UXO assessment to identify and classify the actual on-Site risk posed by UXO and appropriate mitigation measures.	**Insignificant**.
Completed Development			
Effects to the human health of occupants, users and visitors of the Development from ground gas within buildings and hard-landscaped areas.	**Long-term**, **local**, **adverse** and of **moderate significance**.	Further ground and geotechnical investigation to inform an appropriate Remediation Strategy for the Site, as required, thereby ensuring the Site is suitable for its intended end use and does not pose any significant contamination risk to human health and the environment. This may include the implementation of ground gas and vapour mitigation measures and the likely use of	**Insignificant**.
Effects to the human health of occupants, users and visitors of the Development from ground contamination within soft-landscaped areas.	**Insignificant** to **long-term**, **local**, **adverse** and of **moderate significance**.		**Insignificant**.
Effects to controlled waters (including the River Thames) from ground contamination.	**Long-term**, **local**, **beneficial** and of **minor significance**.		**Long-term**, **local**, **beneficial** and of **minor significance**.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Effects to buildings structures and services from ground contamination.	**Insignificant**.	imported clean and inert soils within areas of proposed soft-landscaping.	**Insignificant**.
Effects to ecological receptors on the Site from ground contamination.	**Insignificant** to **long-term**, **local**, **adverse** and of **minor significance**.		**Insignificant**.
Effects to ecological receptors off-Site, including those associated with the River Thames.	**Insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**.		**Insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**.

References

1 CL:AIRE, Model Procedures for Land Contamination (Contaminated Land Report 11 (CLR 11)); September 2004.

2 Landmark Envirocheck information (ref. 89303208_1_1); June 2016.

3 Bomb Sight: Mapping the WWII Bomb Census; www.bombsight.org; accessed online June 2016.

4 The Environment Agency Aquifer Designation Map; www.environment-agency.gov.uk; accessed online November 2014.

5 Aecom (2015); Stag Brewery: Phase 1 Environmental Site Assessment, July 2015.

6 Groundsure 2017, Preliminary Unexploded Ordnance Risk Assessment (SCL-3318495, 2017.

7 Construction (Design and Management) Regulations 2015.

8 The Stationery Office (2002): Control of Substances Hazardous to Health (COSHH) Regulations 2002, The Stationery Office.

12. Surface Water Drainage and Flood Risk

Introduction

12.1 This Chapter, prepared by Waterman Infrastructure and Environment (Waterman IE), presents an assessment of the likely significant effects of the Development on flood risk and surface water drainage, together with the likely significant effects of the Development on the capacity of foul and potable water supply infrastructure. The likely significant effect on groundwater quality resulting from potential ground contamination is assessed separately in **Chapter 11: Ground Conditions and Contamination**.

12.2 This Chapter provides a description of the methods used in the assessment and a description of the relevant baseline conditions of the Site and surrounding area. This is followed by an assessment of the likely significant effects of the Development during demolition, alteration, refurbishment and construction (the Works), and once the Development is completed and operational. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any likely significant adverse effects identified and / or enhance any likely beneficial effects. Taking account of the mitigation measures, the nature and likely significance of residual effects are described.

12.3 This Chapter is based on the findings of the Flood Risk Assessment (FRA), prepared by Hydro-Logic (refer to **Appendix 12.1**), and the Drainage Strategy prepared by Waterman IE (refer to **Appendix 12.2**).

Assessment Methodology and Significance Criteria

Assessment Methodology

12.4 The FRA and the Drainage Strategy were used to inform the baseline conditions of the Site and likely significant effects of the Development on surface water resources and flood risk. These reports were undertaken in accordance with the National Planning Policy Framework (NPPF)[1] and in consultation with statutory consultees including London Borough of Richmond Upon Thames (LBRuT), Environment Agency (EA), Port of London Authority (PLA) and Thames Water. A summary of the methodology is provided as follows. Full details are provided in **Appendix 12.1** and **Appendix 12.2**.

Baseline Data Collection and Sources

12.5 The relevant baseline conditions of the Site and surroundings were established using the following sources of information:

- the Environment Agency's (EA) online flood maps and hydraulic base modelling for the River Thames;
- Ordnance Survey (OS) maps, topographical surveys and British Geological Society (BGS) maps;
- on-Site surface water drainage records to review the existing drainage infrastructure;
- the Preliminary Environmental Risk Assessment and the Environmental Risk Assessment in relation to ground conditions and contamination prepared by Waterman IE (refer to **Appendix 11.1** and **11.2**) and the AECOM Environmental Site Assessment Reports[2,3,4];
- a visual inspection of the Site on 16th June 2016 to establish the condition of the Site including drainage;

- review of the Condition Survey of the Thames River Wall report (**Appendix 12.3**) and The Malting Wall Assessment (**Appendix 12.4**) undertaken by Waterman IE;
- consultation with the EA and Thames Water to obtain historical reports on flooding incidents and sewer records; and
- a review of LBRuT's Sequential Test Document and other relevant local planning policy documents.

Flood Risk Assessment

12.6 A FRA (refer to **Appendix 12.1**) has been undertaken by Hydro-Logic, in accordance with the requirements of the National Planning Policy Framework (NPPF)[1] and the accompanying technical guidance[5]. The purpose of the FRA is to identify all potential sources of flooding at the Site, determine the risk posed by these flooding sources to the Development and to predict the likely effect on flood risk that the Development poses to surrounding receptors. Tidal, fluvial, pluvial (surface water), sewer, groundwater and artificial, flood risks have been considered in the FRA, with allowances made for the likely effects of climate change, where relevant. In addition to breach modelling provided by the EA, Hydro-logic undertook further breach modelling, as requested by LBRuT following the FRA Scoping Level FRA (refer to **Appendix B** and **C** of **Appendix 12.1**), as part of the FRA to establish the effect that the Development may have on flood extents resulting from breach analysis.

12.7 As the Chalkers Corner Component of the Site would include highway re-modelling works and landscaping works (refer to **Chapter 5: The Proposed Development**), there would be no change of land-use or impact on ground levels in the Chalkers Corner component of the Site. There are accordingly, no flood risk implications of this part of the Site and it is not considered further in the FRA. The geographical coverage of the FRA is therefore considered to be appropriate and robust for the purposes of the assessment.

Drainage Strategy

12.8 Consideration is also given in the FRA to surface water drainage to ensure the Development does not increase the risk of flooding at off-Site locations. Accordingly, a drainage strategy for the Development has been prepared by Waterman IE. This sets out the proposed surface water runoff rates, together with the type and volume of attenuation proposed. The drainage strategy has been used to inform the FRA and the qualitative assessment presented in this Chapter, which has been based on professional judgement.

12.9 The foul water flow rates of the Development were calculated by Waterman IE. Based on the calculated foul water discharge rates of the Development a qualitative assessment has been undertaken using professional judgement to assess the likely significant effects of the Development on foul water capacity.

12.10 The Drainage Strategy has been developed for the Stag Brewery component of the Site only. The Chalkers Corner component of the Site is highway land and all drainage aspects are the responsibility of the local highway authority. The surface water run-off from the highway drainage would be discharged to the sewer as existing and would not be attenuated. As a result, Chalkers Corner is not included in the Drainage Strategy and this is considered to be appropriate and robust.

Potable Water Demand

12.11 A qualitative assessment of the likely significant effects of increased demand on the capacity of potable water supply infrastructure at the Site has been undertaken. The assessment is based upon available published information from Thames Water and calculations of the Development's likely potable water demand prepared by the Applicant's Building Services Engineers (Hoare Lea).

12.12 In respect of the assessment of the outline component of the Development (Development Area 2), the assessment set out within this Chapter has considered the maximum allowable spatial parameters sought for approval. This would give rise to the most intrusive ground works and the maximum amount of impermeable land cover so can be considered to reflect a 'worst-case' assessment for issues such as groundwater flooding and surface water flooding. That said, based on professional and expert judgement, it is unlikely that the minimum allowable spatial parameters sought for approval would give rise to materially different flood risk effects. This is because the scale of Works that would be required for both the maximum and minimum allowable parameters would be similar and the sensitive receptors likely to be affected by flooding would be the same.

Significance Criteria

12.13 In accordance with **Chapter 2: EIA Methodology**, the relative significance of the likely and residual effects considered in this Chapter are based upon the scale of significance presented in **Table 12.1**.

Table 12.1: Significance Criteria

Significance Criteria	Description of Criteria
Beneficial effect of major significance.	Significant local-scale or moderate to significant regional-scale reductions in flood risk. Major permanent reduction in demand on surface and / or foul water infrastructure. Permanent regional scale reduction in water supply demand and permanent increase in the capacity of existing infrastructure.
Beneficial effect of moderate significance.	Moderate local-scale or minor regional scale reduction in flood risk. Minor permanent reduction in demand on surface and / or foul water infrastructure. Permanent local scale reduction in water supply demand and permanent increase in the capacity of existing infrastructure.
Beneficial effect of minor significance.	Minor local-scale reduction in flood risk. Temporary local scale reduction in demand on surface and / or foul water infrastructure. Temporary local scale reduction in water supply demand and temporary increase in the capacity of existing infrastructure.
Insignificant.	No appreciable change in flood risk. No change to demand surface and/or foul water infrastructure. No change to demand on the capacity of water supply and the existing water supply infrastructure.
Adverse effect of minor significance.	Minor local-scale increases in flood risk. Increase in surface and / or foul water discharge which would require modifications to existing infrastructure. Increase in water supply which would place additional pressure on existing local supplies and existing water supply infrastructure.

Significance Criteria	Description of Criteria
Adverse effect of moderate significance.	Moderate local-scale or minor regional-scale increases in flood risk. Increase in surface and / or foul water discharge which would place undue pressure on existing infrastructure. Increase in water supply which would place undue pressure on existing local supplies and existing water supply infrastructure.
Adverse effect of major significance.	Significant local-scale or moderate to significant regional-scale increases in flood risk. Increase in surface and / or foul water discharge which would require new infrastructure. Increase in water supply which would exceed the water resource capacity of the region and therefore require new sources e.g. application of an abstraction licence.

Baseline Conditions

Topography

12.14 The Site is generally flat with no significant variations in the topographical gradient. The LiDAR map indicates that it is lowest to the east of the Stag Brewery component of the Site (4 to 6 m AOD) and highest in the north west of the Stag Brewery component of the Site (8 to 10 m AOD).

Geology

12.15 The geology beneath the Site, summarised in **Table 12.2**, was established from previous ground investigations by Dames and Moore (1995), CRA (2003) and Aecom (September 2015), BGS records and the findings of the Waterman IE Ground Investigation undertaken in the eastern part of the Stag Brewery component of the Site. Further details of the underlying geology are described in **Chapter 11: Ground Conditions and Contamination**, **Appendix 11.1** and **Appendix 11.2.**

Table 12.2: Geological Sequence Beneath the Site

Stratum	Area Covered	Estimated Thickness (m)	Typical Description
Hardstanding.	Entire Stag Brewery component of the Site (excluding the playing fields).	0.25 - 0.8	Tarmac or reinforced concrete floor slab at surface level. Encountered as two or three separate layers up to 0.5 m thick, each separated by up to 0.5 m Made Ground in eastern area.
Made Ground.	Entire Stag Brewery component of the Site.	0.4 - 2.7	Predominantly coarse sand and gravel, including pieces of brick and minor amounts of black clinker. Rare pipe fragments.
Alluvium.	Entire Stag Brewery component of the Site.	0.3 - 1.5	Soft brown grey slightly gravelly clay. Gravel is fine to coarse flint.
Kempton Park Gravel Formation.	Entire Stag Brewery component of the Site.	1.4 - 3.9	Clayey, silty sand with varying gravel content with areas of soft, brown, sandy clay. Gravel is sub-angular to rounded, fine to coarse flint.

Stratum	Area Covered	Estimated Thickness (m)	Typical Description
London Clay Formation.	Entire Stag Brewery component of the Site.	73	Stiff grey to brown clay, with occasional pockets of silt and sand.
Lambeth Group.	Entire Stag Brewery component of the Site.	15 - 20	Clay, some silty or sandy, with sands and gravels.
Thanet Formation.	Entire Stag Brewery component of the Site.	5 - 10	Fine grained sand that can be clayey and glauconitic. Flints at the base of the formation.
Chalk Group.	Entire Stag Brewery component of the Site.	Not proven.	Chalk and flints.

Hydrology and Hydrogeology

12.16 The nearest surface water to the Site is the River Thames, directly adjacent to the eastern part of the Stag Brewery component of the Site (Development Area 1) to the north.

12.17 The EA's Aquifer Designation Map[6] indicates that the Alluvium and Kempton Park Gravel Formation underlying the Stag Brewery component of the Site are classified as a Secondary A Aquifer (minor aquifer). These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Based on available information, it is anticipated that shallow groundwater in the Alluvium and Kempton Park Gravel Formation is in hydraulic continuity with the River Thames directly adjacent to the Stag Brewery component of the Site.

12.18 The London Clay Formation is an Unproductive Stratum. The Lambeth Group and Thanet Formation are both also classed as Secondary A Aquifers, with the Chalk Formation at depth a Principal Aquifer. According to the EA, the Site is not located within a groundwater Source Protection Zone.

Groundwater Level

12.19 Previous Site Investigations by AECOM in September 2015[3] for the Stag Brewery component of the Site and subsequently Waterman IE in October 2016 for the east part of the Stag Brewery component of the Site (refer to **Appendix 11.2**) observed broadly consistent groundwater levels generally 2 m AOD in the east part of the Stag Brewery component of the Site (east of Ship Lane) and 1.3 m AOD in the west part of the Stag Brewery component of the Site (west of Ship Lane). Occasional perched levels were also observed at different locations across the Stag Brewery component of the Site. The 2015 monitoring results indicate the inferred groundwater flow direction to be to the west.

12.20 Tidal effects from the River Thames on groundwater levels were also assessed. The assessment indicates that groundwater levels of the northern boundary of the east part of the Stag Brewery component of the Site had a very subdued response to tidal variation.

Groundwater Abstractions

12.21 There are two recorded historical groundwater abstractions within the Stag Brewery component of the Site boundary. These wells were drilled circa 1830, extended to 101m and 121m below ground level and drew groundwater from the Chalk Group aquifer. A further two groundwater abstractions are recorded within a 1km radius of the Site. The closest of these is located 228m north of the Site at Dukes Meadow Golf Club, drawing groundwater from the Chalk Group aquifer. The further abstraction is located 663m north east, also at Dukes Meadow Golf Club. There are no Environmental Permits for discharges to groundwater recorded within 1km of the Site.

Tidal and Fluvial Flood Risk

12.22 The EA have provided maps of the flood zone which shows that the east and south of the Site (including the Chalkers Corner component of the Site) is located within Flood Zone 3 (high probability of tidal flooding), and the north east of the Stag Brewery component of the Site is located in Flood Zone 2 (medium probability of tidal flooding). The principal source of flood risk to the Site is from the River Thames, which is entirely from tidal flooding, with no fluvial component. As such, the risk of fluvial flooding is very low and has not been considered further within this Chapter.

12.23 Despite being located within an area at a medium to high probability of tidal flooding, the Site is protected up to the 1 in 1000-year standard by the River Thames defences. The Thames Estuary 2100 Plan (TE2100)[7], would ensure that the River Thames defences are not overtopped for the lifetime of any redevelopment on the Site. Furthermore, the Site currently benefits from tidal flood defences along the river frontage. These are formed from the Site boundary walls and the Maltings building.

12.24 Given the Site is protected by the River Thames flood defences, the risk of tidal flooding is considered to be low.

Breach

12.25 Despite the Site being defended from tidal flooding, the EA require assessment of the residual risk of flooding to the Site should the defences fail (breach).

12.26 The EA have provided their breach modelling maps and levels (refer to **Appendix 12.1**) which show that some parts of the Site could be affected if the defences were to fail. EA modelling indicates that in this scenario the Site could be subject to a future peak flood level of 6.03 m AOD by the year 2100. The further breach modelling undertaken by Hydro-logic for the Development is presented later in this Chapter.

Surface Water (Pluvial) Flood Risk

12.27 Pluvial flooding occurs when natural and engineered systems lack capacity to manage the volume of rainfall. Pluvial flooding can occur in urban areas during an extreme, high intensity, low duration summer rainfall event which overwhelms the local surface water drainage systems. This flood water would then be conveyed via overland flow routes based on the local topography.

12.28 Review of the EA's Risk of Flooding from Surface Water map indicates that most of the Site is at a 'very low' risk of surface water flooding. However, there are some areas, generally in the south of the Site, that are shown to be at a 'low' to 'high' risk of flooding.

12.29 In the low-risk scenario, greater depths of surface water flooding are predicted in Lower Richmond Road adjacent to the Watney's Sports Ground playing fields (300 to 900 mm) and in Mortlake

Green, south of Lower Richmond Road (in excess of 900 mm). Some of the surface water flooding on Lower Richmond Road may be linked to blocked gully incidents.

12.30 For the high-risk scenario, predicted surface water flooding is restricted to the carriageway of the Upper Richmond Road and the adjacent park and is of shallow depth.

12.31 Although surface water and foul sewers are laid under the Site, Thames Water have confirmed that there is no recorded history of sewer flooding at the Site (in their response to Waterman IE dated January 2016), extracts from which are shown in **Appendix E** of **Appendix 12.1**.

12.32 Given the generally 'very low' risk of surface water flooding and the lack of pluvial flooding history, it is considered that the risk of pluvial flooding from surcharged sewers or overland surface water runoff is low.

Groundwater Flood Risk

12.33 As previously described, groundwater levels are generally 2 m AOD in the east part of the Stag Brewery component of the Site (east of Ship Lane) and 1.3 m AOD in the west part of the Stag Brewery component of the Site (west of Ship Lane), with occasional perched groundwater levels.

12.34 LBRuT have confirmed that they hold no record of any flooding reports at Mortlake High Street, Lower Richmond Road, Ship Lane or Williams Lane, other than blocked gully reports.

12.35 Given that LBRuT hold no records of historical groundwater flooding within and surrounding the Site, groundwater flooding at the Site is considered to be low over the majority of the Site. However, in the far east of the Stag Brewery component of the Site, there is some uncertainty over the relative influence of the mechanisms controlling groundwater flow through the Site - either through the high permeability Kempton gravels and / or groundwater flows in the underlying minor aquifer.

Flood Risk from Artificial Sources

12.36 The Site has a potential risk of flooding from the Queen Elizabeth II reservoir and the Queen Mary reservoir in Surrey. This could occur if the reservoirs were to fail, causing water to flood over the western and southern parts of the Site. However, these reservoirs are located over 20 km upstream of the Site, and are managed and maintained by Thames Water. All large reservoirs must be inspected and supervised by reservoir panel engineers. The EA are the enforcement authority for the Reservoirs Act 1975[8] and ensure that reservoirs are inspected regularly and essential maintenance and safety work is carried out. This would ensure that the embankments are maintained to a high standard, reducing the associated flood risk.

12.37 There are no other artificial bodies of water within proximity to the Site, and the risk of flooding from artificial sources is therefore considered to be very low. Consequently, flood risk from artificial sources has not been considered further in this Chapter.

Infrastructure

Flood Defences

12.38 The formal River Thames defences within and in the vicinity of the Site are made up of a combination of walls, existing buildings and raised ground levels.

12.39 EA correspondence indicates that the present day statutory flood defence level at the Site is 5.94m AOD.

12.40 Defence record drawings confirm that the defences adjacent to the Site vary in construction. In some locations, the defences consist the remaining exterior walls of historic buildings (where the windows have been bricked up). For example, the brick wall of the Maltings Building within the Stag Brewery component of the Site behind the towpath, forms part of the flood defence wall. A Site visit confirmed that in some locations the walls themselves are considerably taller than the statutory defence height (5.94m AOD). A short section of the tidal defences is also formed in an informal basis by Ship Lane, as it rises away from the River Thames in a southerly direction. On occasion, Ship Lane and the adjacent towpath to north of the Stag Brewery component of the Site can become flooded at high tide, as noted during a previous walkover of the Site by Waterman in January 2016 (refer to **Appendix 12.1**).

12.41 Stop-logs (hydraulic engineering control elements) are located in Bull's Alley. The stop-log arrangement at Bull's Alley enables maintenance vehicles to access the river to clear debris on the foreshore. Given this regular usage, it is anticipated that this location would be regularly inspected and maintained.

12.42 The current condition of the defences is rated by the EA as 2 which is 'good' on a scale of 1 (very good) to 5 (very poor). However, a river wall condition survey (**Appendix 12.3**) undertaken by Waterman IE in September 2016 for a 368 m stretch of the River Thames wall along the northern boundary of the Stag Brewery component of the Site found the river wall to be in a poor to fair condition. Due to the nature of the existing defences it is likely that some areas would need to be replaced as part of any development proposals coming forward.

Existing Foul Drainage

12.43 Thames Water sewer records (refer to **Appendix B** of **Appendix 12.2**) indicate that several sewers are present near to and beneath the Stag Brewery component of the Site, as indicated in **Table 12.3**.

Table 12.3: Existing Sewers Associated with the Stag Brewery Component of the Site

Location	Sewer
Crossing through the north west of the Stag Brewery component of the Site.	225mm diameter Thames Water foul sewer.
Within north west of the Stag Brewery component of the Site.	Two Thames Water foul rising mains.
Along north eastern boundary of the Stag Brewery component of the along Thames towpath.	686mm diameter combined Thames Water sewer.
West of Stag Brewery component of the Site along Willams Lane.	900mm diameter Thames Water surface water sewer.
South of Stag Brewery component of the Site along Lower Richmond Road.	600mm diameter Thames Water surface water sewer.
	750mm diameter and 225mm diameter Thames Water foul water sewer.
Centre of Stag Brewery component of the Site along Ship Lane.	600mm diameter Thames Water surface water sewer.
	225mm diameter Thames Water foul water sewer.

12.44 Following review of the existing on-Site drainage records for the Stag Brewery component of the Site (refer to **Appendix C** of **Appendix 12.2**) it is understood that existing drainage scenario is as follows:

- existing foul flows discharge to the Thames Water sewer network;
- existing surface water flows from the north east of the Stag Brewery component of the Site discharge into the Thames via an existing outfall; and
- existing surface water flows from the remainder of the Stag Brewery component of the Site discharge to the Thames Water sewer network at various connection points.

12.45 The existing foul discharge rate has been calculated using the water consumption method at 14.4 l/s.

Potable Water Supply and Demand

12.46 Thames Water is responsible for public water supply within in, and in the locality of the Site. There are water distribution mains surrounding the Site including those running alongside Thames Bank (north west of the Stag Brewery component of the Site), Williams Lane (western boundary of the Stag Brewery component of the Site), Ship Lane (running north south within the centre of the Stag Brewery component of the Site) and Lower Richmond Road / Mortlake High Street (south of the Site). A trunk main also runs along Lower Richmond Road / Mortlake High Street.

12.47 As the existing Site is currently vacant, there is currently no significant on-Site demand for potable water and therefore there is no existing water demand rate for the Site.

Likely Significant Effects

The Works

Groundwater Flow and Flooding

12.48 With reference to **Chapter 5: The Proposed Development** and **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, the bottom of the proposed basement slab within the east part of the Stag Brewery component of the Site (east of Ship Lane) would be set at 0.76 m AOD. This is around 1.25 m below the typical groundwater level of 2 m AOD. Whilst locally, some higher levels have been observed up to 3 m AOD, these are believed to be perched water tables that reflect local interventions.

12.49 The proposed foundation design for all buildings within the detailed element of the Stag Brewery component of the Site would comprise a 1 m deep piled raft, with the exception of the proposed cinema area which would be founded in 1 m deep local pile caps with 1 m deep ground beams. Below the foundations, all buildings would have an expanse of piles (3 to 5 per column) that would be 600mm in diameter and extending down 25m in length. However, as the piles would be relatively small in diameter (up to 600mm), groundwater flow would be able to continue to move around the new piles.

12.50 The maximum depth of the proposed basement within the west part of the Stag Brewery component of the Site (west of Ship Lane), would be set at 2.45m AOD. All proposed buildings in the western part of the Stag Brewery component of the Site would be above the observed groundwater levels of September 2015, therefore the Works would not impede or interfere with any groundwater flows in this part of the Site.

12.51 The new river wall would be formed within the north of the Stag Brewery component of the Site. This would comprise a sheet pile wall with an in-situ reinforced concrete capping beam. The toe level of the sheet pile wall would be set at -1 m AOD. Given the river wall piling works would be undertaken immediately next to the River Thames, and groundwater at this location is in hydraulic continuity with the river, groundwater flow would not be impeded by these works.

12.52 In view of the above, perched groundwater could be encountered during the excavation works required to construct the basement within the east part of the Stag Brewery component of the Site (east of Ship Lane). This could lead to the ingress of groundwater and potential flooding of excavated areas. The potential effect from increased flood risk from groundwater during construction, however, would be temporary and highly localised on-Site. It is therefore not considered likely that the excavation works would lead to an increase in flood risk from groundwater beyond the Site. Taking a precautionary approach, it is anticipated that during excavation of the basement within the east part of the Stag Brewery component of the Site (east of Ship Lane) in the absence of mitigation there would be a **temporary**, **short** to **medium-term**, **local**, **adverse effect** of **minor significance** in respect of groundwater flooding.

Surface Water (Pluvial) Flood Risk

12.53 Construction works, including earthworks, removal of some soft landscaping and trees, storage of waste stockpiles, sewer diversions and temporary Site drainage, would have the potential to give rise to changes in the surface water run-off regimes particularly during periods of heavy rainfall. The diversions would need to be undertaken prior to the commencement of the basement construction and would require formal liaison with Thames Water.

12.54 In the absence of mitigation, the risk of surface water flooding from overland sources could increase, as discharge rates may not be controlled, and overland surface water run-off could potentially be diverted away from the existing sewers and towards areas at higher risk of surface water flooding (such as Lower Richmond Road and Mortlake Green). A temporary change in Site conditions, and in surface water drainage regimes, could give rise to a **temporary**, **short to medium term**, **local**, **adverse effect** of **minor significance**.

River Wall

12.55 The Development does not propose any direct work to the River Thames. Nonetheless, statutory exclusion zones from the River Thames and approval of relevant consents for sewer diversion works would be agreed with the EA and other appropriate bodies in advance of the Works.

12.56 The Works, including work to the river wall and the construction compounds, would be located behind the existing river wall, within the Stag Brewery component of the Site, ensuring that access to the river wall from the towpath is maintained. This would ensure that access to the river wall for inspection and maintenance would not be hindered during the Works. As such the likely effect on access to the river wall during the Works would be **insignificant**.

12.57 As set out previously, the new flood defence walls comprise a sheet pile wall with an in-situ reinforced concrete capping beam behind the existing river wall. The existing river wall would be lowered in certain areas. However, this would be undertaken after the new flood defence wall has been built, which would be set at a minimum of 6.70 m AOD, with a 0.42 m high balustrade on top in some areas providing a crest level of 7.12 m AOD, well above the current statutory level of 5.94 m AOD. In parts, the wall would be lowered at 6.13 m AOD but would be topped by a 1.1 m high glass balustrade, with an effective crest at 7.23 m AOD. Temporary defences would also provide the required level of protection until any replacements are in place and the Works would be undertaken when there is no practical risk of tidal flooding. The alignment of the new flood defence wall would be either identical to the existing alignment, or set further into the Stag Brewery component of the Site. Accordingly, there would be no loss of flood plain storage. All such work would be undertaken in conjunction with the EA to ensure necessary approvals for design and constructional sequence through Environmental Permits (formerly Flood Defence Consents). As

such, the likely effect of remodelling the river wall on flooding during the Works would be **insignificant**.

Foul and Potable Water Infrastructure Capacity

12.58 Wastewater generation from the Works would include effluent from sanitary facilities, as well as sediment-laden water from excavations, washing down and wheel wash facilities. It is expected that foul water generated at the Site during excavation and construction would be drained via the existing Thames Water combined sewers in the surrounding area. This would result in a minor temporary increase in foul water flows to the Thames Water network, although due to the low volumes expected this is expected to be **insignificant**.

12.59 The Works may require significant volumes of water supply for sanitary facilities for staff, wheel washing and the washing down of construction areas. This is considered to have a **temporary**, **short** to **medium term**, **local**, **adverse effect** of **minor significance** on water supply and demand.

Existing Drainage Infrastructure

12.60 Vibration from piling and excavations could have the potential to lead to water main bursts or sewer collapse. However, the Development would comply with all necessary easements, and where these are not possible, appropriate diversions would occur.

12.61 The 225 mm diameter Thames Water foul sewer crossing the Stag Brewery component of the Site would be diverted as shown on the drainage plan in **Appendix I** in **Appendix 12.2**. The two rising mains only service the existing uses within the Stag Brewery component of the Site (now redundant and dis-used), and would be abandoned. An easement of 4 m is allowed for in respect of the combined sewer along the north eastern boundary of the Stag Brewery component of the Site. This would ensure there would be no physical effect to the combined sewer as it conveys off-Site flows.

12.62 Although appropriate easements and sewer diversions would be in place and agreed with Thames Water, in the absence of mitigation, vibration effects from piling and excavation works could result in a **temporary**, **short to medium term**, **local**, **adverse effect** of **moderate significance**.

Completed Development

Tidal Flood Risk

Risk to Occupants of the Development

12.63 Whilst the Site is located in a tidal flood zone, the land raising and setting of finished floor levels (FFLs) within the Development associated with the Stag Brewery component of the Site would ensure that the majority of occupiable floorspace of the Development would be at a safe level. This means that even in the event of overtopping of defences or a breach, the TE2100 levels would not encroach on the residential accommodation, all of which is set at a minimum of 7.03 m AOD, well above the reference flood level of 6.03 m AOD by 2100. The principal streets have been set at a minimum level of 6.03 m AOD in the east part of the Stag Brewery component of the Site (east of Ship Lane) and 6.30 m AOD in the west part of the Stag Brewery component of the Site (west of Ship Lane). Given this level of protection, residents would have no need for emergency egress from the Site due to flood conditions. The Development associated with the Chalkers Corner component of the Site would not be occupiable. As such, land raising would not be required at the Chalkers Corner component of the Site.

12.64 Despite the above, there are some exceptions where occupiable floorspace within the Development would be below the reference flood level of 6.03 m AOD. The exceptions would be as follows:

- **Building 1 (Cinema) & B06 (Retail):** the proposed FFL for the cinema and retail area would be set at 5.565 m AOD, however, since the proposed leisure and retail uses have a shorter design life, it is appropriate to use modelled flood levels for 2065. Interpolation for this date gives a reference flood level specific to this location of around 5.52 m AOD, which is lower than the FFL and so the risk posed by tidal flooding is deemed acceptable;
- **Building 4 (The Maltings):** the FFL for the ground floor has been constrained by the existing building which would be retained, altered and refurbished as part of the Development. The FFL for the community space on the ground floor would be set at 4.74 m AOD, well below the reference flood level. Furthermore, the exits from the residential properties on the upper floors of the Maltings would be at 5.53 m AOD, also below the reference flood level. However, a survey of the Maltings wall undertaken by Waterman IE (**Appendix 12.4**) showed the wall to have sufficient capacity to resist the increase in water level that occurs when the river rises to the 2100 flood defence levels. As such, the risk posed by tidal flooding is deemed acceptable;
- **Building 5 (Hotel lobby and bar):** the hotel lobby and bar are at a level of 5.15 m AOD, slightly below the reference flood level for this location of 5.52 m AOD. However, access to the hotel lobby and bar would be available via steps from the hotel lobby to reception, which would be set at the 2100 reference flood level of 6.03 m AOD;
- **Building 9 (Boathouse):** most of the ground floor would be at 4.25 m AOD in order to provide a facility for boat storage and access to the River. Club house facilities would also be provided at this level. Whilst the access to the river would be via 'flood-proof doors', it is accepted that these doors would not be sufficient to form part of the official tidal defences. The residential entrance lobby, deemed a 'more vulnerable' use, would be set at 6.03 m AOD and therefore be located at a safe level. However, the defences would need to be raised at this level in the future to ensure that the defences are at a sufficient height to cope with the TE2100 levels for 2100 of 6.70 m AOD. Provision has been made for additional steps from the training room to the residential exit to ensure the integrity of the defences for TE2100 levels;
- **Building 10 (Retail & substation):** some retail space along the southern elevation would have a FFL of 5.40 m AOD, lower than the reference level at this location, however there would be access via steps to levels at 6.03 m AOD at the rear of the unit. This building would also contain a sub-station, with a FFL also at 5.40 m AOD, which would need to be protected from residual risk of flooding. There would be a single point of access to the facility via a secure, flood proof door. As such, the risk posed by tidal flooding is deemed acceptable; and
- **Basement car park:** The entrance to the eastern basement from Mortlake High Street would be around 5.3 m AOD and below the reference flood level. Consequently, there would be a residual risk from any breach in the vicinity of Bull's Alley. However, it should be noted that the basement would not be for habitation and the other entry / exit ramp to the basement located along Ship Lane would be located above the reference flood level.

12.65 In summary, the Development would be designed to ensure all residential accommodation and most of the non-residential accommodation would be safe from tidal flooding. Exceptions lie with Building 9 (the Boathouse) and one entrance to the basement car park located within the east part of the Stag Brewery component of the Site (east of Ship Lane), However, the land uses within Building 9 and the basement car park that would be at risk from tidal flooding would not be intended for habitation. As such, the Development is likely to result in an **insignificant** to **long-**

term, local adverse effect of **minor significance** in respect of flood risk from tidal sources on occupants of the Development.

Off-Site Risk

12.66 It is a fundamental principle of the NPPF that redevelopment should not cause any adverse flood risk to others. The EA was consulted in 2016 as to whether any flood storage compensation would be required for Development. The response is provided in **Appendix C** of **Appendix 12.1** which states:

"*We can confirm that as the site is only at risk of tidal flooding flood storage compensation will not be required.*"

12.67 As noted in **Chapter 5: The Proposed Development**, the defences along the river frontage would be significantly upgraded. As such, the Development would reduce the risk of a breach.

12.68 The modelling undertaken as part of the FRA (refer to **Appendix D** of **Appendix 12.1**) has shown a general reduction in flood extent and depths compared with the EA modelling. Furthermore, the proposed elevated nature of the Stag Brewery component of the Site could provide a safe refuge for residents of low-lying neighbouring properties that would be at a greater risk from flooding than the Development in the highly unlikely event that the defences would be breached.

12.69 Given that the Development would improve the defences along river frontage and would provide elevated ground levels that could provide a safe refuse for surrounding residents, the Development would have a **long-term**, **local**, **beneficial effect** of **minor significance** on tidal flood risk to surrounding receptors.

Surface Water (Pluvial) Flooding

12.70 Surface water runoff from the north east of the Stag Brewery component of the Site would discharge by gravity to the River Thames (adjacent to the northern boundary of the Stag Brewery component of the Site) via three outfalls. As the River Thames is tidal at this location, direct discharge to the river would be unrestricted. Surface water runoff from the remainder of the Stag Brewery component of the Site would discharge via gravity to the Thames Water sewer network in the surrounding highways, at 50% of the existing rate (equivalent to 405.0 l/s), as per the London Plan[9]. LBRuT have confirmed that this approach is acceptable (refer to **Appendix D** of **Appendix 12.2**). The surface water run-off from the highway drainage associated with the Chalkers Corner part of the Site would discharge to the sewer as existing and would not be attenuated.

12.71 Based on a restriction to 405.0 l/s, approximately 2,655 m^3 of attenuation storage would be required, accounting for a 40% increase in rainfall intensity due to climate change. The required attenuation is provided via attenuation tanks (with the potential for lined permeable paving / sub-base storage to be considered at the detailed design stage). The location and provision of attenuation is set out in **Table 12.4**.

Table 12.4: Attenuation Provision Across the Development

Attenuation Tank	Location Within the Stag Brewery Component of the Site	Attenuation Provided (m^3)
1	South of the school building, under the Multi-Use Games Area (MUGA), West of Ship Lane.	917
2	North of the school sports pitch, west of Ship Lane (two tanks in series).	100

Attenuation Tank	Location Within the Stag Brewery Component of the Site	Attenuation Provided (m^3)
3	Western basement, underneath Building 19, west of Ship Lane (three tanks in series).	252
4	Western basement, underneath Building 18, west of Ship Lane (two tanks in series).	177
5 (offline tank)	Below tree pits, north west of Building 18, west of Ship Lane (two tanks in series).	369
6	Below tree pits, in between Buildings 13 and 14, west of Ship Lane.	499
7	In between Buildings 1 and 6, east of Ship Lane.	140
8	Below tree pits, in between Buildings 5 and 6, east of Ship Lane.	117
9	Below tree pits, in between Buildings 5 and 10, east of Ship Lane.	84
TOTAL		**2,655**

12.72 Where feasible, the attenuation tanks would be located outside of the basement extents and below the extents of the proposed tree pits. However, due to the extensive basement proposed in the north west of the Stag Brewery component of the Site, two attenuation tanks are proposed within the basement. Surface water from these tanks would be pumped into the adjacent Thames Water sewers. This would avoid the risks associated with the Thames Water sewers surcharging, which could back-up into the low-lying basement tanks and potentially cause over-flow into the basement rooms.

12.73 It is anticipated that any surface water within the proposed basements would pass through a petrol interceptor prior to being pumped into the foul network. In addition, appropriate treatment would be incorporated into the drainage system to ensure that the quality of water discharged is acceptable. This would be achieved through the incorporation of green roofs, and the potential inclusion of rainwater harvesting and permeable paving. If required, a biomat filtration system, downstream defender or other hard engineered solution could also be incorporated to ensure discharge is appropriately treated.

12.74 The above would result in a reduction in the volume and peak rate of surface runoff from the Site and hence a reduction in flood risk elsewhere compared to the current situation. Consequently, the inclusion of sustainable drainage systems (SuDS) and the management of surface water would likely result in a **long-term**, **local**, **beneficial** and of **minor significance** effect on surface water flooding.

12.75 As discussed earlier, there is a lack of pluvial flooding history in the vicinity of the Site and the existing risk of flooding to the Site from surcharged sewers or overland surface water runoff is very low. This is unlikely to change with the Development in place. Accounting for the above, including the inherent design mitigation to avoid sewer surcharging, the Development would have an **insignificant** effect on sewer surcharging flooding.

Groundwater Flow and Flooding

12.76 As described previously, the basement east of Ship Lane in the Stag Brewery component of the Site would sit within and below the typical groundwater level of 2 m AOD. However, once the Development is operational, this encroachment is unlikely to pose any groundwater flood risk, either on-Site or off-Site as the basement would be designed to be suitably waterproofed for the lifetime of the Development.

12.77 Furthermore, it was observed that the groundwater flow paths were to the west and south-west and away from the River Thames. It was inferred that the levels in the Thames, averaged over a tidal cycle of around 2 m AOD, were providing the 'source' for the associated hydraulic gradient. Any projection of the basement into this saturated area would not lead to any increase in groundwater levels off-Site. A small reduction on the southern side of the Development is the most likely response, but this would not be significant.

12.78 In view of the above, the likely effect of groundwater flooding both on-Site and off-Site would be **insignificant**.

River Wall

Access to the River Wall

12.79 The Development does not include any works to the River Thames channel or river walls. The proposal provides a minimum 4 m clear access route on the Development side for any access that may be required (as per the existing situation and as agreed with the EA via a meeting held on 26th September 2016, refer to the meeting minutes in **Appendix 12.5**), however the actual standoff is considerably more than this. Access is also available to the defences from the towpath. As such access to the river wall once the Development is completed and operational would be **insignificant**.

Change in Flood Risk from Upgrading Tidal Defences

12.80 As previously described, the crest level of the remodelled defences would be set at a minimum of 6.70 m AOD. This is the level recommended in the TE2100 Plan for 2100. It is therefore well above the current statutory level, and obviates the need for any raising to be undertaken for the foreseeable future. Furthermore, the flood wall would be topped in some places a 1.1 m high glass balustrade, with an effective crest level of 7.23 m AOD.

12.81 The risk of breach in this entire section of remodelled flood wall is effectively eliminated by the ground raising behind the defences. This provides a very robust defence, requiring only limited maintenance. The alignment is either identical to the existing alignment, or behind the existing alignment, within the Stag Brewery component of the Site. As such, there would be no loss of flood-plain storage.

12.82 Part of the defences are formed by The Maltings, as they have been for many years. The survey of the Maltings wall undertaken by Waterman IE (**Appendix 12.4**) showed the wall to have sufficient capacity to resist the increase in water level that occurs when the river rises to the 2100 flood defence levels. Furthermore, it is anticipated that the stop-logs at Bull's Alley are regularly inspected and maintained, given the regular usage to access the river to clear debris on the foreshore. As such, the risk of breach is considered unlikely at this location.

12.83 In summary, the Development is considered to result in a significant reduction in flood risk. This would be partly due to the greater integrity of the defences, and partly due to likely lower incidence of breach at the stop-logs in Bull's Alley. The modelling undertaken as part of the FRA has shown a general reduction in flood extent and depths compared with the EA modelling. As such, the likely effect of tidal flooding as a result of upgrading the tidal defences as part of the Development would be **long-term**, **local**, **beneficial** and of **minor significance**.

Change in Foul Water Drainage Capacity

12.84 The Development would introduce new land uses on the Site resulting in an increase in foul water discharges from the Site. As set out in **Appendix 11.2**, the proposed foul discharge rates have

been calculated using the water consumption method at 25.5 l/s, an increase of 11.1 l/s than existing. On-site drainage records indicate that in the existing situation some surface water flows are directed to the Thames Water foul sewer. As a result of the Development, all surface water flows into the foul sewage system would be removed.

12.85 The proposed foul drainage would be designed in accordance with BS EN 752 - Drain and Sewer Systems Outside Buildings[10], BS EN 12056 - Gravity Drainage Systems Inside Buildings[11], and Approved Document H of Building Regulations[12].

12.86 It is understood that foul flows from the existing Stag Brewery component of the Site discharge to the Thames Water foul network in the surrounding highways. It is proposed to mimic this scenario, with new connections into the sewers on Mortlake High Street, Lower Richmond Road, Ship Lane, and Williams Lane according to the proposed building layout. The indicative connection points are shown within **Appendix I** of **Appendix 11.2**.

12.87 A Pre-Development enquiry has been submitted to Thames Water to confirm that the existing public sewer network has the capacity to accommodate the foul flows.

12.88 If new connections are required, these would be made to the public sewer system through a Section 106 Agreement with Thames Water, under the Water Industry Act 1991[13] (separate from a planning S106 agreement).

12.89 Despite an outstanding response from the abovementioned Pre-Development Enquiry, it is Thames Water's statutory duty to ensure that sufficient capacity exist in the foul water drainage system (including sewage treatment and network infrastructure) to cope with the demands of existing and future population demands. Accordingly, it is considered likely that the Development would have an **insignificant** effect upon the capacity of foul water drainage infrastructure and sewage treatment works.

Change in Potable Water Demand

12.90 There are no existing uses on the Site that demand significant quantities of potable water. The Development would introduce new land uses on the Site resulting in an increase in potable water demand on the Site.

12.91 New water supplies would be required to serve cold water storage plant in each phase of the Development. Each retail unit would be provided with their own mains water supply. Commercial buildings (e.g. cinema, office, school, community centres) would also each have their own water supply. Each group of buildings (set out below) would require its own fire supply to serve sprinkler plantrooms. New water supplies would be required to serve cold water storage plant in each group of buildings. The water supply rate is based on a tank-fill rate of 4 hours, as follows:

- Buildings 1 to 4 - 2.5l/s;
- Buildings 5 to 8 and 20 - 2.8l/s;
- Buildings 9 to 11 - 2 l/s;
- Buildings 13 to 19 - 6.4 l/s; and
- Buildings 20 and 21 (townhouses) - each would be provided with their own domestic mains water supply.

12.92 Each retail unit would be provided with their own mains water supply, each with circa 0.5l/s capacity. Commercial buildings (cinema, office, school, community centres etc) would each have their own water supply, ranging from 0.5l/s to 1.5l/s depending on fit out requirements. Each group of buildings would also require its own fire supply to serve sprinkler plantrooms.

12.93 The Thames Water 'Water Resource Management Plan 2015-2040' (December, 2013)[14] indicates that over a forecast period to 2040, there is likely to be a significant demand on water supply in the London catchment (the London Water Resource Zone (WRZ) in the Thames Water supply area). To address this, Thames Water has prepared a detailed plan which aims to ensure that sufficient supply is available to meet demand during the plan period. This involves a variety of measures including the replacement of Victorian Water Mains to reduce leakage, compulsory metering and encouraging the use of water efficiency measures. Developing new water resources would also be required and schemes planned by Thames Water comprise a number of small groundwater schemes, aquifer recharge schemes, aquifer storage and recovery schemes, and water reuse schemes. In addition, in extreme periods, bulk water transfers from neighbouring water companies and further afield may be required to ensure availability of supply.

12.94 As a result of the above measures, water demand should be met within London until at least 2040. The demand supply forecast provided by Thames Water which takes into account an increase in population within the London WRZ, thus the additional demand on water resources resulting from the Development would likely be accommodated. Consequently, the likely effect of the Development on potable water demand would likely be **insignificant**.

Mitigation Measures and Likely Residual Effects

The Works

Groundwater Flow and Flooding

12.95 The construction of the basement within the east part of the Stag Brewery component of the Site (east of Ship Lane) would involve excavation to below likely groundwater levels. Appropriate dewatering and disposal, using standard techniques such as sumps and pumps would likely be required. This would mitigate the risk of groundwater flooding during excavation works and result in an **insignificant** likely residual effect.

Surface Water (Pluvial) Flood Risk

12.96 The Site-specific Construction Environmental Management Plan (CEMP) developed for the Works (refer to **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**) would include temporary measures to control surface water runoff from the Site. Such measures would include the provision of adequate drainage to manage surface water run-off. Construction of the drainage system should be designed and managed to comply with BS 6031:2009 'The British Standard Code of Practice for Earthworks'[15], which details methods that should be considered for the general control of drainage on construction sites. Discharge rates and volumes of water discharged would be agreed with the EA and Thames Water. Where appropriate, cut-off drainage would be provided around the Site during the Works when there is no on-Site drainage network in place.

12.97 As set out in **Chapter 11: Ground Conditions and Contamination**, temporary stockpiling of materials would be located away from the Thames and drains, and drums and barrels would be stored in designated bunded safe areas within the Site compound to reduce the risk of silt and pollutants entering the surface water drainage system.

12.98 Following the implementation of these measures, the anticipated likely residual effect of surface water flooding during the Works would be **insignificant**.

River Wall

12.99 Given that the river wall would still be accessible from the towpath side during the Works as all Works would be behind the existing river wall within the Stag Brewery component of the Site, no mitigation would be required and the anticipated likely residual effect on access to the river wall during the Works would remain **insignificant**.

12.100 The existing river wall would be lowered in certain areas, however, this would be undertaken after the new flood defence wall has been built, and would still be above the statutory flood defence level. Temporary defences would also provide the required level of protection until any replacements are in place and the Works would be undertaken when there is no practical risk of tidal flooding. All such work would be undertaken in conjunction with the EA to ensure necessary approvals for design and constructional sequence through Environmental Permits. As such, no mitigation would be required and the likely residual effect of remodelling the river wall on flooding during the Works would remain **insignificant**.

Foul and Potable Water Infrastructure Capacity

12.101 The likely effects of the Works upon wastewater were identified as being of insignificance. Therefore, no mitigation measures are considered necessary and the likely residual effect would remain as per the likely effect. That is, **insignificant**.

12.102 To reduce the water demand of the Development during the Works, all relevant contractors would be required to investigate opportunities to minimise and reduce the use of water in accordance with the CEMP. These would include:

- selection and specification of equipment;
- implementation of staff-based initiatives such as turning off taps, plant and equipment when not in use;
- use of recycling water systems in functions such as wheel washes and toilets;
- rainwater harvesting system for equipment and vehicle washing; and
- where possible, water from excavation would be used for dust suppression during construction.

12.103 Water consumption throughout the Works would be monitored, either through sub-metering or utility bills to allow a comparison against best practice benchmarks. With these control measures in place, the likely residual effects of the Work upon potable water supply would be **insignificant**.

Existing Drainage Infrastructure

12.104 As set previously and within **Appendix 11.2**, easements would be provided to ensure existing drainage infrastructure is not impacted upon. The CEMP would set out measures to ensure that the existing sewers are adequately protected and / or diverted in line with best practice. Requirement for asset protection measures during the Works would be confirmed with Thames Water during the future design stages. The adoption of appropriate piling methods, which would be detailed in the CEMP, would ensure vibration levels are kept to a minimum and would not affect existing below ground infrastructure.

12.105 Following the implementation of these measures, the anticipated likely residual effect on existing drainage infrastructure would be **insignificant**.

Completed Development

Tidal Flood Risk

Risk to Occupants of the Development

12.106 As previously described, the Development would be designed to ensure occupants are safe from tidal flooding. Some areas of the Development, including Building B09 (the Boathouse) and one entrance to the basement car park located in the east part of the Stag Brewery component of the Site (east of Ship Lane), would require further mitigation for residual flooding (although it should be noted that these areas would not be used for habitation). Further mitigation would be as follows:

- a self-activating flood barrier would be required for the entrance to the eastern basement car park from Mortlake High Street; and
- flood proof doors and / or demountable barriers for access from the Community Boathouse (Building B09) to the river foreshore.

12.107 In addition, a tidal flood gate would be required at Ship Lane at some point in the future to account for future flood levels and to ensure the integrity of the tidal defences (refer to later in this Chapter).

12.108 Given the level of flood protection provided by the inherent design of the Development and mitigation measures above, future residents should have no need for emergency egress from the Site due to flood conditions. However, in line with the pre-application response from LBRuT, a Flood Emergency Plan has been prepared and submitted as an appendix to the FRA (Appendix G of **Appendix 11.1**). The Plan identifies a safe route from the Stag Brewery component of the Site to land that is wholly outside Flood Zone 3.

12.109 In view of the above the likely residual risk of tidal flooding (and therefore likely residual effect) to future occupants would therefore be **insignificant**.

Off-Site Risk

12.110 As stated previously, the Development would not result in an increase in flood risk to receptors surrounding the Site and via the proposed elevated ground levels may even provide a safe place of refuge from flooding for residents of low-lying neighbouring properties. As such, the likely residual risk of off-Site tidal flooding (and therefore likely residual effect) would remain **long-term**, **local**, **beneficial effect** of **minor significance**.

Surface Water (Pluvial) Flooding

12.111 The inclusion of SuDS and the management of surface water would likely result in a **long-term**, **local**, **beneficial** effect of **minor significance** on surface water flooding, both on and off-Site by reducing the level of surface water discharge to Thames Water sewers to 50% of the existing rate. A maintenance programme of key drainage infrastructure should be put in place to ensure that these beneficial likely effects are maintained as the likely residual effect (refer to **Appendix 11.2** for further details on frequency and type of maintenance required for the SuDS).

12.112 As stated previously, the risk of flooding from surcharging sewers would be insignificant and no mitigation would be required. The likely residual effect of flooding from surcharging sewers once the Development is completed and operational would therefore be **insignificant**.

Groundwater Flows and Flooding

12.113 The completed Development is not expected to significantly alter or displace the existing groundwater flows beneath the Site and thus the risk of groundwater flooding off-Site is not expected to increase. Furthermore, given the proposed basements would be appropriately waterproofed, the basements would be unlikely to flood. No mitigation measures are therefore considered necessary. Consequently, the likely residual effects of the Development once completed and occupied would be **insignificant** in respect of groundwater flows and flooding.

River Wall

Access to the River Wall

12.114 Considering that the completed Development would have an **insignificant** effect on access to the river wall, no mitigation measures would be required and the likely residual effect would remain **insignificant**.

Change in Flood Risk from upgrading Tidal Defences

12.115 As described above, the upgrades to the river wall would improve the performance of the defences when compared to the existing situation. There is a future requirement for a tidal flood gate on Ship Lane, to ensure the integrity of the tidal defences. Without this gate, peak water levels would be able to propagate along Ship Lane. This would only be required at some point in the future. However, a suitable location has already been earmarked in the Development. Since this is a public highway, the way in which this is to be achieved would need to be discussed and agreed with LBRuT. It is likely that this would be provided using a demountable barrier, but the precise details of location and operation would need to be established in detailed design, likely as part of a suitably worded planning condition. The likely residual effect on upgrading the tidal flood defences would therefore be **long-term**, **local**, **beneficial** and of **moderate significance**.

Change in Foul Water Drainage Capacity

12.116 The Development is likely to result in an insignificant effect in respect of the capacity of foul water drainage. As such, no mitigation measures are required and the residual effect would remain as per the likely effect. That is, **insignificant**.

Change in Potable Water Demand

12.117 The Development is likely to result in an insignificant effect in respect of potable water demand. As such, no mitigation measures are required and the residual effect would remain as per the likely effect. That is, **insignificant**.

Summary

12.118 **Table 12.5** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 12.5: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Groundwater flood risk from excavation works of eastern basement.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **minor significance**.	Dewatering of excavation activities.	**Insignificant**.
Surface water (pluvial) flood risk.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **minor significance**.	Implementation of CEMP to ensure appropriate adequate drainage and to manage surface water run-off.	**Insignificant**.
Access to the river wall.	**Insignificant**	None required.	**Insignificant.**
Tidal flood risk during remodelling of the river wall.	**Insignificant**.	None required, to be undertaken through an Environmental Permit.	**Insignificant**.
Foul water infrastructure capacity.	**Insignificant**.	None required.	**Insignificant**.
Increase in potable water demand.	**Temporary**, **short** to **medium-term**, **local**, **adverse effect** of **minor significance**.	Implementation of CEMP to include measures to monitor and reduce water consumption.	**Insignificant**.
Existing drainage infrastructure.	**Temporary**, **short** to **medium-term**, **local**, **adverse** and of **moderate significance**.	Implementation of CEMP to ensure existing drainage is protected and appropriate piling methods are used to minimise vibration.	**Insignificant**.
Completed Development			
Tidal flood risk to future occupants of the Development.	**Insignificant** to **long-term, local adverse** and of **minor significance**.	A self-activating flood barrier would be required for the entrance to the eastern basement car park from Mortlake High Street. Flood proof doors and / or demountable barriers would be required for access from the Community Boathouse (Building B09) to the river foreshore.	**Insignificant**.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
Tidal flood risk to off-Site receptors.	**Long-term**, **local**, **beneficial effect** and of **minor significance**.	None required.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
Surface water (pluvial) flood risk.	**Long-term**, **local**, **beneficial** and of **minor significance**.	None required, maintenance programme to be implemented to ensure beneficial effects are maintained.	**Long-term**, **local**, **beneficial** and of **minor significance**.
Flood risk from sewers surcharging	**Insignificant**.	None required.	**Insignificant**.
Groundwater flood risk.	**Insignificant**.	None required.	**Insignificant**.
Access to the river wall.	**Insignificant**.	None required.	**Insignificant**.
Change in tidal flood risk from upgrading the tidal defences (river wall).	**Long-term**, **local**, **beneficial** and of **minor significance**.	A flood proof gate would be required at some point in the future at Ship Lane to account for future flood levels through an appropriately worded - planning condition.	**Long-term**, **local**, **beneficial** and of **moderate significance**.
Change in foul water drainage capacity.	**Insignificant**.	None required.	**Insignificant**.
Change in potable water demand.	**Insignificant**.	None required.	**Insignificant**.

References

1 Department for Communities and Local Government (2012): 'National Planning Policy Framework'. HMSO: London.

2 AECOM (2015); 'Stag Brewery: Phase 1 Environmental Site Assessment. For AB InBev UK Ltd', July 2015.

3 AECOM (2015); 'Stag Brewery: Phase 2 Environmental Site Assessment. For AB InBev UK Ltd', September 2015.

4 AECOM (2015); 'Stag Brewery: Groundwater Sampling Point Decommissioning Report. For AB InBev UK Ltd', February 2016.

5 Department for Communities and Local Government (2015): 'Planning Practice Guidance – Flood Risk and Coastal Change'.

6 The Environment Agency's Aquifer Designation Map (accessed online April 2017), www.environment-agency.gov.uk

7 Environment Agency (2011): 'Thames Estuary 2100 Plan (TE2100)'.

8 Her Majesty's Stationery Office (1975): Reservoirs Act 1975, Her Majesty's Stationery Office, London.

9 Greater London Authority (2016); 'The London Plan: Spatial Development Strategy for Greater London consolidated with Alterations since 2011', March 2016.

10 British Standards (2008): BS EN 752:2008 'Drain and Sewer Systems Outside Buildings'.

11 British Standards (2000): BS EN 12056-4:2000 'Gravity Drainage Systems Inside Buildings'.

12 Department for Communities and Local Government (2010): 'Drainage and waste disposal: approved Document H', Approved Documents and Building regulation.

13 The Stationery Office (1991): Water Industry Act 1991, The Stationery Office, Norwich.

14 Thames Water (2013): 'Water Resources Management Plan 2015-2040, December 2013.

15 British Standards (2009): BS 6031:2009 'The British Standard Code of Practice for Earthworks', December 2009.

13. Ecology

Introduction

13.1. This Chapter, prepared by Waterman Infrastructure and Environment (IE), presents an assessment of the likely significant effects of the Development on terrestrial ecology and nature conservation features.

13.2. A description of the approach and methodology adopted for this assessment is presented in this Chapter. This is followed by a description of the ecological baseline conditions and an assessment of the likely significant effects of the Development during demolition, alteration, refurbishment and construction works ('the Works') and once the Development is completed and operational on the Important Ecological Features (IEFs) that have been scoped into this assessment.

13.3. Mitigation measures are identified where appropriate to avoid, reduce or offset any significant adverse ecological effects identified and enhancement measures are also presented to maximise, where practicable, beneficial ecological effects. Considering the mitigation and enhancement measures, the nature of the likely residual effects are then described.

13.4. The Chapter is supported by the following appendices:

- **Appendix 13.1**: Preliminary Ecological Appraisal (PEA);
- **Appendix 13.2**: Protect Species Report (PSR); and
- **Appendix 13.3**: Water Framework Directive screening request and response.

13.5. It should be noted that via consultation with the Environment Agency (EA) no Water Framework Directive (WFD) Assessment was deemed necessary for the Development. Further details can be obtained by reference to **Appendix 13.3**.

Assessment Methodology and Significance Criteria

Assessment Methodology

Methods of Baseline Data Collection

Ecological Data Search

13.6. An ecological data search undertaken as part of the PEA (refer to **Appendix 13.1**) was requested from eCountability / Greenspace Information for Greater London (GIGL)[1] in January 2016 where existing records were obtained for protected species and / or other notable fauna and flora, together with records of important statutory and non-statutory designated sites located within 2 km of the Site. Statutory sites were also searched for on the Multi-Agency Geographic Information for the Countryside maps (MAGIC map)[2] and aerial photography for the area was also reviewed.

13.7. The aim of an ecological data search is to collate existing ecological records for the Site and denoted Zone of Influence (ZoI) for the anticipated likely significant effects from the Development.

13.8. In addition to the above, Habitats of Principal Importance (HoPI) and Species of Principal Importance (SoPI) listed under Section 41 of the NERC Act[3], as well as Habitat Action Plans (HAPs) and Species Action Plans (SAPs) listed under the London Biodiversity Action Plan (LBAP)[4] and the London Borough of Richmond upon Thames (LBRuT) Biodiversity Action Plan (RBAP)[5] were reviewed to assign an ecological context to the Site.

'Extended' Phase 1 Habitat Survey

13.9. An 'Extended' Phase 1 Habitat Survey was undertaken on 15th February 2016 for the Stag Brewery component of the Site and on 11th April 2017 for the Chalkers Corner component of the Site using the Joint Nature Conservancy Council (JNCC, 2010)[6] standard 'Phase 1' survey technique to identify habitats on the Site. All habitat types within the Site were mapped with target notes where appropriate. The Phase 1 Habitat Survey methodology was 'Extended' by undertaking an assessment of the Site's potential to support protected and / or notable species. Adjacent habitats were also viewed to assess the Site within the wider context, and to provide information with which to assess the likely significant effects of the Development.

13.10. Further details of the 'Extended' Phase 1 Habitat Survey, including the invasive plant species assessment and external ground based preliminary roost inspections for bats are provided in **Appendix 13.1**.

Internal Preliminary Bat Roost Inspections of Buildings

13.11. On the 13th June 2016, an internal preliminary roost inspection for bats was undertaken at building B10 (refer to **Figure 13.1**). The survey was led by an experienced ecologist who holds a Natural England Bat Licence (Class 2). Due to specific surveying constraints (refer to **Appendix 13.2**), no internal preliminary roost inspections were undertaken at B8, B12, B13 and B14.

Bat Emergence / Re-entry Surveys

13.12. In line with best practice guidelines[7], evening emergence and dawn re-entry surveys (separated by more than 24 hours, where applicable) were undertaken on those buildings (B8, B10, B12, B13 and B14 on **Figure 13.1**) and trees (those in the south of Watney's Sports Ground playing fields, circled in orange on **Figure 13.1**) where bat potential had been identified as part of the preliminary roost inspections, to determine the presence / likely absence of roosting bats.

13.13. The evening emergence surveys were undertaken during optimum weather conditions and commenced at least 15 minutes prior to sunset and extended to between 1.5-2 hours thereafter or until it was too dark to see emerging bats, whilst the dawn re-entry survey commenced 1.5 hours before sunrise and extended 15 minutes thereafter if considered necessary. Surveyors were situated so that all potential bat roosting features could be viewed. A record of all bat activity (i.e. commuting, foraging, social calls) during the surveys was noted.

13.14. All bat surveys were undertaken in optimal weather conditions, i.e. wind levels below 4 on the Beaufort wind force scale, the absence of prolonged rain and above 10°C in temperature as per best practice guidelines. Table 1 within **Appendix 13.2** provides a summary of the bat emergence and re-entry surveys undertaken.

Bat Activity Surveys

13.15. To determine the use of the habitats along the northern Site boundary adjacent to the River Thames, three bat activity surveys were undertaken in accordance with the scope agreed with LBRuT (refer to **Appendix 13.1 and 13.2**).

13.16. The evening activity surveys commenced from sunset to two hours thereafter and the dawn activity survey was undertaken in reverse. A pair of surveyors followed a pre-determined transect route along the north boundary of the Site which lies adjacent to the River Thames (refer to **Figures 13.2, 13.3** and **13.4** and **Appendix 13.2**).

13.17. All surveys were undertaken in appropriate weather conditions and within the recognised optimal bat active season (May to September) for activity surveys at a Site of this nature. Table 2 within **Appendix 13.2** provides a summary of the bat activity surveys undertaken.

Automated Detector Bat Surveys

13.18. To supplement the bat activity data, an automated bat detector (Model Number: SM2BAT+) was placed on a wall at the northern boundary of the Stag Brewery component of the Site (with the microphone facing the River Thames, refer to **Figures 13.2, 13.3** and **13.4**) for five nights on three separate occasions, in accordance with the scope agreed with LBRuT (refer to **Appendix 13.1 and 13.2**). The automated detectors were set to record all night and were programmed to record from 30 minutes prior to sunset until 30 minutes post sunrise. Table 3 within **Appendix 13.2** provides a summary of the automated bat detector surveys undertaken.

Bat Data Analysis

13.19. All bat survey work was undertaken using time expansion (Pettersson D240X and SM2BAT+) bat detectors with data recorded onto solid state MP3 recorders (where applicable). This survey equipment is considered suitable for detecting all resident species of UK bats. Recorded bat calls were later analysed (using parameters stated within Russ 2012[8]) where appropriate using BatSound 4.1.2b and Analook software.

Black Redstart Surveys

13.20. A series of five black redstart surveys, occurring approximately every fortnight, were carried out between 13th May and 29th June 2016 to ascertain the status of this species at the Site and adjacent habitats (a c.25 m buffer around the Site was surveyed) (refer to Table 4 in **Appendix 13.2**). The methodology broadly followed the industry standard for this species as outlined in 'Bird Monitoring Methods'[9]. Each survey commenced between dawn and sunrise as this is the period when black redstarts are the most vocal and therefore most likely to locate.

Assessment Process Criteria

13.21. This assessment was undertaken with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for ecological impact assessments (the 'Guidelines')[10]. Although is the Guidelines are recognised as current industry guidance, they are also recognised as not being a prescriptive tool for carrying out ecological assessments. As such, the Guidelines: "provide guidance to practitioners for refining their own methodologies".

Important Ecological Features and Zone of Influence

13.22. Based on baseline data collection, ecological features (habitats, species, ecosystems and their functions / processes) that are considered to be 'important' and have the potential to be significantly affected by the Development have been identified as Important Ecological Features (IEFs) for assessment within this Chapter. Ecological features can be important for a variety of reasons with importance relating to, for example, the quality or extent of designated sites or habitats, to habitat / species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline.

13.23. To identify IEFs for the purposes of this assessment, professional judgement and experience was used, informed by the results of the baseline data collection for the Site. Consideration was given to habitats and species for nature conservation, such as designated sites, Biodiversity Action Plan (BAP) lists, red listed, rare and legally protected species. When an ecological feature is not listed, consideration was given to population, diversity and key functional role and connectivity within the wider environment. Details of the ecological features that are not considered 'important' or unlikely to be significantly affected by the Development (because of being sufficiently widespread, unthreatened and / or resilient habitats or species, insufficient size or diversity for example) have not been assessed within this Chapter. This is because, in line with the EIA Regulations[11], the assessment focuses on the likely significant effects of the Development. However, ecological features which are not considered 'important' are discussed further in the PEA and PSR (refer to **Appendices 13.1** and **13.2**).

13.24. In summary, ecological features either scoped in (and would therefore qualify as IEFs) or out of this assessment are detailed in **Table 13.1**.

Table 13. 1: Ecological Features Scoped in / out of the Assessment

Ecological Feature	Scoped In or Out?	Rationale
Designated Sites (River Thames and Tidal Tributaries SINC).	In.	In the absence of mitigation, indirect effects to the River Thames and Tidal Tributaries Site of Importance for Nature Conservation (SINC) could occur as a result of the Development.
On-Site habitats (all).	Out.	All habitat types recorded on-Site are commonly found locally and nationally and not assessed to be of geographical or legal importance. The Development is highly unlikely to give rise to significant effects upon such ecological features.
Roosting bats.	Out.	No roosting bats were found during the emergence / re-entry surveys. As such, the Development is highly unlikely to give rise to significant effects upon roosting bats.
Foraging and commuting bats.	In.	In the absence of mitigation, indirect effects to commuting and foraging bats along the River Thames could occur as a result of the Development.
Black redstart.	Out.	No black redstarts were found during surveys in 2016. As such, the Development is highly unlikely to give rise to significant effects to black redstarts.
Breeding birds.	Out.	The Development is highly unlikely to give rise to significant effects to breeding birds, however legal implications are required and detailed within the PSR (**Appendix 13.2**).

Ecological Feature	Scoped In or Out?	Rationale
Terrestrial invertebrates.	Out.	The Development is highly unlikely to give rise to significant effects upon invertebrates.
Invasive species.	Out.	No invasive species were identified on Site. Species listed under the London Invasive Species Initiative (LISI) were recorded at the Site but are not assessed to of geographical or legal importance. As such, the Development is highly unlikely to result in significant effects from invasive species.

13.25. The ZoI is the area in which IEFs would be affected by biophysical changes caused by the Development. The ZoI was determined through a review of baseline conditions, consideration of the wider local environment, and consideration of the type of development proposed.

13.26. To establish whether the IEFs would be significantly affected by the Development, consideration was given to whether the IEF would be directly affected (such as habitat loss) or indirectly through a potential pathway (such as the IEF being affected by emissions to air, soil or water). The area of the ZoI was defined using the criteria set out in **Chapter 2: EIA Methodology**.

- **'local'** effects are those affecting neighbouring receptors;
- **'district'** effects are those which are likely to occur to receptors within the wider Borough of the LBRuT;
- **'sub-regional'** effects are those affecting Boroughs adjacent to LBRuT; and
- **'regional'** effects are those affecting receptors across Greater London.

13.27. The ZoI for each IEF assessed within this Chapter is set out in **Table 13.2**.

Table 13.2: Important Ecological Feature Zone of Influence

Important Ecological Feature	ZoI
Designated Sites (River Thames and Tidal Tributaries SINC).	Local.
Foraging and Commuting Bats.	Local.

Evaluation to Determine Importance

13.28. Under the Guidelines the importance (value) of each IEF was considered within a defined geographical context, as follows:

- international and / or European value;
- national value;
- regional value;
- metropolitan, county, vice-county or other local authority-wide area value; and
- local value.

Designated Sites

13.29. In respect of the above, some ecological sites have already been assigned a level of nature conservation value via designation, and the Guidelines recommend that the reasons for this designation need to be considered in the assessment. Such designations include:

- internationally important sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites;
- nationally important sites such as Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs); and
- county / Local Authority important sites such as SINCs.

Habitats

13.30. The Guidelines recommend that the value of habitats and plant communities should be measured against published selection criteria where available. Where areas of a habitat or plant community do not meet the necessary criteria for designation at a specific level, the Guidelines recommend that the suitably qualified assessor (ecologist) may consider the local context if appropriate.

Species

13.31. The Guidelines deal with species that need to be assessed because they are of biodiversity value, rather than because they are legally protected (although some species may fit in to both categories). In assigning value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. The valuation of populations should make use of any relevant published evaluation criteria.

Assessment of Likely Significant Effects

13.32. Adverse and beneficial effects on IEFs were identified via a qualitative assessment using professional judgement and experience, based on predicted changes as a result of the Development. To establish the likely significant effects of the Development on IEFs, the assessment takes account of the following parameters:

- the importance (value) of an ecological feature (as described above);
- magnitude of the effect;
- the spatial extent or the ZoI (refer to **Table 13.2**) over which the effect would occur;
- the temporal duration of the effect (short, medium and long term);
- whether the effect is reversible and over what timeframe; and
- the timing and frequency of the effect.

Assessment Criteria

13.33. In accordance with the Guidelines, the assessment identifies adverse and beneficial effects of the Development which would be ‘significant’ based on the structure, function and conservation status of the IEF. The Guidelines defines an ecologically significant effect as:

"… *an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general…*".

13.34. The conservation status of habitats and species within a defined ZoI is described in the Guidelines as follows and was used in this assessment to determine whether the likely effects of the Development on non-designated habitats and species are likely to be significant:

- for habitats, *"… conservation status is determined by the sum of influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area…";* and
- for species, *"… conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area…".*

Significance Criteria

13.35. Once a likely effect is identified as 'significant', as described above, for the purposes of the EIA and in accordance with the general methodology of the EIA described in **Chapter 2: EIA Methodology**, the likely significant effect on an IEF is assigned a level of significance, based on the significance criteria set out in **Table 13.3**. Where the likely effect is identified as 'not significant' in accordance with the Guidelines, for the purposes of this assessment, is described as 'insignificant'. The significance criteria used for the purposes of this assessment was established using professional judgement and experience, taking into account the value of IEF, together with the extent, structure and functions of a habitat and abundance and distribution of species.

Table 13.3: Significance Criteria

Level of Significance	Description
Beneficial effect of major significance.	Considerable beneficial effect (by extent, duration or magnitude) on an IEF of greatest sensitivity or in breach of recognised acceptability, legislation, policy or standards.
Beneficial effect of moderate significance.	Moderate beneficial effect (by extent, duration or magnitude) on an IEF of greater sensitivity.
Beneficial effect of minor significance.	Slight, very short or localised beneficial effect on an IEF of lesser sensitivity.
Insignificant.	No discernible change to the value of an IEF would arise from the Development.
Adverse effect of minor significance.	Slight, very short or localised adverse effect on an IEF of lesser sensitivity.
Adverse effect of moderate significance.	Moderate adverse effect (by extent, duration or magnitude) on an IEF of greater sensitivity.
Adverse effect of major significance.	Considerable adverse effect (by extent, duration or magnitude) on an IEF of greatest sensitivity or in breach of recognised acceptability, legislation, policy or standards.

Baseline Conditions

13.36. The existing baseline conditions detailed below are provided for the IEFs that have been scoped into this assessment as detailed in **Table 13.1**. A summary of the habitats present at the Site is also provided for completeness and context.

Site Summary

13.37. The Site currently comprises a large former brewery complex (part of the Stag Brewery component of the Site) and a road junction known as Chalkers Corner (the Chalkers Corner component of the Site). The brewery complex is dominated by buildings and hard standing. Other habitats present at the Site include Watney's Sports Ground playing fields, amenity grassland, trees, ornamental planting, a hedge, scattered trees and ephemeral vegetation (refer to **Figure 13.1**). The Site is bounded by a mix of uses and areas, with the River Thames bounding the north east of the Stag Brewery component of the Site and Fulham (North Sheen) Cemetery bounding the north of the Chalkers Corner component of the Site.

Statutory Designated Sites

13.38. The Site itself is not subject to any statutory designations. However, the River Thames and Tidal Tributaries SINC is located adjacent to the northern boundary of the Stag Brewery component of the Site. Full citations of this SINC are detailed in **Appendix 13.1**.

13.39. The section of river that flows adjacent to the Site is tidal and the banks adjacent to the footpath are heavily modified being reinforced by stone and concrete. A small boat landing stage also fronts on to the River Thames at the top of Ship Lane adjacent to the northern boundary of the Stag Brewery component of the Site. A disused wharf is also situated within the north east of the Stag Brewery component of the Site with limited access via Bulls Alley. The banks of the River Thames comprise gravel and gently slope to the water's edge and support limited aquatic vegetation. The River Thames is of value to fish, birds and invertebrates, as well as acting as a wildlife corridor. The EA's closest and most recent river quality data[12] set for biology and chemistry indicates that the current ecological quality of the River Thames is 'Moderate'. The River Thames and Tidal Tributaries SINC is considered to be of **Metropolitan** value.

Commuting and Foraging Bats

13.40. The desk study results provided numerous records of bats within 2 km of the Site (refer to **Appendix 13.1**). The closest bat record provided is located approximately 330 m north of the Site (2005).

13.41. Species included:

- serotine (Eptesicus serotinus);
- myotis Myotis sp.;
- pipistrelle Pipistrellus sp.;
- brown long-eared bat Plecotus auritus;
- Natterer's bat Myotis nattereri;

- soprano pipistrelle Pipistrellus pygmaeus;
- Daubenton's bat Myotis daubentonii;
- Leisler's bat Nyctalus leisleri;
- noctule Nyctalus noctula;
- Nathusius's pipistrelle Pipistrellus nathusii; and
- common pipistrelle Pipistrellus pipistrellus.

13.42. During the bat activity surveys in 2017 (refer to **Appendix 13.2**), common pipistrelle and soprano pipistrelle were the only species recorded utilising the habitats associated with and adjacent to (i.e. the River Thames) to the northern boundary of the Stag Brewery component of the Site. It is also noted at a single commuting serotine and foraging noctule were recorded over the River Thames during the dawn re-entry survey conducted on 20th July 2016.

13.43. A total of five confirmed bat species were recorded by the automated detectors deployed at the Site (refer to **Appendix 13.2**) in 2017, namely common pipistrelle, soprano pipistrelle, noctule, serotine and Leisler's. In addition, at least two more species from the long-eared and myotis family were also recorded. Nearly all of the bat recordings from the automated detectors were of common and soprano pipistrelle (98.03% when combined) which is consistent with the results of the bat activity surveys. Noctule, serotine, Leisler's and long-eared species were also recorded on the automated bat detectors but in very low registrations.

13.44. Given the results of the bat surveys undertaken it is assessed that the habitats at the Site and adjacent to (i.e. the River Thames) to the northern boundary of the Stag Brewery component of the Site are used on a sporadic basis by urban bat species typically associated to be non-light sensitive (excluding long-eared and myotis species). The results of the bat activity and automated survey has demonstrated that bat activity is low at and adjacent to the northern boundary of the Stag Brewery component of the Site (i.e. the River Thames) and it is more readily used for commuting. However, bat species were recorded in good diversity with five identified to species level and a confirmed further two species present that could only be identified to family level. Bats are therefore assessed to be of **Local** value within and adjacent to the northern boundary of the Stag Brewery component of the Site, particularly with respect to the River Thames.

Likely Effects

The Works

Direct Effects to Designated Sites

13.45. The Works would not have a direct effect on the River Thames and Tidal Tributaries SINC. This is because the Works would be confined to the Site boundary (including the works to the river wall which would be behind the existing river wall). As such, the likely residual direct effect to River Thames and Tidal Tributaries SINC would be **insignificant**.

Indirect Effects to Designated Sites

13.46. There would potentially be an increase in dust and noise pollution, and vibration from demolition and construction activities during the Works (refer to **Chapter 9: Noise and Vibration** and **Chapter 10: Air Quality**) which has a low risk of disturbing faunal species and coating plant leaves within the SINC. In addition, there would be an increase in light spill and glare from temporary artificial lighting installed to facilitate the Works with the potential to indirectly disturb bat behaviour.

13.47. As detailed in **Chapter 11: Ground Conditions and Contamination** and **Chapter 5: The Proposed Development**, the new river wall would be formed within the north of the Stag Brewery component of the Site. This would comprise a sheet pile wall extending to -1m Above Ordnance Datum (AOD). Such intrusive works may mobilise contamination in the Made Ground, and create a pollutant pathway for contaminants to migrate to and impact the River Thames. The risk to the River Thames is therefore increased for the piling river wall works, in comparison to activities undertaken within the wider Site.

13.48. In the absence of mitigation, indirect effects such as dust, noise, vibration, surface water run-off and lighting may occur during the Works. The likely significant effect to the River Thames and Tidal Tributaries SINC would be **temporary**, **short** to **medium-term**, **local**, **adverse effect** of **moderate significance**.

Direct Effects to Commuting and Foraging Bats

13.49. Bats using the northern boundary of the Site and directly adjacent to the River Thames for foraging and commuting are considered unlikely to be directly affected during the Works given the retention of these areas. Some pruning of understorey vegetation to open key views would be undertaken along the towpath. However, this would not have a significant effect on bats. The loss of habitats within the remainder of the Site would not adversely impact bats given their limited value to bats. As such, the likely residual direct effect to bats would be **insignificant**.

Indirect Effects to Commuting and Foraging Bats

13.50. In the absence of mitigation, indirect effects to foraging and commuting bats along the River Thames including disturbance via increased noise and vibration, and lighting is likely to occur given the works to the river wall. Whilst it is proposed that the Works would be undertaken during daylight hours and therefore unlikely to affect bats, should night-time working be required, the effects of this would be temporary only and so it is considered that there would be a **temporary**, **short** to **medium-term, local**, **adverse effect** of **minor significance** to bats.

Completed Development

Direct Effects to Designated Sites

13.51. The completed Development is considered to have no direct impact on the River Thames and Tidal Tributaries SINC. As such, the likely residual effect to the River Thames and Tidal Tributaries SINC would be **insignificant**.

Indirect Effects of Public Disturbance to Designated Sites

13.52. During the operational phase of the Development, the River Thames and Tidal Tributaries SINC could potentially be adversely impacted by increased public disturbance as a result in a change in surrounding land use (i.e. residential use). However, the River Thames is already well used for recreational purposes, including heavy boat use adjacent to the northern boundary of the Stag Brewery component of the Site, and as such the effect is considered to be insignificant. Furthermore, the provision of green space within the Development design would provide amenity space for the future residents, alleviating pressure on the adjacent non-statutory sites. As such, the likely residual effects of public disturbance to the River Thames and Tidal Tributaries SINC are **insignificant**.

Indirect Effects of Lighting to Designated Sites

As detailed in the indicative lighting strategy prepared by Michael Grub Studio (submitted as a standalone document in support of the Planning Applications), the proposed River Terrace would be subject to low level lighting. High level lighting has been avoided in this part of the Site so that light spill upon the River Thames is avoided. A small amount of lighting would be implemented to the steps that lead down to the towpath for safety reasons. However, the lighting used would have no glare or upward spill and therefore light spill upon the River Thames would be minimal. The internal lighting for the buildings fronting the river has not been designed at this stage. The uses on ground floor are flexible with residential uses on upper floors. The final lighting design will be mindful of light spill to the river and levels will comply with the suggestions of the Institute of Lighting Professionals (ILP) and not exceed 5 Lux post curfew. Furthermore, the floodlighting for the proposed sports pitch would be located too far from any designated sites to have a significant effect. As such, the likely residual effects of lighting to the River Thames and Tidal Tributaries SINC are **insignificant**.

Indirect Effects of Overshadowing to Designated Sites

13.53. As detailed in **Chapter 18: Daylight, Sunlight, Overshadowing and Light Pollution**, the results of the sunlight amenity assessment has shown that all amenity areas surrounding the Site would experience direct sunlight across more than 50% of their area for 2 hours or more on the 21st of March or see a reduction of less than 20% from the existing level. The Development does cause some shadow to the towpath, however, it should be noted that the existing buildings on Site already cause a level of overshadowing in the afternoon. The buildings within the Stag Brewery component of the Development (East of Ship Lane) have been designed to have gaps facing onto the towpath in order to allow a good level of direct sunlight to penetrate. As such, levels of overshadowing would be less than in the baseline condition at specific times during the day. The likely significant effect of overshadowing to existing surrounding amenity areas (i.e. the River Thames) once the Development is completed is therefore **insignificant**.

Indirect Effects of Pollution to Designated Sites

13.54. As detailed in **Chapter 11: Ground Conditions and Contamination**, the Development does not propose any land uses that would be classified as hazardous. In addition, the drainage system would be designed to incorporate drainage solutions such as interceptors, filters or silt traps to

avoid the discharge or any fuels of oils associated with the three proposed drainage outfalls to the River Thames (refer to **Chapter 12: Water Resources and Flood Risk**). Such inherent design features of the Development would likely reduce the silt and oil deposition into the River Thames when compared to the existing situation. As such, the likely significant effect of pollution to the River Thames and Tidal Tributaries SINC would be a **long-term**, **local**, **beneficial effect** of **minor significance**.

Direct Effect on Commuting and Foraging Bats

13.55. The completed Development is not anticipated to have a direct impact on existing foraging and commuting bats using the northern boundary of the Stag Brewery component of the Site given the retention of trees in this part of the Site.

13.56. As detailed in **Chapter 5: The Proposed Development**, soft landscaping as well as artificial habitats would be provided in the Development, inherent to the scheme design, which would provide enhanced opportunities at the Site for roosting, foraging and commuting bats. The Stag Brewery component of the Site would include:

- up to 160 new trees and up to 51 retained trees;
- hedge planting (1.5 m high) enclosing all ground level residential courtyards east of Ship Lane in the detailed part of the Stag Brewery component of the Development;
- a minimum of ten bat boxes incorporated in the Development Area 1 (number of bat boxes within the outline component of the Site would be determined following the reserved matters application);
- provision of new trees including the use of native species, or species of benefit to wildlife. This includes littoral plant species in areas close to the river edge responding to existing riverside vegetation and fruit / berry and nut bearing trees located in the community park south of the proposed school;
- provision of biodiversity roofs, including a mix of green and brown roofs; and
- a green link connecting the River Thames and Mortlake Green.

13.57. In addition, the Chalkers Corner component of the Site would provide a new pocket park and replacement and additional tree planting.

13.58. In view of the above, the completed Development would have a **temporary**, **medium-term**, **local**, **beneficial effect** of **minor significance** on bats.

Indirect Effect on Commuting and Foraging Bats

13.59. As detailed above, light spill upon the River Thames would be avoided given the design of the lighting strategy and distance of the proposed floodlighting for the sports pitch. Both the existing sports field and proposed sports pitch hold little habitat value for bats, particularly given the proposed sports pitch would be made of artificial grass. The proposed floodlighting at this location would therefore not result in a significant effect on bats. Given the nature of commuting and foraging bats, it is highly likely that commuting and foraging bats are already commuting between various highly lit areas and are therefore well adapted to artificially lit environments. The results of the bat surveys undertaken assessed that the habitats at the Site and adjacent to (i.e. the River

Thames) to the northern boundary of the Stag Brewery component of the Site are used on a sporadic basis by urban bat species typically associated to be non-light sensitive (excluding long-eared and myotis species). As such, the likely significant effect of light spill to foraging and commuting bats using the River Thames is **insignificant**.

Mitigation Measures and Likely Residual Effects

The Works

Designated Sites

13.60. A Construction Environmental Management Plan (CEMP) would be produced to ensure appropriate environmental controls to protect the River Thames and Tidal Tributaries SINC from dust, noise, vibration, surface water run-off and lighting. As detailed within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, such protective measures would include:

- the Contractor would minimise disturbance to the River Thames and Tidal Tributaries SINC by minimising noise and dust arisings through the use of environmental screens, water jet suppression, dust monitoring devices and other best working practices;
- no waste materials, including silt laden drainage and spillages, hazardous / contaminated materials, chemicals or fuels shall be allowed to enter the River Thames and Tidal Tributaries SINC through measures such as the use of appropriately tanked and bunded storage areas; and
- all construction lighting would be positioned so that no increased light levels are spilled on to the adjacent River Thames and Tidal Tributaries SINC. In addition, the main hours of the Works would be undertaken during typical working hours minimising the requirement for additional lighting during the night.

13.61. With the implementation and adherence to the measures detailed in the CEMP, the likely residual effects on the River Thames and Tidal Tributaries SINC during the Works (both direct and indirectly) would be **insignificant**.

Bats

13.62. Specifications for external lighting controls would be set out in the CEMP (as detailed above and in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**). Lighting during the Works would be designed so that retained commuting and foraging habitats along the northern boundary of the Stag Brewery component of the Site and adjacent to the River Thames would remain dark and no excessive light spill on to these habitats would occur. As detailed above, the main hours of the Works would be undertaken during typical working hours minimising the requirement for additional lighting during the night. The CEMP would also include measures to minimise noise along the northern boundary of the Stag Brewery component of the Site and adjacent to the River Thames.

13.63. With the implementation of the mitigation listed above, the likely residual effects during the Works (both direct and indirectly) on bats would be **insignificant**.

Completed Development

Designated Sites

13.64. The inherent design of the Development would avoid light spill on the River Thames as well as reduce silt and oil deposition. The massing of the completed Development would also not result in any significant overshadowing effects on the River Thames and towpath. Furthermore, the provision of green space within the Development would provide amenity space for the future residents, alleviating pressure on the adjacent non-statutory sites. The likely residual effect on the River Thames and Tidal Tributaries SINC (both direct and indirectly) would therefore remain **insignificant**.

Bats

13.65. Without appropriate management, the permanence of the roosting, foraging and commuting habitats provided within the Development cannot be guaranteed in the long-term. As such, appropriate mitigation in the form of a Landscape and Environment Management Plan (LEMP) would be implemented to manage and ensure the permanence of the roosting, foraging and commuting habitats provided within the Development.

13.66. The assessment of likely significant effects identified that the completed and operational Development would likely give rise to a temporary, medium-term, local, beneficial effect of minor significance on bats. This would be a result of the inherent design of the Development which would avoid light spill on the River Thames as well as provide roosting and foraging / commuting habitats for bats. Given the implementation of mitigation in the form of a LEMP, the likely residual effect (both direct and indirectly) would therefore result in a **long-term**, **local**, **beneficial effect of minor significance.**

Summary

13.67. **Table 13.4** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 13.4: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Direct effects on the River Thames and Tidal Tributaries SINC.	**Insignificant**.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from dust, noise, vibration,	**Temporary, short** to **medium-term, local, adverse effect** of **moderate significance**.	Implementation of a CEMP to include measures to minimise dust, noise, vibration,	**Insignificant**.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
surface water run-off and lighting.		surface water run-off and lighting.	
Direct effects on commuting and foraging bats.	**Insignificant**.	None required.	**Insignificant**.
Indirect effects on commuting and foraging bats from noise and lighting.	**Temporary, short** to **medium-term, local, adverse effect** of **minor significance**.	Implementation of a CEMP to include measures to minimise noise and lighting.	**Insignificant**.
Completed Development			
Direct effects on the River Thames and Tidal Tributaries SINC.	**Insignificant**.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from public disturbance.	**Insignificant**.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from lighting.	**Insignificant**.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from overshadowing.	**Insignificant**.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from pollution.	**Long-term**, **local**, **beneficial effect** of **minor significance**.	None required.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
Direct effects on commuting and foraging bats.	**Temporary**, **medium-term**, **local**, **beneficial effect** of **minor significance**.	Implementation of a LEMP.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
Indirect effects on commuting and foraging bats from lighting.	**Insignificant**.	None required.	**Insignificant**.

References

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2 Magic.defra.gov.uk. (2017); Magic. [online] Available at: http://magic.defra.gov.uk/

3 ODPM (2006); 'Natural Environment and Rural Communities Act (2006)'.

4 The London Biodiversity Partnership (2004); 'London Biodiversity Action Plan'.

5 London Borough of Richmond upon Thames (2013); 'Biodiversity Action Plan'.

6 JNCC. (2010); 'Handbook for Phase 1 Habitat Survey'. Nature Conservancy Council.

7 Collins, J. (ed) (2016); 'Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)'. The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

8 Russ. J. (2012); 'British Bat Calls: A Guide to Species Identification', Pelagic Publishing.

9 Gilbert, G. (2011); 'Bird Monitoring Methods – A manual of techniques for key species'. RSPB.

10 Chartered Institute of Ecology and Environmental Management (2016); 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal'. Technical Guidance Series.

11 HMSO, 2011, Statutory Instrument 2011 No. 1824 - Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended).

12 Environment Agency (2009); 'River Thames, Wey - Mole Stretch'. Available on-line at http://maps.environment-agency.gov.uk

14. Archaeology (Buried Heritage)

Introduction

14.1 This Chapter, which has been prepared by CgMs (part of RPS Group Plc) presents an assessment of the likely significant effects and likely residual effects (accounting for recommended mitigation) of the Development on archaeological (buried heritage) resources within the Site.

14.2 This Chapter provides a description of the methods used in the assessment and the relevant baseline conditions of the Site. This is followed by an assessment of the likely significant effects of the Development during the demolition, alteration, refurbishment and construction works (the Works). Where appropriate, mitigation measures are identified to avoid, reduce or offset any likely significant adverse effects. Taking account of the mitigation measures, the likely nature and significance of the residual effects are described.

14.3 No assessment was undertaken (or is, indeed necessary) in relation to the completed and operational Development. This is because likely effects to archaeology would result from intrusive ground works only. These would be limited to the Works. Accordingly, there would be no archaeological effects associated with the completed and operational Development.

14.4 The preparation of this Chapter has been informed by a below ground Desk Based Archaeological Assessment (DBA), which is presented in **Appendix 14.1**, together with the results of archaeological evaluation and monitoring fieldwork, the report for which is presented at **Appendix 14.2**.

14.5 It should be noted that the assessment of the likely significant effects of the Development upon above ground built heritage is presented in **Chapter 15: Above Ground Built Heritage**.

Assessment Methodology and Significance Criteria

Assessment Methodology

14.6 The DBA (refer to **Appendix 14.1**) upon which this Chapter is based, was carried out in accordance with the requirements of the National Panning Policy Framework (NPPF)[1], and to standards specified by the Chartered Institute of Archaeologists (CIfA)[2] and the Greater London Archaeological Advisory Service (GLAAS)[3].

14.7 In summary, the preparation of the DBA and this Chapter has employed the following steps:

- a review of legislative framework and requirements, as well as policy and best practice guidance considerations;
- undertaking of a comprehensive data search of the Greater London Historic Environment Record (GLHER) maintained by the Greater London Archaeological Advisory Service (GLAAS), for records of previously identified heritage assets (in particular, relevant scheduled monuments, archaeological investigations and find spots). The data search was undertaken for the Stag Brewery component of the Site and also within a 750m of the boundary of the Stag Brewery component of the Site. For the purposes of this assessment, this data search area is referred to as the 'Study Area';
- an examination of reports of relevant archaeological investigations, in particular those undertaken within the Stag Brewery component of the Site in 1995, 1996, 1999;

- an examination of other relevant publications, articles, historic maps, plans and other documentary evidence;
- a walkover survey of the Stag Brewery component of the Site undertaken in May 2016 to define the existing ground conditions and the potential for buried heritage assets to survive;
- the incorporation of the results of archaeological evaluations and archaeological monitoring of site investigation works within the Stag Brewery component of the Site undertaken in July and October 2016 (refer to **Appendix 14.2**);
- identification of the likely significant effects of the Development during the Works;
- identification of appropriate mitigation to prevent, reduce and off-set any identified significant adverse effects resulting from the Development; and
- identification of the likely residual effects (and their significance) following the successful implementation of the recommended mitigation.

14.8 Whist the DBA focusses on the Stag Brewery component of the Site (Applications A and B) (and not the Chalkers Corner component of the Site (Application C)), this is due to the fact that the highway works associated with Chalkers Corner relate to highway improvements and landscaping (refer to **Chapter 5: The Proposed Development**). Such works are not highly intrusive and would unlikely lead to any significant (if any) below ground works. Accordingly, and based on professional and expert judgement, the proposals at the Chalkers Corner component of the Site are unlikely to give rise to any significant archaeological effects. The geographical coverage of the DBA is therefore considered to be appropriate and robust for the purposes of the assessment.

14.9 In addition to the above, consultation was undertaken with the GLAAS Officer for London Borough of Richmond upon Thames (LBRuT) regarding the form and content of the DBA and associated field evaluation. Reference to **Appendix 14.1** confirms that the information gathered and presented to date is sufficient for the purposes of the Planning Applications and, therefore, the Development.

14.10 Finally, in respect of the assessment of the outline component of the Development, the assessment has considered the maximum allowable spatial parameters sought for approval. This would give rise to the most intrusive ground works and so can be considered to reflect a 'worst-case' assessment. That said, based on professional and expert judgement, it is unlikely that the minimum allowable spatial parameters sought for approval would give rise to materially different archaeological effects. This is because the scale of Works that would be required for both the maximum and minimum allowable parameters would be similar and due to the finite nature of below ground archaeological resources.

Significance Criteria

14.11 The intrinsic significance unique to each heritage asset (including below ground heritage assets) can be defined as the sum of tangible and intangible values which make it important to society. This may consider age, aesthetic and the fabric of an asset as well associations with historic people or events.

14.12 The determination of the significance of heritage assets is based upon English Heritage (now known as Historic England) guidance which recommends assigning significance via four main categories:

- **Evidential value:** derived from *"…the potential of a place to yield evidence about a past human activity"*;

- **Historical value:** derived from *"…the way in which past people, event and aspect of life can be connected through a place to be present";*
- **Aesthetic value:** derived from *"…the ways in which people draw sensory and intellectual stimulation from a place";* and
- **Communal value:** derived from *"…the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory".*

14.13 The significance of any given heritage asset is the product of the sum of its values. However, it must be noted, that the terms 'significance' and 'value' are used interchangeably in the NPPF and associated guidance. The terms are therefore also used interchangeably in this assessment and Chapter.

14.14 The criteria for establishing the significance of the below ground heritage assets at the Site are set out as follows:

- **High:** A feature, space or theme which is significant at national or international level. These will tend to have a high cultural value and form an important element of a building or site;
- **Medium:** A feature, space or theme which is significant at a regional or national level. These will tend to have some cultural merit and form a significant part of the building or site;
- **Low:** A feature, space or theme which is of local or regional significance;
- **Neutral:** A feature, space or theme which has no cultural significance but is also not considered intrusive to heritage value; and
- **Intrusive:** A feature, space or theme which detracts from heritage value.

14.15 In order to determine the likely effect of the Development on the significance of buried heritage assets, the magnitude of change brought about by the Development to the buried heritage assets must be understood. The criteria for assessing the magnitude of change are set out in **Table 14.1**.

Table 14.1: Magnitude of Change

Magnitude of Change	Description
Major	The Development would cause a large change to existing environmental conditions. Change to most or all key archaeological materials, such that the resource is totally altered.
Moderate	The Development would cause a noticeable change to existing environmental conditions. Changes to many key archaeological materials, such that the resource is clearly modified.
Minor	The Development would cause a small change to existing environmental conditions. Changes to key archaeological materials, such that the asset is slightly altered.
Insignificant	The Development would cause no discernible change to existing environmental conditions. Very minor changes to archaeological materials.

14.16 The significance of the likely effect has been derived from establishing the significance of the buried heritage asset and the magnitude of change as shown in **Table 14.1**. The likely significant effects can be direct or indirect, adverse or beneficial and the criterion used in this assessment is set out in **Table 14.2**.

Table 14.2: Significance of Likely Effects

Significance / Value of Buried Heritage Assets	Magnitude of Change			
	Major	**Moderate**	**Minor**	**Insignificant**
High	Effect of major significance.	Effect of major significance.	Effect of moderate significance.	Insignificant effect.
Medium	Effect of major significance.	Effect of moderate significance	Effect of minor significance	Insignificant effect.
Low	Effect of moderate significance	Effect of minor significance	Effect of minor significance	Insignificant effect.
Neutral	Insignificant effect.	Insignificant effect.	Insignificant effect.	Insignificant effect.

14.17 Where preservation of a buried heritage asset in situ is not feasible, as part of the overall design of a development, measures to mitigate likely significant adverse effects to buried heritage assets would normally consist of investigation and recording before and during redevelopment (i.e. preservation by record). Accordingly, the likely residual effect reflects the success rating for the recommended mitigation. It may be beneficial, insignificant or adverse depending on whether mitigation would enhance or detract from the asset.

14.18 **Table 14.3** provides an indication of the significance of likely residual effects (i.e. likely effects following the implementation of recommended mitigation).

Table 11.3: Significance of Likely Residual Effects

Significance	Description
Adverse effect of major significance	Major harm to, or loss of, an asset's significance as a result of changes to its physical form or setting.
Adverse effect of moderate significance	Less than major harm to an asset's significance as a result of changes to its physical form or setting.
Adverse effect of minor significance	Limited harm to an asset's significance as a result of changes to its physical form or setting.
Insignificant effect	No appreciable change to an asset's significance.
Beneficial effect of minor significance	Limited improvement of an asset's significance as a result of changes to its physical form or setting.
Beneficial effect of moderate significance	Notable enhancement of an asset's significance as a result of changes to its physical form or setting.
Beneficial effect of major significance	Major enhancement of an asset's significance as a result of changes to its physical form or setting.
Uncertain	Significance of effect uncertain due to lack of information on the importance of the asset.

14.19 An evaluation of the likely extent, nature and importance of the archaeological resource was undertaken qualitatively, based on the above sources of information, and taking into account

existing designations. Where such resource has no formal designation status, professional judgement has been used.

Baseline Conditions

14.20 Full details of the relevant baseline conditions are presented in **Appendix 14.1** and **Appendix 14.2**. A summary of most relevant matters is summarised as follows.

14.21 A review of historical maps and other relevant sources indicates that the eastern part of the Stag Brewery component of the Site (Development Area 1) is known to have been occupied by the site of the Medieval palace of the Archbishops of Canterbury, together with the site of the fourteenth century parish church, while the western part of the Stag Brewery component of the Site (Development Area 2 plus school location) is known to contain the site of the Renaissance mansion of Thomas Cromwell, Earl of Essex.

14.22 The earliest mention of the brewing industry associated with Mortlake is in the late fifteenth century and by the early nineteenth century, the Stag Brewery component of the Site had undergone significant development for brewery uses. During the twentieth century, the demolition and construction of industrial buildings at the Site was undertaken to allow the expansion of brewery operations. By the second half of the twentieth century the brewery had extended west across Ship Lane.

14.23 One of the significant phases of the Site's redevelopment was in the 1970's, which included construction of new brewery buildings across the Stag Brewery component of the Site.

14.24 The Stag Brewery ceased operations in late 2015 and decommissioning of brewery infrastructure was undertaken following cessation of brewery activities. Most recently, works on-Site have been undertaken in respect of removal of brewery fixtures and fittings.

Topography

14.25 The modern topography of the Stag Brewery component of the Site is generally level, with a slight drop from south to north, and west to east. The Stag Brewery component of the Site to the west of Ship Lane is generally level at circa (c.) 4.99-6.40m Above Ordnance Datum (AOD) (Development Area 2). The Stag Brewery component of the Site to the east of Ship Lane (Development Area 1) is generally level at c.4.5-6.0m AOD. The natural topography is however believed to comprise a drop towards the river to the north, as well as a drop from west to east.

14.26 Mortlake lies on the south western side of the arc of a bend in the River Thames. The river flows from north west to north east beyond the north western boundary of the Stag Brewery component of the Site, and abuts the north eastern boundary.

Geology

14.27 The mapped geology of the Stag Brewery component of the Site comprises Kempton Park floodplain gravels, with a thin strip of alluvium along the northern boundary with the River Thames. Site investigation and archaeological works (refer to **Appendix 11.2** and **14.2**) within the Stag Brewery component of the Site have revealed substantial quantities of made ground above the natural deposits, associated with previous and existing development, including landforming.

Designated Heritage Assets

14.28 In terms of relevant designated heritage assets, as defined in NPPF, no World Heritage Sites, Scheduled Monuments, Historic Battlefield or Historic Wreck Sites have been identified within the Site or its immediate vicinity.

Non-Designated Heritage Assets

14.29 In terms of relevant local designations, the whole Site lies within the Mortlake and Barnes Archaeological Priority Area (APA). The northern boundary of the Stag Brewery component of the Site abuts the Thames Foreshore and Bank APA, related to archaeology from all past periods of human activity, particularly the prehistoric.

Prehistoric

14.30 A moderate archaeological potential has been identified for the Prehistoric periods within the Stag Brewery component of the Site. Primarily, this is due to the proximity of the adjacent water source, the River Thames. Small quantities of Palaeolithic and Mesolithic flintwork artefacts have been identified within the Study Area, together with finds and features of Neolithic, Bronze Age and Iron Age date.

Roman

14.31 A low archaeological potential has been identified for the Roman period within the Site. No archaeological finds or features of Roman date have been identified within the Study Area.

Early Medieval

14.32 A low archaeological potential has been identified for the Anglo-Saxon period within the Stag Brewery component of the Site. No archaeological finds or features of Anglo-Saxon date have been identified within the study area search radius. Evidence of agricultural activity and land division could conceivably be present within the archaeological record.

Medieval

14.33 Within the Stag Brewery component of the Site to the east of Ship Lane, a high archaeological potential has been identified for the Medieval period. The site of the palace of the Archbishops of Canterbury is known to have been present, by 1099 until the sixteenth century. The site of a church has also been identified within the Site east of Ship Lane, present by 1349 and demolished by 1543.

14.34 Within the Stag Brewery component of the Site to the west of Ship Lane, a generally low archaeological potential has been identified for the Medieval period. Evidence of agricultural activity and land division could conceivably be present within the archaeological record.

Post Medieval

14.35 The potential of the Stag Brewery component of the Site for the Post Medieval and Modern periods can be categorised as high. Remains of a Renaissance mansion owned by Thomas Cromwell, Earl of Essex (Cromwell House c.1491-1857) may survive within the north western boundary of the Stag Brewery component of the Site. Remains associated with the former Archbishop's Palace may survive east of Ship Lane (apparently extant until the early / mid nineteenth century) together with village activity and occupation in the south eastern corner, prior to absorption into the brewery complex in 1865.

Industrial Age - Present Day

14.36 Documentary sources relating to commercial brewing at Mortlake date from 1765 onwards. Major expansion of the Brewery complex appears to have taken place in the mid nineteenth century, and also during the twentieth century.

14.37 Across the whole of the Stag Brewery component of the Site, remains associated with previous phases of the brewery dating from the eighteenth century onwards are likely to survive below the existing facility, where not truncated by later development.

Known Below Ground Heritage Significance

14.38 The Stag Brewery component of the Site is known to have been previously occupied by a Medieval bishop's palace and parish church, to the east of Ship Lane, and by a Post Medieval mansion to the west of Ship Lane.

Truncation and Potential for Survival

14.39 The post-depositional impact within the Stag Brewery component of the Site, primarily as a result of the development of the Brewery, is considered likely to have been severe. The significant quantities of made ground identified in the site investigation and archaeological evaluation and monitoring work is indicative of truncation of archaeological remains.

14.40 The phases of archaeological works previously undertaken within the Stag Brewery component of the Site (in 1995, 1996 and 1999) do not reveal ploughsoils / garden soils dating from the Medieval period onwards, together with Medieval, Post Medieval and Modern walls and foundations. Most recently, archaeological evaluation and monitoring within both the western and eastern sides of the Stag Brewery component of the Site in 2016 (refer to **Appendix 14.2**) revealed evidence of extensive horizontal truncation. Intact subsoil above natural sands and gravels were noted in places, together with traces of nineteenth century buildings, and a large piece of decorated masonry which may relate to Medieval / Post Medieval activity, albeit discovered in a modern context, to the west of Ship Lane.

Likely Significant Effects

The Works

14.41 The Works required to facilitate the Development have the potential to impact upon below ground archaeological remains through the following activities (as described in **Chapter 6: The Development Programme, Demolition, Alteration, Refurbishment and Construction**):

- demolition of the majority of existing structures and buildings, with the exception of the Maltings and the façade of the Former Hotel and Former Bottling building;
- grubbing out of existing foundations, basement areas and other features associated with the existing buildings;
- landforming / excavation associated with the proposed basements. Within the Stag Brewery component of the Site, proposed basements are extensive across the principal area of the Site east of Ship Lane (Development Area 1). To the west of Ship Lane, areas of basement are proposed within the central / northern parts of this part of the Stag Brewery Component of the Site (Development Area 2). No basement is proposed underneath the school location and play facilities;
- pile probing, the insertion of pile caps and ground beams;

- the cutting of other associated foundations and footings; and
- the cutting of services.

14.42 The bottom of the proposed basement slab within the east part of the Stag Brewery component of the Site (east of Ship Lane) would be set at 0.76m OD. This area of the Site recorded natural terrace gravel at between 4.4m and 2.68m OD, so the proposed basement would likely impact on any archaeological structures or deposits present.

14.43 The maximum extent for the proposed basement within the west part of the Stag Brewery component of the Site (west of Ship Lane), would be set at 2.45m OD. The natural gravel in this area of the Site was recorded at between 5.6 and 4.68m OD, so the proposed basement would also likely impact on any archaeological structures or deposits present in this area of the Site.

14.44 The proposed foundation design for all buildings within the detailed element of the Stag Brewery component of the Site would comprise a 1 m deep piled raft, with the exception of the proposed cinema area which would be founded in 1 m deep local pile caps with 1 m deep ground beams. Below the foundations, all buildings would have an expanse of piles (3 to 5 per column) that would be 600mm in diameter and extending down 25m in length.

14.45 In addition to the above, the new river wall would be formed of a sheet pile wall with an in-situ reinforced concrete capping beam. The toe level of the sheet pile wall would be set at -1m AOD.

14.46 Without the implementation of appropriate mitigation measures, the Works associated with the Development have the potential to have a **direct**, **permanent**, **local**, **adverse** effect of **major significance** on archaeological remains of potential national importance. Potential remains include the Medieval archbishop's palace, and church with burial ground, on the east side of Ship Lane, with any associated features, and the Post Medieval mansion on the west side of Ship Lane, again with any associated features.

14.47 Due to the Site's perceived low to moderate potential for the prehistoric, Roman and Anglo-Saxon periods, the Works of the Development would have an **insignificant** effect on any surviving archaeological remains of these periods, of local importance.

14.48 Across areas of the Stag Brewery component of the Site where archaeological remains are likely to have been truncated by previous and existing development, associated with the brewery, the Works of the Development have an **insignificant** effect on any surviving archaeological remains of all past periods of human activity.

Mitigation Measures and Likely Residual Effects

The Works

14.49 Given the likely significant adverse effects of the Works associated with the Development (in the absence of any mitigation), the following measures are proposed in order to mitigate such effects:

- implementation of a phased archaeological evaluation programme, following demolition and Site clearance, moving across the Site behind the demolition; and
- implementation of further excavation work dependent upon the results of the evaluation recommended above.

14.50 The above mitigation strategy has been discussed and agreed with the GLAAS Officer for LBRuT (refer to **Appendix 14.1**). Furthermore, it has been agreed that it would be appropriate to secure such mitigation via an appropriate planning condition.

14.51 The implementation of the proposed mitigation would result in an **insignificant** likely residual effect, upon archaeological remains of potential national importance.

14.52 For past periods of human activity where a low potential has been identified (from the pre-historic, Roman and Anglo-Saxon periods), the likely residual effect would remain **insignificant** with implementation of the proposed mitigation.

14.53 Across areas of the Stag Brewery component of the Site where archaeological remains are likely to have been truncated by previous and existing development, the likely residual effect would remain **insignificant** with implementation of the proposed mitigation.

Summary

14.54 **Table 14.4** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 14.4: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Archaeological remains of national importance (medieval and post-medieval remains).	**Direct**, **permanent**, **local**, **adverse** effect of **major significance**.	Implementation of a phased archaeological evaluation programme, following demolition and Site clearance, moving across the Site behind the demolition. Implementation of further excavation work dependent upon the results of the evaluation recommended above.	**Insignificant**.
Archaeological remains from the pre-historic, Roman and Anglo-Saxon periods.	**Insignificant**.		**Insignificant**.
Archaeological remains likely to have been previously truncated by existing development i.e. the Stag Brewery.	**Insignificant**.		**Insignificant**.

References

1 Department of Communities and Local Government (2012); 'National Planning Policy Framework', DCLG London.

2 Chartered Institute for Archaeologists (2014); 'Standard and guidance for historic environment desk-based assessment. The Chartered Institute for Archaeologists: Reading'.

3 Greater London Archaeological Advisory Service (2015); 'Guidelines for Archaeological Projects in Greater London'.

15. Built Heritage

Introduction

15.1 This Chapter has been prepared by Waterman Infrastructure and Environment Ltd (Waterman IE). It presents an assessment of the likely significant effects and likely residual effects of the Development on built heritage (above ground) assets within the Site, and those in its environs.

15.2 This Chapter outlines the methodology used in the assessment and goes on to provide a description of the relevant baseline conditions of the Site and immediate surrounding area. This is followed by an assessment of the likely significant effects of the Development during the demolition, alteration, refurbishment and construction works ('the Works') and once the Development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset any significant adverse impacts which have been identified. Taking into account the mitigation measures, the nature and significance of the likely residual impacts of the Development are also described.

15.3 Baseline information to support the conclusions of this Chapter can be found in a Built Heritage Statement prepared by Waterman IE, which is presented in **Appendix 15.1**.

15.4 It should be noted that the assessment of the likely significant effects of the Development upon below ground heritage assets is presented in **Chapter 14: Archaeology**. Furthermore, the assessment of the likely significant effects of the Development upon views and townscape character is presented in **Chapter 16: Townscape and Visual Assessment**.

Assessment Methodology and Significance Criteria

Assessment Methodology

15.5 This assessment follows best practice procedures produced by Historic England[1,2], the Chartered Institute for Archaeologists[3] and policy contained in Section 12 of the National Planning Policy Framework (NPPF) 'Conserving and Enhancing the Historic Environment'[4]. Further details of these documents are provided in **Appendix 15.1**.

15.6 The assessment methodology is based on that outlined in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 2, in the amended document HA 208/07[5] issued by the Highways Agency in August 2007. Although this guidance was written for road schemes, it is widely accepted as a general best-practice approach to heritage impact assessment.

15.7 The methodology and data sources used to prepare this assessment are set out in detail within **Appendix 15.1**. However, in summary, the methodology has included:

- consultation of relevant early maps, documents and other heritage information in the LBRuT archives, to build up an understanding of the Site's history and development.;
- consultation of online heritage information resources;
- appraisal of designated heritage assets and areas, including conservation areas and local lists;
- a visual survey of the Site and immediate surrounding area;
- assessment of the heritage significance of the buildings and structures likely to be affected by the Development;
- assessment of the effect that the Development (as known) would have on the significance of the heritage assets; and
- consultation of local and national planning policy and guidance pertaining to heritage.

15.8 The Site was most recently visited on 25th August 2017. The aim of the visit and walkover was to assess the form of the buildings and identify any features of heritage interest on the Site or in its surroundings which may be affected by development on the Site. Access to all external areas of the Site was obtained during the Site visit, as well as internal access to the former Hotel building, the former Bottling building and the Maltings building.

15.9 Whilst the Built Heritage Statement (**Appendix 15.1**) focusses on the Stag Brewery component of the Site (and not the Chalkers Corner component of the Site), this is due to the fact that there are no built heritage assets within this area of the Site and the highway works associated with Chalkers Corner relate to highway improvements and landscaping (refer to **Chapter 5: The Proposed Development**). Accordingly, and based on professional and expert judgement, the proposals at the Chalkers Corner component of the Site are unlikely to give rise to any significant built heritage effects. The geographical coverage of the Built Heritage Statement (**Appendix 15.1**) is therefore considered to be appropriate and robust for the purposes of the assessment.

15.10 In respect of the assessment of the outline component of the Development, the assessment set out within this Chapter has considered the maximum allowable spatial parameters sought for approval. This would give rise to the greatest massing and so can be considered to reflect a 'worst-case' assessment. That said, based on professional and expert judgement, it is unlikely that the minimum allowable spatial parameters sought for approval would give rise to materially different built heritage effects. This is because the scale of Works that would be required for both the maximum and minimum allowable parameters would be similar and other factors such as the choice of materials and façade details of the proposed buildings would be in accordance with the Design Code also submitted for approval.

Significance Criteria

15.11 Heritage Significance in a planning policy context is a specific concept which is distinct and different from the Environmental Impact Assessment (EIA) meaning of ' the significance of effect'. Heritage significance is defined in Annex 2 of the National Planning Policy Framework as:

"*The value of a heritage asset to this and future generations because of its heritage interest*…[and]…*derives not only from a heritage asset's physical presence, but also its setting"*[6].

15.12 It is the sum of tangible and intangible values which make a heritage asset important to society. This may consider the evidential and aesthetic qualities of an asset as well as intangible qualities such as associations with historic people or events, or the importance of an asset to a local community. It is therefore describing the value of a heritage asset or its setting.

15.13 In EIA terms, the term 'significance' is used in relation to likely environmental effects on, or change to, an environmental asset or receptor. To avoid confusion, when referring to the NPPF context, the term 'heritage significance' (rather than just significance) is used within this assessment.

15.14 To assess the heritage significance of built heritage assets within the Site, consideration was given to guidance from Historic England, which recommends making assessments under the categories of:

- **Evidential Value**: "*Evidential value derives from the potential of a place to yield evidence about past human activity*";
- **Historical Value**: "*Historic value derives from the ways in which past people, events and aspects of life can be connected through a place to the present*";

- **Aesthetic Value**: "*Aesthetic value derives from the ways in which people draw sensory and intellectual stimulation from a place*"; and
- **Communal Value**: "*Communal value derives from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory*"[7]

15.15 Taking account of the sum of evidential, historical, aesthetic and communal value of a heritage asset, the overall heritage significance (value) was assessed using a number of ratings, which are set out in **Table 15.1**.

Table 15.1: Heritage Significance (Value) of Asset

Level of Significance	Criteria
Very High	• Heritage Assets identified as having Outstanding Universal Value, such as World Heritage Sites. • Other structures or sites of recognised international importance.
High	• Scheduled Monuments with standing remains. • Grade I and II* Listed Buildings. • Other listed buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the grade of listing. • Conservation Areas containing high grade or very important listed buildings / historic parks and gardens. • Non-designated structures of clear national importance.
Medium	• Grade II Listed Buildings. • Non-designated heritage assets that can be shown to have exceptional qualities in their fabric or important historical associations. • Conservation Areas. • Non-designated historic townscapes or built-up areas with important historic integrity in their buildings, or in their settings (including surviving street furniture or other structures).
Low	• Non-designated heritage assets such as Locally Listed Buildings, with modest quality in their historic fabric or historical associations. • Historic townscapes or built up areas of limited historic integrity in their structures or setting.
Neutral	• A building, feature, or area which has no cultural significance but is also not considered intrusive to heritage value.
Unknown	• Structures or features with some hidden or inaccessible potential for heritage significance.
Intrusive	• A building, structure or area which detracts from heritage significance.

15.16 To establish the likely significant effects of the Development on heritage assets, the assessment provides a comparable analysis of the heritage significance against the magnitude of impact. Criteria based on the Design Manual for Roads and Bridges[8] (DRMB) and the International Council on Monuments and Sites (ICOMOS)[9] were used to determine the heritage significance of the asset, the magnitude of impact and the significance of effect (the overall impact) of the Development upon heritage significance (value).

15.17 The criteria for assessing the magnitude of impact in this assessment are set out in **Table 15.2**.

Table 15.2: Magnitude of Impact Definitions

Magnitude of Impact	Description
Major beneficial.	The proposed changes would significantly improve the character of the heritage asset or its setting, revealing and / or enhancing important characteristics which were previously unknown or inaccessible. There would be a substantial improvement to important elements of the asset.
Moderate beneficial.	The proposed changes would considerably improve the setting or overall character of the heritage asset. There may be an improvement in key uses and beneficial change (e.g. the creation of coherency) to the characteristics of the asset.
Minor beneficial.	The proposed changes may cause a minor improvement to the setting or overall character of a heritage asset.
Negligible.	The proposed changes would have a minimal positive or negative impact on the heritage asset or its setting.
Neutral.	The proposed changes would have no impact on the heritage asset or its setting.
Minor adverse.	The proposed changes would have minor negative impact on the setting or overall character of a heritage asset, such that it is slightly different or its setting slightly changed to its detriment.
Moderate adverse.	The proposed changes would negatively alter the setting or overall character of the heritage asset such that it is significantly modified. It will likely disturb key features and detract from the overall heritage significance.
Major adverse.	The proposed changes would significantly damage the overall setting and/or character of heritage assets. They will cause a notable disruption to, or in some cases, complete destruction of, important features.

15.18 The significance of the likely effects of the Development on the significance of heritage assets was determined by cross referencing the heritage significance (value) of the heritage assets with the magnitude of the impact to the environment resulting from the Development. To consider these in combination, a matrix of significance of likely effects was used to provide a transparent and objective assessment, as set out in **Table 15.3**.

Table 15.3: Significance of Effect

Criteria		Sensitivity/ Value				
		Neutral	Low	Medium	High	Very High
Magnitude of Impact	Major Beneficial	Minor beneficial.	Minor / moderate beneficial.	Moderate / major beneficial.	Major beneficial.	Major beneficial.
	Moderate Beneficial	Insignificant / minor beneficial.	Minor beneficial.	Moderate beneficial.	Major / moderate beneficial.	Major beneficial.
	Minor Beneficial	Insignificant / minor beneficial.	Insignificant / minor beneficial.	Minor beneficial.	Minor / moderate beneficial.	Moderate beneficial.
	Negligible	Insignificant.	Insignificant / minor beneficial.	Insignificant / minor beneficial.	Minor beneficial.	Minor / moderate beneficial.
	Neutral	Insignificant.	Insignificant.	Insignificant.	Insignificant.	Insignificant.
	Negligible	Insignificant.	Insignificant / minor adverse.	Insignificant / minor adverse.	Minor adverse.	Minor / moderate adverse.
	Minor Adverse	Insignificant / minor adverse.	Insignificant / minor adverse.	Minor adverse.	Minor / moderate adverse.	Moderate adverse.
	Moderate Adverse	Insignificant / minor adverse.	Minor adverse.	Moderate adverse.	Moderate / major adverse	Major adverse.
	Major Adverse	Minor adverse.	Minor / moderate adverse.	Moderate / major adverse.	Major adverse.	Major adverse.

15.19 The assessment of the likely effects of the Development upon the setting of identified heritage assets has been undertaken using the guidance detailed in Historic England's Historic Environment Good Practice Advice in Planning: 3 The Setting of Heritage Assets (HE 2015)[10]. This recommends that an assessment should consider the following factors when assessing a development's impact:

- location and siting;
- form and appearance;
- additional effects; and
- permanence.

Baseline Conditions

15.21 A detailed description of the Stag Brewery component of the Site, its historical development and heritage assets assessed as being potentially affected by the Development is provided in **Appendix 15.1**. A summary is provided below.

Designated Heritage Assets

Listed Buildings

15.22 There are no listed structures located within the Site. There are seven listed buildings located immediately adjacent to the Stag Brewery component of the Site, and a further listed building within 500 m of the Stag Brewery component of the Site, the settings of which could potentially be affected by the Development and which are considered to be relevant for this assessment. For the purposes of this assessment, these buildings are grouped where appropriate.

15.23 The seven listed buildings adjacent to the Stag Brewery component of the Site are as follows:

- Thames Cottage: Grade II;
- Tudor Lodge: Grade II;
- Thames Bank House: Grade II;
- Leyden House: Grade II;
- Riverside House: Grade II;
- Garden Wall to east of Number 1 to 8 Riverside House and extending behind Numbers 1 to 24 Reid Court: Grade II; and
- Gateway, formerly to Cromwell House: Grade II.

15.24 The location of these listed buildings are shown within **Figure 15.1.**

15.25 The listed building within 500 m of the Site is:

- Chiswick Bridge and attached balustrades: Grade II.

15.26 With reference to **Table 15.1**, all of these listed buildings are of High heritage significance. Reasons for this are provided within **Appendix 15.1**.

15.27 Limes House and Forecourt Piers, Grade II*, are located along the River Thames approximately 470 m to the east of the Stag Brewery component of the Site (refer to **Figure 15.1**). Although listed as a sensitive receptor within the EIA Scoping Report (**Appendix 2.1**) and **Chapter 3: Existing Site and Land Uses**, it is considered that due to the nature of this building, its location and distance from the Stag Brewery component of the Site, and the interposing built form and vegetation, the Site as a whole does not contribute to the significance of this listed building. It is therefore not considered relevant to this assessment.

15.28 Other listed buildings located within 500m, including those listed within the EIA Scoping Report, but which are not considered necessary to consider due to their distance from the Site, location or lack of historical relationship, are included as part of a full gazetteer of list descriptions for structures within 500m of the Site (refer to **Appendix 15.1**, Appendix B).

Conservation Areas

15.29 There are two Conservation Areas in the immediate vicinity of the Stag Brewery component of the Site. These are listed below, and their boundaries are indicated on **Figure 15.1**.

- Mortlake Conservation Area (Medium Heritage Significance); and
- Mortlake Green Conservation Area (Medium Heritage Significance).

15.30 Part of the Stag Brewery component of the Site running along Mortlake High Street and the Thames shoreline is located within the Mortlake Conservation Area. The Maltings building, former Bottling building, former Hotel and parts of the surviving boundary wall of the Site are identified by LBRuT as contributing, in varying degrees, to the significance of the Conservation Area.

15.31 To the south of the Stag Brewery component of the Site is the Mortlake Green Conservation Area. This is centred on Mortlake Green, and includes a residential area to the west. The former Hotel building within the Site is identified in the appraisal as contributing to the character of this area, despite its location just outside the boundary.

15.32 In addition to the two Conservation Areas noted above, to the north of the River Thames in the London Borough of Hounslow (LBH) is the Grove Park Conservation Area. This covers the northern half of Chiswick Bridge. However, it is not considered relevant to this assessment due to its distance from the Site. This is also due to the topography of the land around the Great Chertsey Road which obscures the Site from the Grove Park Conservation, including the existing tall brewery buildings from within it. Sheen Lane Conservation Area is also not considered relevant to this assessment due to its considerable distance (over 500 m) from the Site.

Non-Designated Heritage Assets

15.33 Non-designated heritage assets include structures identified by LBRuT as being of heritage interest. In addition, for the purposes of this assessment, non-designated heritage assets include four structures within the Site which were deemed to be of heritage interest by Waterman IE.

15.34 Three structures within the Stag Brewery component of the Site are specifically identified by LBRuT as 'Buildings of Townscape Merit'[1] (BTM), as shown on **Figure 15.1**. These comprise:

- the former Hotel Building;
- the former Bottling Building; and
- the (former) Maltings Building.

15.35 **Table 15.4** lists the non-designated structures within the Site and ascribes their level of heritage significance, with reference to the criteria set out in **Table 15.1**. Further detail is provided in **Appendix 15.1**.

Table 15.4: Non-Designated Heritage Assets Within the Site

Building Name	Heritage Significance
Former Hotel Building (BTM).	Low.
Former Bottling Building (BTM).	Low.
Maltings Building (BTM).	Medium.
Northern Boundary Walls.	Neutral - Low.
Eastern Boundary Wall.	Neutral.
Southern Boundary Wall.	Low.
Railway Tracks, Granite Paving and River	Low.

1 https://consultation.richmond.gov.uk/environment/buildings_townscape_merit/consult_view. Accessed 07/12/2016.

Building Name	Heritage Significance
Moorings.	
Memorials.	Low.
Historic Gate.	Low.

15.36 In addition to those located within the Site, there are a number of BTMs, which are situated in the vicinity of the Stag Brewery component of the Site to the north, east and south of its boundaries. These include:

- the Ship Public House, Thames Bank;
- the Old Stables, Thames Bank;
- 6 and 7 Thames Bank;
- 1-14 Parliament Mews; and
- The Jolly Gardeners Public House, Lower Richmond Road.

15.37 These are also highlighted on **Figure 15.1**.

15.38 The above BTMs could potentially be affected by the Development and are therefore considered to be relevant for this assessment.

Historical Overview

15.39 A summary of the Site's history is provided as follows. Full detail can be found in **Appendix 15.1** including the presentation of relevant historic maps.

15.40 Mortlake, within which the Site is located, has been a settlement since the early Medieval period, belonging to the Archbishops of Canterbury until the 16th century, then Henry VIII and subsequently Thomas Cromwell. It was famous for the production of tapestries in the 17th century, and subsequently became well known for manufacturing and brewing, the latter particularly from the 18th century onwards.

15.41 The earliest mention of the brewing industry is in the late 15th century, when a brewery is thought to have been set up in the village by a John Williams from Wales. It was located on the eastern side of the Stag Brewery component of the Site, to the east of Ship Lane. The brewing and malting industry grew from this point onwards, with several expansions of the brewery to the west and north west between the early 18th and the late 19th centuries.

15.42 The brewery was purchased by Charles John Philips in 1852 and then subsequently bought out by a partnership of Phillips and James Wigan, who developed the business through the purchase of nearby properties and an industrious period of expansion. This included the reorganising of the village's road system in 1865. Following this, construction of the new brewery began and expansion continued throughout the late 19th century.

15.43 By the end of the 19th century the brewery had considerably expanded, particularly to the west, and much of the Stag Brewery component of the Site to the east of Ship Lane had been developed, with new structures including the former hotel/public house and the bottling plant buildings. The business was bought by Watney, Combe, Reid and Co. in 1898.

15.44 At the beginning of the 20th century, a large eight and part nine storey Maltings was constructed, as well as other new and larger structures which faced the river. Part of this Maltings still stands on the Stag Brewery component of the Site today and is now a well-known landmark near the finishing line of the annual Cambridge / Oxford boat race. During the first half of the 20th century,

considerable expansion occurred within the eastern part of the Stag Brewery component of the Site and the brewery also completely developed the western part of the Stag Brewery component of the Site on the western side of Ship Lane.

15.45 Following the Second World War, the majority of the 19th and early 20th century buildings within the Stag Brewery component of the Site were demolished to facilitate the modernisation of the brewery, leaving only the remaining Maltings building, former Hotel and former Bottling building, and parts of the former boundary walls of the Stag Brewery component of the Site. A new bottling and packing building was constructed in the 1990s, however the Stag Brewery component of the Site has remained largely unchanged since the turn of the twenty first century. Brewing ceased in late 2015.

Likely Significant Effects

The Works

Direct Effects

15.46 Primary direct effects include the material alteration to a built heritage asset, such as its extension, alteration to fabric or design or its demolition. There will be no such primary direct effect to any heritage assets of high heritage significance, namely the listed buildings which fall outside of the Site boundary; however, there will be direct effects to the heritage assets located within the Site that are of low - medium heritage significance.

15.47 **Table 15.5** summarises the direct effects of the Works on the heritage significance of buildings within the Site in the absence of mitigation. This assessment is based on **Table 15.3**, which assesses the significance of effect combined with the assumed magnitude of impact.

Table 15.5: Likely Direct Effects of the Works and their Significance

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Direct Effect
Former Hotel Building (BTM).	Low.	Major adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor** to **moderate significance**.
Former Bottling Building (BTM).	Low.	Major adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor** to **moderate significance**.
Maltings Building (BTM).	Medium.	Moderate adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **moderate significance**.
Northern Boundary Walls.	Neutral - Low.	Major adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor** to **moderate significance**.
Eastern Boundary Wall.	Neutral.	Major adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor significance**.
Southern Boundary Wall.	Low.	Major adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor** to **moderate significance**.
Railway Tracks. Paving and	Low.	Neutral.	**Insignificant**.

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Direct Effect
Moorings.			
Memorials.	Low.	Negligible.	**Insignificant** to **direct**, **permanent**, **local adverse**, effect of **minor significance**.
Historic Gates.	Low.	Negligible.	**Insignificant** to **direct**, **permanent**, **local**, **adverse** effect of **minor significance**.

15.48 The direct effects of the Works on the heritage significance of the structures within the Site are described in more detail below to provide context to **Table 15.5** above.

The Former Hotel Building (BTM)

15.49 It is proposed that the façade of the former Hotel building would be retained and the remainder of the building would be demolished. As such, the Development would result in the loss of part of the historic structure and its historic plan form, as well as the historic features that survive, which include the timber panelling, skirting, cornicing and door surrounds to the interior of the locally listed building. Although some of these surviving elements of historic fabric are in poor condition, they contribute to the aesthetic value of the heritage asset and, along with the historic plan form of the building, provide an understanding of its former use. The partial demolition of this locally listed building would therefore erode the appreciation of its significance. As such, it is considered that there would be a **direct**, **permanent, local**, **adverse** effect of **minor** to **moderate significance** on the heritage significance of the former Hotel building.

The Former Bottling Building (BTM)

15.50 The Development would involve the façade retention of the former Bottling building and the demolition of the remainder of the building. The Development would therefore result in the loss of part of the historic structure and its historic plan form, as well as the loss of surviving internal historic features. This would include the internal cast iron columns and brick arches, which are characteristic architectural features that are indicative of the buildings industrial history and which contribute to its aesthetic and evidential values. The proposals also include the creation of new window openings within the façade of the building, which would involve the removal of historic fabric. As such, the Development would diminish the understanding and appreciation of the significance of the locally listed building and it is therefore considered that there would be a **direct**, **permanent**, **local**, **adverse**, **effect** of **minor** to **moderate significance** on the heritage significance of the former Bottling building.

The Maltings Building (BTM)

15.51 It is proposed that the cast iron columns, horizontal I-beams and the original stairs to the interior of the Maltings building would be removed. These are surviving elements of historic fabric that enable an understanding of the former layout of the Maltings building and contribute to its evidential and aesthetic value. In addition, several windows are proposed to be elongated, which would involve the removal of historic brickwork in some locations. This change would alter the height of some of the windows, which at present are illustrative of the shallow floor to ceiling heights that existed historically. These changes would diminish the appreciation of the

significance of the locally listed building and as such, it is considered that there would be a **direct**, **permanent**, **local**, **adverse**, **effect** of **moderate significance** on the heritage significance of the Maltings building.

Northern Boundary Walls, Eastern Boundary Wall and Southern Boundary Wall

15.52 It is proposed to demolish the historic brick boundary walls to the perimeter of the Stag Brewery component of the Site, minus a small section of boundary wall to the north east corner of the Stag Brewery component of the Site, which is proposed to be retained. **Appendix 15.1** identifies that these walls are representative of the industrial history of the main Stag Brewery component of the Site and provide evidence of structures that formerly existed on the Stag Brewery component of the Site. As such, their removal would result in the loss of part of the historic fabric of the Stag Brewery component of the Site. The boundary walls are, however, assessed as being of neutral to low heritage significance. Therefore, it is considered that there would be a **direct**, **permanent, local**, **adverse** effect of **minor** to **moderate** significance on the heritage significance of the boundary walls.

Railway Tracks, Paving and Moorings

15.53 There would be no direct effect on the heritage significance of these heritage assets arising from the Works as these features are being retained in-situ. The likely effect would therefore be **insignificant**.

Memorials

15.54 The memorials would be retained and relocated within the Stag Brewery Component of the Site. However, the existing modern section of the southern boundary wall within which they are located would be demolished. As such, it is considered that there would be an **insignificant** to **direct**, **permanent**, **local**, **adverse effect** of **minor significance** on the heritage significance of the memorials.

Historic Gates

15.55 The surviving historic gates would also be retained, relocated and reused as part of the Development. However, one set of gates currently forms part of the modern boundary wall along the west boundary of the Site, which would be demolished. Accordingly, there would be an **insignificant** to **direct**, **permanent**, **local, adverse effect** of **minor significance** on the heritage significance of the historic gates.

Indirect Effects

15.56 The indirect effects of the Works are assessed in two instances. The first relates to the indirect effects on the heritage significance of the historic structures within the Stag Brewery component of the Site and the heritage assets within the environs of the Site resulting from the demolition of the existing modern brewery structures within the Stag Brewery component of the Site, presented in **Table 15.6**. The second relates to the potential for noise, vibration dust and additional traffic from the Works in the absence of mitigation to have a detrimental effect on the setting of the heritage assets identified, presented in **Table 15.7**.

Table 15.6: Likely Indirect Effects of the Works and their Significance (Setting Effects Arising from the Demolition of Modern Brewery Structures)

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Indirect Effect
Former Hotel Building (BTM).	Low.	Moderate beneficial.	**Indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Former Bottling Building (BTM).	Low.	Moderate beneficial.	**Indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Maltings Building (BTM).	Medium.	Moderate beneficial.	**Indirect**, **permanent**, **local**, **beneficial** effect of **moderate significance**.
Remainder of Boundary Wall.	Neutral - Low.	Minor beneficial.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Railway Tracks, Paving and Moorings.	Low.	Minor beneficial.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Memorials.	Low.	Minor beneficial.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Historic Gates.	Low.	Minor beneficial.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Group of listed and locally listed buildings and garden wall on Thames Bank.	Low - Medium.	Minor beneficial.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Gateway, formerly to Cromwell House.	Medium.	Minor beneficial.	**Indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Chiswick Bridge.	Medium.	Minor beneficial.	**Indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Indirect Effect
Mortlake Conservation Area.	Medium.	Minor beneficial.	**Indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
Mortlake Green Conservation Area.	Medium.	Minor beneficial.	**Indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.
The Jolly Gardeners Public House.	Low.	Minor beneficial.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effect of **minor significance**.

15.57 It is considered that there would be **insignificant** to likely **indirect**, **permanent**, **local**, **beneficial** effects of **minor** to **moderate significance** upon the medium and low value heritage assets identified within and surrounding the Site. This would be a result of the demolition and removal of modern brewery structures on the Stag Brewery component of the Site which currently detract from the appreciation of the heritage assets assessed.

Table 15.7: Likely Indirect Effects of the Works and their Significance (Setting Effects Arising from Noise, Vibration, Dust and Construction Traffic)

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Indirect Effect
Former Hotel Building (BTM).	Low.	Minor adverse.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Former Bottling Building (BTM).	Low.	Minor adverse.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Maltings Building (BTM).	Medium.	Minor adverse.	**Indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Remainder of Boundary Wall.	Neutral - Low.	Minor adverse.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Railway Tracks, Paving and Moorings.	Low.	Minor adverse.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Indirect Effect
Memorials.	Low.	Minor adverse.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Historic Gates.	Low.	Minor adverse.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Group of listed and locally listed buildings and garden wall on Thames Bank.	Low - Medium.	Negligible.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Gateway, formerly to Cromwell House.	Medium.	Negligible.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Chiswick Bridge.	Medium.	Negligible.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Mortlake Conservation Area.	Medium.	Negligible.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
Mortlake Green Conservation Area.	Medium.	Negligible.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.
The Jolly Gardeners Public House.	Low.	Negligible.	**Insignificant** to **indirect**, **short** to **medium-term**, **local**, **adverse** effect of **minor significance**.

15.58 In view of **Table 15.7**, it is considered likely that the Works would give rise to **insignificant** to **indirect**, **short** to **medium-term, adverse,** effects of **minor significance** upon the medium and low value heritage assets identified within and surrounding the Site. This would be in relation to the likely effects that noise, vibration, dust and traffic associated with the Works would have upon the setting of the heritage assets.

Completed Development

Direct Effects

15.59 The likely direct effects of the completed Development upon the heritage assets within the Site are set out in **Table 15.8** below.

Table 15.8: Likely Direct Effects of the Completed Development and their Significance

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Direct Effect
Former Hotel Building (BTM).	Low.	Minor adverse.	**Insignificant** to **direct**, **permanent**, **local**, **adverse** effect of **minor significance**.
Former Bottling Building (BTM).	Low.	Minor adverse.	**Insignificant** to **direct**, **permanent**, **local**, **adverse** effect of **minor significance**.
Maltings Building (BTM).	Medium.	Minor adverse.	**Direct**, **permanent**, **local**, **adverse** effect of **minor significance**.
Remainder of Boundary Wall.	Neutral - Low.	Neutral.	**Insignificant**.
Railway Tracks, Paving and Moorings.	Low.	Minor beneficial.	**Insignificant** to **direct**, **long-term**, **local**, **beneficial** effect of **minor significance**.
Memorials.	Low.	Neutral.	**Insignificant**.
Historic Gates.	Low.	Neutral.	**Insignificant**.

The direct effects of the Completed Development phase on the structures within the Site are described in more detail below in order to provide context to **Table 15.8** above.

The Former Hotel Building (BTM)

15.60 The Development would reinstate the historic hotel use of the former Hotel building through the construction of a restaurant / bar and reception area at ground floor level of the proposed building, and bedrooms with en-suites at the upper levels. The reintroduction of the former function of the locally listed building would enhance the understanding and appreciation of its heritage value, which would better reveal its significance in comparison to the existing situation.

15.61 Externally, the appearance of the heritage asset would remain largely unaltered and the character of the curved façade, which contributes to the significance of Mortlake Conservation Area and to framing Mortlake Green, would overall be retained. The existing windows would be replaced on a like-for-like basis, with a new doorway inserted on the south elevation at ground floor level to replace an existing window. An extension is proposed at second floor / roof level with fenestration

to the south elevation. This would be visible from Mortlake High Street and therefore would somewhat alter the appearance of the south elevation.

15.62 Overall, it is considered that the Development would have an **insignificant** to **direct**, **permanent**, **local**, **adverse** effect of **minor significance** on the heritage significance of the former Hotel building.

The Former Bottling Building (BTM)

15.63 The proposed works to the former Bottling building consist of the construction of a new building behind the retained façade, which would comprise a gym at lower ground floor level, retail unit and office space at ground floor level and office space to the upper floors.

15.64 It has been established that the façade of the former Bottling building, fronting onto Mortlake High Street, contributes to the significance of the Conservation Area and is identified as making the principal contribution to the buildings significance. The Development involves the addition of a glazed extension at roof level, which would be visible from this elevation. In addition, it is proposed to insert new windows, as well as enlarge the windows at existing second floor level. Although these changes would occur where there are existing or blind openings, the alterations would erode the legibility of the fenestration pattern and alter the character of the principal elevation, which would diminish the appreciation of the significance of the heritage asset.

15.65 The proposed new building would be larger in footprint than the existing, with an addition on the north side of the building. However, it is considered that as built form historically existed in this location, this would not have an adverse effect on the significance of the locally listed building. The north and east elevations of the existing former Bottling building have minimal openings, although there are several blind openings to these elevations. The proposed new building would have a number of windows and doors to the north and east elevations, which would alter the overall character of the former Bottling building and could detract from the appreciation of the heritage assets significance.

15.66 Overall, it is considered that there would be an **insignificant** to **direct**, **permanent**, **local**, **adverse** effect of **minor significance** on the heritage significance of the locally listed building.

The Maltings Building (BTM)

15.67 The proposed works to the Maltings building relate to the conversion of the building to residential apartments and community space. As previously identified, the proposals involve the removal of the cast iron columns, horizontal I-beams and the original stairs to the interior of the building. New staircases would be inserted within the floorspace to provide access to the apartments. This would result in a change to the internal layout of the building, however, although not in the original location of the circulation space, it is considered that the staircases would remain a secondary element within the building rather than a principal feature, in keeping with the buildings character.

15.68 New floors would also be inserted, to create eight floor levels within the building. These would largely be consistent with the floor levels that existed historically, albeit that two of the floors would be double height. The upper floors would be partitioned to create apartments. Historically, the maltings floors would have primarily been large open plan spaces. As such, this element of the proposals would compromise the appreciation of the former use of the building.

15.69 Externally, it is considered that the overall appearance of the building would be largely retained. Existing windows would be replaced on a like-for-like basis and some new windows inserted in existing blind openings. Several existing windows are proposed to be elongated on the north, east and west elevations and a new large glazed opening is proposed to the east elevation. This would

alter the historic appearance of the locally listed building. However, it is considered that the fenestration pattern would largely remain legible. In addition, external features that contribute to the aesthetic value of the locally listed building would be retained, such as the cast iron tie-rod pattress plates and decorative brick bands. As such, it is considered that the industrial character of the building and an understanding of its former use will be retained.

15.70 Overall, it is considered that there would be a **direct**, **permanent**, **local**, **adverse** effect of **minor significance** on the heritage significance of the Maltings building.

Remainder of Boundary Wall

15.71 A section of the boundary wall is proposed to be retained in the north east corner of the Stag Brewery component of the Site. As identified, the demolition of the majority of the boundary walls would result in a loss of historic fabric, which would have an adverse effect on their heritage significance. The retention of a section of the wall would, however, allow an understanding of the former function and industrial history of the main Stag Brewery component of the Site to be retained.

15.72 Overall it is considered that the effect on the heritage significance of the remainder of the boundary wall would be **insignificant**.

Railway Tracks, Paving and Moorings

15.73 It is proposed to retain the existing railway tracks and granite paving within the north east corner of the Site. The existing granite setts would be cleaned and any new granite setts in this location would be to match the existing. The railway tracks would also be retained and refurbished and a section of the historic boundary wall would be retained adjacent to these heritage assets. The retention and restoration of these historic features would enhance and better reveal their significance, and would provide an understanding and appreciation of their former use and the functional link between these elements and the Site.

15.74 Overall, it is considered that the Development would have a **direct**, **long-term**, **local, beneficial effect of minor significance** on the heritage significance of the railway tracks, paving and moorings.

Memorials

15.75 As part of the Development, the memorial plaques within the southern boundary wall would be retained and relocated within the Site. As identified in **Appendix 15.1**, the memorials are not situated in their original context. Therefore, their relocation would not diminish their heritage value and would allow the understanding and appreciation of the heritage assets' significance to be sustained.

15.76 Overall it is considered that the effect on the heritage significance of the memorials would be **insignificant**.

Historic Gates

15.77 The cast metal historic Watney's Brewery gates are proposed to be retained and relocated as part of the Development. These gates have already been removed from their original locations and therefore their relocation would not compromise their heritage value. As such, the understanding and appreciation of the heritage assets' significance would be retained.

15.78 It is considered that the likely effect of the Development on the heritage significance of the historic gates would be **insignificant**.

Indirect Effects

15.79 The indirect effects of the Development relate to the change within the settings of the heritage assets, if any, caused by the completed Development. The effects of the Development upon the setting of heritage assets within the Site boundary are set out in **Table 15.9**.

Setting of Non-Designated Heritage Assets within the Site

Table 15.9: Likely Indirect Effects of the Completed Development and their Significance

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Indirect Effect
Former Hotel Building (BTM).	Low.	Minor adverse.	**Insignificant** to **indirect**, **long-term**, **local**, **adverse** effect of **minor significance**.
Former Bottling Building (BTM).	Low.	Minor beneficial.	**Insignificant** to **indirect**, **long-term**, **local**, **beneficial** effect of **minor significance**.
Maltings Building (BTM).	Medium.	Minor beneficial.	**Indirect**, **long-term**, **local**, **beneficial** effect **of minor significance**.
Railway Tracks, Paving and Moorings (BTM).	Low.	Minor beneficial.	**Insignificant** to **indirect**, **long-term**, **local**, **beneficial** effect of **minor significance**.
Memorials (BTM).	Low.	Neutral.	**Insignificant**.
Historic Gates (BTM).	Low.	Neutral.	**Insignificant**.

15.80 It is considered that overall there would be an **insignificant** to **long-term**, **local**, **beneficial** effects of **minor significance** on the low and medium value heritage assets within the Stag Brewery component of the Site. Although the Development would be residential rather than industrial in nature, it is considered that the scale of the Development is consistent with the scale of development that would have existed historically on the Stag Brewery component of the Site and along the riverfront in general, particularly in an area with industrial history. It is also noted that the Development would be of a high quality of design, which is an improvement on the existing situation on the Site. Furthermore, the landscaping associated with the Development would complement the appreciation of the heritage assets. The likely effect on the memorials and historic gates would be **insignificant**, as it is considered that the Development would not affect the particular significance of these heritage assets. A **long-term**, **local**, **adverse**, **effect of minor significance** on the heritage significance of the former Hotel building is identified due to the proximity of the Development to this heritage asset and as a link attachment would be created between the heritage asset and the new built form adjacent and to its north.

15.81 The effects of the Development upon the setting of heritage assets outside the Site boundary are set out in **Table 15.10.**

Setting of Heritage Assets Surrounding the Site

Table 15.10: Likely Indirect Effects of the Completed Development and their Significance

Heritage Asset	Level of Heritage Significance	Magnitude of Impact	Significance of Effect
Group of listed and locally listed buildings and garden wall on Thames Bank.	Low - Medium.	Minor beneficial.	**Insignificant** to **indirect**, **long-term**, **local**, **beneficial** effect of **minor significance**.
Gateway, formerly to Cromwell House.	Medium.	Minor beneficial.	**Indirect**, **long-term**, **local**, **beneficial** effect of **minor significance**.
Chiswick Bridge.	Medium.	Minor beneficial.	**Indirect**, **long-term**, **local**, **beneficial** effect of **minor significance**.
Mortlake Conservation Area.	Medium.	Minor beneficial.	**Indirect**, **long-term**, **local beneficial**, effect of **minor significance**.
Mortlake Green Conservation Area.	Medium.	Minor beneficial.	**Indirect**, **long-term**, **local**, **beneficial** effect of **minor significance**.
The Jolly Gardeners Public House.	Low.	Minor beneficial.	**Insignificant** to **indirect**, **long-term**, **local**, **beneficial** effect of **minor significance**.

15.82 The likely effect of the Development on the setting of each heritage asset or group of heritage assets is described below to provide context to **Table 15.10** above.

Group of Listed and Locally Listed Buildings and Garden Wall on Thames Bank (Grade II Listed Buildings and BTMs)

15.83 This group of listed and locally listed buildings are identified in **Appendix 15.1** as forming a distinctive group along the south bank of the River Thames. The Stag Brewery component of the Site is located directly to the south and east of the heritage assets. It has been established that the historic structures on the Stag Brewery component of the Site make a positive contribution to the significance of the heritage assets. However, this contribution is lessened by the industrial 20th century brewery structures on the Stag Brewery component of the Site, which detract from the appreciation of the assets. This is largely due to these structures dominating in views of the assets along the Thames.

15.84 Although the built form of the Development would be of a consistent scale to the existing and therefore visible in views of the heritage assets along the River Thames, it is considered that the Development would be an enhancement when compared to the existing situation and that the

design of the new built form would complement the appreciation of the heritage assets. The Development would also be in keeping with the scale of development that would have existed historically along the riverfront. In addition, it is considered that the Development would not compromise the assets' relationship with the elements of setting that contribute positively to their significance, namely the River Thames and the listed Chiswick Bridge. As such, it is considered that that Development would likely give rise to **insignificant** to **long-term**, **local**, **beneficial effects** of **minor significance** to the heritage significance of the listed and locally listed buildings on Thames Bank.

Gateway, formerly to Cromwell House (Grade II Listed Building)

15.85 It has been established that the contribution of the Site to the significance of the listed gateway is largely invested in the positive contribution made by the sports ground in the north west portion of the Stag Brewery component of the Site; an area which has historically consisted of open green space and was formerly a cricket ground. However, the view of the existing brewery structures on the Stag Brewery component of the Site compromises this contribution. Importantly, this green space would largely be retained as part of the Development and would form sports grounds for the proposed school. The area directly adjacent to the heritage asset would remain as green space, maintaining the relationship between this element of setting and the listed gateway.

15.86 In addition to the above, the replacement of the modern brewery structures on the Stag Brewery component of the Site with the high quality built form of the Development would complement this green space and the appreciation of the heritage asset. It is therefore considered that there would be a **long-term**, **local**, **beneficial**, **effect** of **minor significance** on the heritage significance of the listed gateway.

Chiswick Bridge (Grade II Listed Building)

15.87 The Grade II Listed Chiswick Bridge is located to the north west of the Stag Brewery component of the Site. It has been identified in **Appendix 15.1** that the Site, as a whole, makes a positive contribution to the significance of the listed bridge, as it is illustrative of the industrial history of the area and its former functional link with the River Thames. However, the 20th century brewery structures are noted as diminishing this contribution. This is due to their dominance in views. It is considered that although the built form of the Development would be large scale, it would be in keeping with the scale of development that would have existed historically along the riverfront and its high-quality design would complement the appreciation of Chiswick Bridge.

15.88 In addition to the above, the heritage asset's associative relationship with the River Thames, or its relationship with the listed and locally listed buildings along Thames Bank that contribute positively to its significance, would not be diminished as a result of the Development. Overall, it is considered that there would be a **long-term**, **local**, **beneficial**, **effect** of **minor significance** on the heritage significance of Chiswick Bridge.

Mortlake Conservation Area

15.89 As outlined in **Appendix 15.1**, a small portion of the Stag Brewery component of the Site falls within Mortlake Conservation Area boundary. This element of the Site is considered to contribute positively to the significance of the Conservation Area as part of the historic brewery site. The modern brewery structures within the remainder of the Stag Brewery component of the Site are considered to detract from the appreciation, character and appearance of the Conservation Area. As such, it is considered that the Development would be an enhancement when compared to the

existing situation on the Site and that the high-quality design of the Development would complement the appreciation of the Conservation Area.

15.90 It is also considered that the Development would not compromise the Conservation Area's relationship with the positive elements of its setting, which include Mortlake Green, the River Thames and the surrounding historic townscape. Overall, it is considered that there would be a **long-term**, **local**, **beneficial effect** of **minor significance** on the heritage significance of Mortlake Conservation Area.

Mortlake Green Conservation Area

15.91 Mortlake Green Conservation Area is located adjacent and to the south of the Stag Brewery component of the Site, to the opposite side of Lower Richmond Road. It has been identified that there are elements of the Stag Brewery component of the Site that complement the character and appearance of the conservation area, most notably the former Hotel building which frames the green and the sports ground at the west end of the Stag Brewery component of the Site. It is considered, however, that the modern industrial structures on the existing Stag Brewery component of the Site detract from the assets appreciation, particularly as they dominate in views northwards across the green.

15.92 Importantly, the contribution of the positive elements of the Conservation Area's setting would be sustained, with the façade of the former Hotel remaining largely unaltered and the majority of the open green space at the western end of the Stag Brewery component of the Site being retained. Although the built form of the Development would be visible in views across the green, it is considered that the high-quality architecture would complement the appreciation of these views and of the character of the Conservation Area. It is therefore considered that there would be a **long-term**, **local**, **beneficial effect** of **minor significance** on the heritage significance of Mortlake Green Conservation Area.

The Jolly Gardeners Public House

15.93 It has been established that the historic elements of the brewery which survive on the Stag Brewery component of the Site contribute positively to the significance of the locally listed building, as part of its historic setting. However, the 20th century brewery structures on the Stag Brewery component of the Site detract from the appreciation of the asset. As such, the replacement of the existing brewery structures with the new built form of the Development would be an improvement on the existing situation and would complement the appreciation of the heritage asset.

15.94 In addition, the heritage asset's relationship with Mortlake Green and the built form to the opposite side of Lower Richmond Road, which contribute positively to its significance, would not be diminished. Overall it is considered that there would be an **insignificant** to **long-term**, **local**, **beneficial effect of minor significance** on the heritage significance of the Jolly Gardeners Public House.

Mitigation Measures and Likely Residual Effects

The Works

15.95 All buildings on the Site that have been identified as being of historic interest would be retained or partially retained as part of the Development, ensuring that the group value and relationships between the heritage assets on the Stag Brewery component of the Site would be retained. Direct adverse effects of minor to moderate significance on these heritage assets have been identified,

due to the demolition of historic fabric associated with the heritage assets. To reduce this adverse effect, it is recommended that a programme of archaeological building recording is carried out prior to the commencement of the Works. Accounting for such mitigation, the likely residual effects from the Works resulting in the removal of historic fabric of heritage assets within the Site would be **insignificant** to **direct**, **permanent**, **local**, **adverse effect** of **minor significance**.

15.96 During the Works, the implementation of a Construction Environmental Management Plan (CEMP) would ensure that measures are taken to limit the extent of vibration and dust, reducing the effect upon the heritage assets within the environs of the Site. As described in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, easements around the BTMs within the Site would form a specified distance from the edge of the retained buildings and structures where no demolition or slab removal works would take place. This would prevent ground loading or any ground disturbance which may cause foundations to move. In addition, and where required, all diesel and oil filling for plant and machinery would be located at the further cleared distance, in excess of the easement from the BTMs. The Site Manager would undertake dilapidation photographs of the retained buildings and structures and assess whether any additional protection is required such as boarding of windows or the erection of a physical barrier around them. Necessary protective measures would be identified through consultation with the relevant parties and review and sign off on a pre-construction condition survey of adjacent historic assets.

15.97 Further mitigation measures to protect historic assets during the Works would include:

- arrangement of delivery locations and times to limit disruption and possible damage to neighbouring historic structure;
- use of excavation and demolition methods that produce low vibration levels and participation in a monitoring programme to ensure vibration levels are within established thresholds;
- ensuring surface water runoff is not directed towards any historic assets; and
- directing debris chutes away from historic assets.

15.98 Following the above mitigation, the likely residual effect from noise, dust and vibration during the Works on heritage assets within the Site and within its environs would be **insignificant**.

15.99 Demolition of the existing modern brewery buildings and structures would result in **insignificant** to **permanent**, **beneficial**, **indirect** likely residual effects of **minor** to **moderate significance** upon the medium and low value heritage assets identified within the Site boundary and within its environs. This is due to the removal of an element of setting that is considered to detract from the appreciation of the heritage assets. As such, no additional mitigation measures would be necessary.

Completed Development

15.100 Insignificant to direct, adverse effects of minor significance on the heritage significance of some of the heritage assets within the Site have been identified due to the Development as a result of the alteration to the historic fabric or character of these assets. However, these adverse effects should be considered in the wider context of the Development overall and the harm weighed against the public benefits of the Development.

15.101 The likely residual effect of the proposed works to the former Hotel building, former Bottling Building and Maltings building would remain as the likely significant effect. That is, **insignificant** to **direct, long-term, local adverse** effect of **minor significance**.

15.102 The retention and restoration of the railway tracks, paving and moorings historic features would enhance and better reveal their significance, and would provide an understanding and appreciation of their former use and the functional link between these elements and the Site. The effect of the Works to the railway tracks, paving and moorings would be beneficial, therefore there is no need for mitigation measures to be proposed. The likely residual effect on the railway tracks, paving and moorings would be a **direct, long-term, local beneficial** effect of **minor significance**. Again, this would be identical to the likely effect.

15.103 The retention and relocation of the memorials and the historic gates, and the retention of a section of boundary wall, would result in **insignificant** effects. As such, there is no need for mitigation measures to be proposed. The likely residual effects on the memorials, historic gates and section of boundary wall would therefore remain as **insignificant.**

15.104 Once the Development is completed, the change to the setting of the heritage assets within and surrounding the Site would be uniformly beneficial. Therefore, there would be no need for mitigation measures. The likely residual effect on the setting of heritage assets within the Site would remain as per the likely effects. That is, ranging from **insignificant** to **indirect, long-term, beneficial** effects of **minor significance**.

Summary

15.105 **Table 15.11** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 15.11: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Demolition of historic fabric within the Stag Brewery component of the Site.	**Direct**, **permanent**, **local**, **adverse** effects of **minor** to **moderate significance**.	Undertaking of a programme of archaeological building recording prior to commencement of the Works.	**Insignificant** to **direct**, **permanent**, **local**, **adverse** effects of **minor significance**.
Retention in-situ of the railway tracks, paving and moorings within the Stag Brewery component of the Site.	**Insignificant**.	Not applicable.	**Insignificant**.
Indirect effects upon the setting of heritage assets within and surrounding the Stag Brewery component of the Site arising from the demolition of existing modern brewery buildings and structures within the Stag Brewery component of the Site.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effects of **minor** to **moderate significance**.	Not applicable.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effects of **minor** to **moderate significance**.
Indirect effects upon the	**Insignificant** to **indirect**,	Implementation of	**Insignificant**.

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
setting of heritage assets within and surrounding the Stag Brewery component of the Site arising from noise, vibration, dust and traffic associated with the Works.	**short to medium-term**, **local**, **adverse** effects of **minor significance.**	CEMP to limit and appropriately manage noise, vibration, dust and construction traffic associated with the Works. Implementation of appropriate easements around heritage assets to be retained during the demolition and slab removal works required to facilitate the Development.	
Completed Development			
Conversion of the Maltings building and a new building behind the retained façades of the former Hotel building and former Bottling Building.	**Insignificant** to **direct**, **long-term**, **local**, **adverse** effect of **minor significance**.	Not applicable.	**Insignificant** to **direct**, **long-term**, **local**, **adverse** effect of **minor significance**.
Retention of part of the boundary wall.	**Insignificant**.	Not applicable.	**Insignificant**.
Retention and improvement to the setting of the railway tracks, paving and moorings.	**Direct**, **long-term**, **local beneficial** effect of **minor significance**.	Not applicable.	**Direct**, **long-term**, **local beneficial** effect of **minor significance**.
Retention and relocation of memorials.	**Insignificant**.	Not applicable.	**Insignificant**.
Retention and relocation of historic gates.	**Insignificant**.	Not applicable.	**Insignificant**.
Change of setting of the heritage assets within and surrounding the Stag Brewery component of the Site.	**Insignificant** to **indirect**, **long-term**, **local**, **beneficial** effects of **minor significance**.	Not applicable.	**Insignificant** to **indirect**, **long-term**, **beneficial** effects of **minor significance**.

References

1 Historic England (2015); Historic Environment Good Practice Advice in Planning Note 3 - The Setting of Heritage Assets, March 2015.

2 English Heritage (2008); Conservation Principles, Policies and Guidance, For the Sustainable Management of the Historic Environment, April 2008.

3 Chartered Institute for Archaeologists (2014); Standard and Guidance: Historic Environment Desk-based Assessments, December 2014.

4 Department for Communities and Local Government (2012); National Planning Policy Framework, March 2012.

5 The Highways Agency (2007); Design Manual for Roads and Bridges, Volume 11, Section 3, Part 2 HA 208/ 07 Cultural Heritage, August 2007.

6 Department for Communities and Local Government (2012); National Planning Policy Framework, March 2012.

7 Historic England (2008); Conservation Principles, Policies and Guidance, For the Sustainable Management of the Historic Environment, Historic England, London.

8 The Highways Agency (2007); Design Manual for Roads and Bridges, Volume 11, Section 3, Part 2 HA 208/ 07 Cultural Heritage, August 2007.

9 International Council on Monuments and Sites (ICOMOS) (2010); Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.

10 Historic England (2015); Good Practice Advice in Planning Note 3: The Setting of Heritage Assets, Historic England, London.

16. Townscape and Visual Effects

Introduction

16.1 This Chapter, prepared by Waterman Infrastructure and Environment Ltd (Waterman IE), assesses the likely significant effects of the Development on townscape character and views. It provides a description of the methods used in the assessment and the relevant baseline conditions of the Site and surrounds. This is followed by an assessment of the likely significant effects of the Development during demolition, alteration, refurbishment and construction (the Works) and once the Development is completed and operational.

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

16.3 It should be noted that the assessment of the likely significant effects of the Development upon below ground built heritage is presented in **Chapter 14: Archaeology (Buried Heritage)** and the assessment of the likely significant effects of the Development upon above ground built heritage is presented in **Chapter 15: Above Ground Built Heritage**.

Assessment Methodology and Significance Criteria

Assessment Methodology

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

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

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

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

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

- **Townscape effects**: the likely effects (and their significance) of the Development during the Works and once completed and operational on the physical and cultural characteristics of the Site and on the surrounding townscape character; and
- **Visual effects:** the likely effects (and their significance) of the Development during the Works and once completed and operational on views from visual receptors, and the likely effects and their significance on the amenity value of these views.

Establishing the Baseline

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

- fieldwork to undertake an assessment of the character of the Site and its surrounds, together with the sensitivity of the townscape to change;
- use of existing descriptions of townscape character using national level character assessment from the National Character Areas (produced by Natural England), and local level sources including the 'Mortlake Village Planning Guidance, Draft Supplementary Planning Document[5]', London Borough of Richmond upon Thames (LBRuT), February 2015 and the 'Stag Brewery, Mortlake, SW14 Planning Brief'[6], London Borough of Richmond upon Thames, adopted July 2011; and
- a description of the key features and views of the existing Site and surrounding area and identification of their sensitivities to change.

Townscape Assessment

16.8 A townscape resource should be understood in terms of:

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

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

Visual Assessment

16.10 The visual baseline establishes the area in which the Site may be visible, the nature of the views and amenity value attributed to the views. Viewpoint locations were established through desk-

based research, including Geographical Information System (GIS) analysis of the topography of the Site and surrounding area using Ordnance Survey (OS) base mapping and profile height data to produce a Terrain Analysis (refer to **Figure 16.1**). Consideration was also given to protected or locally defined views such as views and vistas defined on the Local Plan Proposals Map[7]. The desk-based selection of viewpoints has then been verified through Site fieldwork.

16.11 The photographic locations for each viewpoint were agreed via consultation with LBRuT. This included a walkover of the local area surrounding the Site with representatives of LBRuT on 4th July 2016, to witness and refine the viewpoint locations. Viewpoint selection was also agreed via email correspondence, a copy of which can be found in **Appendix 16.1**.

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

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

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

16.14 Field surveys were undertaken on 6th March 2016, 7th March 2016 and 17th October 2016 to obtain all viewpoint photography. All baseline photographs comprise high resolution images taken with a 35 mm (full frame) digital SLR camera. To capture the full extent of the Development and an appropriate amount of contextual built form, some local townscape views were photographed using a wide angle (24mm focal length - Canon TS-e 24mm f/4L II) lens, giving a horizontal field of view of 73.7°. Some views were photographed using a 50mm (Canon 50mm f/1.4l) lens in portrait orientation. With the camera mounted on an indexed panoramic tripod head, several photographs were taken and joined together to form a panorama of approximately 90°. A surveyor was instructed (by means of a marked-up photograph, map and tripod (in situ) photograph) to record a range of contextual reference points. The collected survey reference point data and camera location data was imported into a 3D model environment. Using a photo editing package (Adobe Photoshop CC 2015.5) the photography, survey reference point render and proposed development render were aligned to create an AVR of the Development within its townscape context. The resulting images (AVRs) seek to demonstrate the Development and the visibility of the Site within the local townscape that would be experienced at each viewpoint.

16.15 A combination of wireline (AVR level 1) and fully rendered (AVR level 3) AVRs views were created, the selection of which was agreed in consultation with LBRuT (refer to **Appendix 16.1**). Consideration of night-time views, including methodology, appraisal and illustrative photomontage figure, is provided in **Appendix 16.2**.

16.16 It is acknowledged that differing visual effects are possible due to seasonality and that the winter view provides clearer prospects where deciduous vegetation intervenes. The assessment considers the winter view (no leaves on the trees) through review and assessment of the winter

photography and consequently, the assessment is based on winter views which depict the worst-case scenario. Commentary on summer views is also provided, where appropriate.

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

16.18 In respect of the assessment of the outline component of the Development, the assessment set out within this Chapter has considered the maximum allowable spatial parameters sought for approval. This would give rise to the greatest massing and so can be considered to reflect a 'worst-case' assessment. That said, based on professional and expert judgement, it is unlikely that the minimum allowable spatial parameters sought for approval would give rise to materially different townscape and visual effects. This is because the scale of Works that would be required for both the maximum and minimum allowable parameters would be similar and other factors such as the choice of materials and façade details of the proposed buildings would be in accordance with the Design Code also submitted for approval.

Significance Criteria

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

Value and Sensitivity to Change

16.20 **Table 16.1** sets out the criteria used to define the value of townscape and visual receptors and the criteria used to define the sensitivity of townscape and visual receptors to change.

Table 16.1: Value and Sensitivity to Change Criteria

Value and Sensitivity to Change	Criteria	
	Townscape Receptor	**Visual Receptor**
High	• Internationally (i.e. World Heritage Site) or nationally statutory designated (i.e. National Parks, Areas of Outstanding Natural Beauty, Registered Park and Garden, Listed Buildings and Scheduled Monuments) recognised townscape of high quality and distinctive character with a large number of features and strong sense of place. • A relatively undisturbed, pristine townscape where changes or disruptions to the existing townscape would be noticeable and difficult to mitigate or restore. • Susceptible to change which would permanently alter key characteristics and elements of the townscape.	• Receptors with a key interest and expectation of enjoying the view (e.g. walkers and spectators of the annual Oxford-Cambridge University Boat Race). • Residents in homes who have open, uninterrupted views in the direction of the development. • Receptors within a nationally or internationally designated townscape.
Medium	• Locally designated (i.e. BTMs, OOLTIs, Conservation Areas, Local Green Spaces, and Local Nature Reserves) / recognised townscape with some distinctive and / or designated characteristics and features in reasonable condition (e.g. a public/ semi-public private open space that is of value to the local community). • Townscape of relatively widespread and common features or characteristics, capable of tolerating moderate levels of change without affecting the key characteristics and elements.	• Visitors at locations where the view is valued but not fundamental to the location or activity (e.g. people in outdoor recreation / activities that do not focus on an appreciation of the townscape). • Existing residents who have views in the direction of the Development where the quality, condition and extent of the existing view is unexceptional (e.g. some properties fronting Mortlake High Street). • People travelling on local roads or on trains with specific interest in the view but where viewing periods are discontinuous and / or irregular. • Receptors within locally valued townscapes.

Low	• Undesignated townscape with local value but low quality. • Few distinctive characteristics, features or elements many of which may be in poor condition. • Townscape capable of tolerating substantial change / improvement / enhancement.	• People engaged in activities that either distract from the view or require concentration on the foreground, resulting in minimal interest or appreciation of the view (e.g. people at work, motorists travelling not for the specific enjoyment of the scenery or people engaged in sports or recreation where the focus is more on the activity rather than the view). • Receptors where visual amenity is not the principal reason for them to be present or where the quality of the existing view is poor (e.g. industrial areas or derelict land).

Magnitude

Townscape

16.21 The magnitude of townscape effects depends on the following:

- the scale and extent of change in the townscape with respect to the loss and / or addition of new characteristics or features;
- the degree of contrast, or integration / compatibility of any new features with existing characteristics of the townscape;
- the duration of the effect (temporary or permanent, intermittent or continuous);
- the distance of the townscape resource from the source of the effect;
- the degree of containment / openness, influenced by urban grain, topography and presence of intervening vegetation and other features (and therefore also seasonal variation); and
- the extent of mitigation planting or other mitigation measures such as extent or positioning of new buildings or structures.

Visual

16.22 The magnitude of the visual effect depends on the following:

- the scale of change in the view with respect to the loss and / or addition of new features;
- the degree of contrast, or integration of / compatibility with any new features with existing features in the view;
- the duration of the effect (temporary or permanent, intermittent or continuous);
- the distance of the receptor from the source of the effect;
- the angle of view and presence of intervening vegetation or features;
- the dominance of the impact feature in the view;

- seasonal variation;
- the extent and position of the new buildings and structures that would be visible in the view;
- the extent to which views of the Development would be screened or filtered by intervening landform or by townscape elements such as trees, or built structures; and
- the extent of mitigation planting.

16.23 **Table 16.2** sets out the criteria used to assess the magnitude of predicted townscape and visual effects.

Table 16.2: Magnitude Criteria

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

Significance of Effect

16.24 The assessment combines the sensitivity of the receptors with the predicted magnitude of effect to establish the significance of the townscape and visual effects as shown in **Table 16.3**.

Table 16.3: Significance of Effect Matrix

		Sensitivity to Change		
		High	**Medium**	**Low**
Magnitude of Change	**Major**	Major Adverse / Beneficial	Major Adverse / Beneficial	Moderate Adverse / Beneficial
	Moderate	Major Adverse / Beneficial	Moderate Adverse / Beneficial	Minor Adverse / Beneficial
	Minor	Moderate Adverse / Beneficial	Minor Adverse / Beneficial	Minor Adverse / Beneficial
	Negligible	Insignificant	Insignificant	Insignificant

16.25 Based upon the significance matrices within **Table 16.3** the assessment of likely and likely residual townscape and visual effects can be described as stated within **Table 16.4**.

Table 16.4: Significance of Likely Effects and Likely Residual Effects

Significance	**Description**	
	Landscape Character	**Visual Amenity**
Adverse effect of major significance	The Development is at considerable variance with the scale, landform and pattern of the townscape, and / or there is a total or major loss of key characteristics.	The Development would be visually intrusive and would cause substantial deterioration and / or adverse change in the existing view / general visual amenity of the area.
Adverse effect of moderate significance	The Development is out of proportion and does not fit with the scale, landform and pattern of the townscape, and / or damages quality, with a loss of key characteristic features.	The Development would be visually intrusive and would cause noticeable deterioration and / or adverse change in the existing view/ general visual amenity of the area.

Adverse effect of minor significance	The Development fits within the scale, landform and pattern of the townscape however, there is some loss of quality or characteristic features.	The Development would cause limited visual intrusion and would cause minor deterioration and / or adverse change in the existing view / general visual amenity of the area.
Insignificant	The Development has no easily discernible effect on townscape character.	The Development would cause no easily discernible change to visual amenity and key views.
Beneficial effect of minor significance	The Development would complement the scale, landform and pattern of the townscape, whilst contributing to the existing character.	The Development would result in minor improvement and / or positive changes to key views / visual amenity of the area.
Beneficial effect of moderate significance	The Development would fit in well with the scale, landform and existing pattern of the townscape, and maintain and / or enhance the existing townscape character.	The Development would create a very noticeable improvement and / or positive change in key views / visual amenity of the area.
Beneficial effect of major significance	The Development would fit in very well with the scale, landform and existing pattern of the townscape, and bring considerable enhancements.	The Development would create a substantial improvement and enhancement of key views / visual amenity of the area.

Baseline Conditions

Townscape Character

National Character

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

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

- *"…Flat and low-lying land, rising to low, river-terraced hills…;*
- *…The numerous hydrological features provide unity to an area which otherwise lacks homogeny; these features include the River Thames and its tributaries…;*

- *…Although densely populated and developed, pockets of woodland, open grassland, parkland, wetlands and intimate meadows provide escape and tranquillity…;*
- *…Towards London in the east, the natural character of the area is overtaken by urban influences: a dense network of roads,...railway lines…;*
- *…To the south, the open Thames flood plain dominates, with its associated flat grazing land, becoming characterised by a number of formal historic landscapes on higher ground. Between Hampton and Kew, the River Thames forms the focus of a series of designed landscapes.;*
- *…The area has an urban character, and there are very few villages of more traditional character…;*
- *…The river is closely associated with numerous historic places and cultural events…; and*
- *…The area is important for recreation, both for residents and visitors. Historic parkland and commons provide access to green space, the Thames Path National Trail runs the length of the NCA, and a variety of activities are enjoyed on the river and other waterbodies."*

Local Character

Design Quality Supplementary Planning Document (Adopted 2016)

16.28 The character of LBRuT is briefly noted within the Design Quality Supplementary Planning Document (SPD)[8]. The Site lies wholly within the 'Mortlake and East Sheen' character area and an extract of its characteristics is provided below:

"Mortlake has a dense built up character composed of regular patterns of terraced Victorian streets with some set back but little planting. A similar character prevails in parts of East Sheen, becoming more suburban towards East Sheen Common. Near the common are some of the lowest density homes in the Borough, set back from the street within extensive and mature grounds enclosed by gated high boundaries."

16.29 The SPD states:

"…*The Thames plays a profound role in the natural environment of the Borough… There is great variety in the landscape and townscape which borders the river passing through areas of tranquillity and intensity…"*

16.30 Riverside character is illustrated within the northern edge of the Site as being of an '*urban*' riverside character. The northern bank of the River Thames opposite the Site is noted as '*semi urban*'.

Conservation Area Statement (undated)

16.31 The south eastern edge of the Site adjacent to the westernmost extent of Mortlake High Street and the Maltings buildings within the northern part of the Stag Brewery component of the Site falls partially within the Mortlake Conservation Area.

16.32 The character of the conservation area is defined within the relevant LBRuT Conservation Area Statement[9] and includes the following:

- historic core focused around St. Mary's Church with many fine 18th century listed houses on the riverside and High Street. Along the river frontage, between Chiswick Bridge and Ship

Lane, is a particularly fine group of 18th century buildings, with at least one from the Tudor period. 19th and 20th century development along the river frontage has respected the style and scale of the group;

- an intimate relationship with the Thames. The High Street follows the flood line and links with the riverfront via historic access ways to former wharfs at Bull's Alley and Ship Lane;
- between Ship Lane and White Hart Lane, the riverfront is reflective of the area's industrial history. Enormous contrasts in scale are evident yet a shared robust utilitarian conformity exists through the use of brickwork and detailing;
- original architectural details including ground floor bay windows, roofs laid in diamond pattern slate, timber bracketed porches and chimney with corbelled and dentilled brick work;
- exceptional views along the river in both directions;
- view into Mortlake from Chiswick bank is dominated by large-scale housing developments along the south side of the widened High Street; and
- large numbers of trees contribute to the cohesive character of the area.

Mortlake Village Planning Guidance, Draft SPD (February 2015)

16.33 The draft planning guidance SPD[10] includes a character area assessment which subdivides the village into seven distinct character areas (two of which are adopted Conservation Areas), as follows:

- Conservation Area 1 (TCA1): Mortlake;
- Character Area 2 (TCA2): West of White Hart Lane;
- Character Area 3 (TCA3): Mortlake High Street (part);
- Conservation Area 4 (TCA4): Mortlake Green;
- Character Area 5 (TCA5): Kingsway and surrounds;
- Character Area 6 (TCA6): Watney Road and surrounds; and
- Character Area 7 (TCA7): Stag Brewery.

16.34 Each character area is described in further detail below.

TCA1: Mortlake

16.35 This area is situated along the south bank of the Thames between Chiswick Bridge and White Hart Lane. It comprises Mortlake Conservation Area which adjoins Barnes Green Conservation Area to the east and Mortlake Green Conservation Area to the west. The Stag Brewery component of the Site abuts the western boundaries of this TCA. The characteristics of the area are described as above.

TCA2: West of White Hart Lane

16.36 This TCA is located approximately 200 m to the east of the Stag Brewery component of the Site. This area comprises six parallel streets bound by Mortlake High Street to the north, North Worple Way and railway to the south and St Mary's Church, St. Mary Magdalen's Church and Primary School to the west. This area comprises the south eastern extent of Mortlake Village.

16.37 The area is characterised by:

- predominantly late 19th Century and early 20th Century residential development with impressive and architecturally distinctive Edwardian and late Victorian character. Terraced housing on wide leafy streets;
- some interwar housing and recent infill (Ripley Gardens is noted as a sub area of Character Area 2 within the Mortlake Village Planning Guidance SPD);
- original architectural details including red, yellow and painted brick, roughcast render, applied timbering, timber frame windows, timber porches, clay tiled roofs, clay chimneypots, brick gate piers with dwarf walls incorporating railings and fencing;
- planted front gardens and street trees; and
- the spur footbridge, an unusual semi-circular iron structure of 1902, provides an important link from Mortlake to East Sheen.

TCA3: Mortlake High Street (part)

16.38 This TCA is located adjacent to the south eastern boundary of the Stag Brewery component of the Site, south of Mortlake High Street. This area occupies a small section of Mortlake High Street, between Mortlake Green and the Grade II* listed St Mary's Parish Church, on the southern side of the road only. It is surrounded by Mortlake Conservation Area on three sides and Mortlake Green Conservation Area to the west, though it is not itself a Conservation Area.

16.39 The area is characterised by:

- three large post war blocks of flats of relatively consistent character juxtaposed with less sympathetic modern developments at the end of the high street, with a high-rise block and the Royal Mail depot which is of lower quality and regarded as banal and out of scale with adjacent streets;
- lower quality buildings within the area detract from significant aspects of the adjacent Mortlake Conservation Area;
- consistent architectural features include red brick, unplasticized polyvinyl chloride (uPVC) windows and two-four storey buildings; and
- presence of street trees.

TCA4: Mortlake Green

16.40 This TCA is located adjacent to the south boundary of the Stag Brewery component of the Site. This area is bound by the railway line, Lower Richmond Road, Sheen Lane and Rosemary Lane. It adjoins Mortlake Conservation Area to east and Sheen Lane Conservation Area to the south.

16.41 The area is characterised by:

- Mortlake Green, which provides a buffer between heavy traffic on Lower Richmond Road and Sheen Lane. It is predominantly an informal grassed area with children's play area and a hard-surfaced recreational area. The Green is well screened in parts by mature trees;
- Victorian and Edwardian buildings and terraced properties generally of two-, three- and four-storeys and featuring red bricks, rendered bands, tall brick chimneys and sash windows;

- two groups of BTMs:
  - 11-25 Sheen Lane including the Railway Tavern; and
  - 27 Sheen Lane with its rendered bands and good brick detailing;
- Lower Richmond Road, which is contrasted by two- and three- storey brick terraced houses on the south side and the Brewery buildings which dominate the road to the north;
- two pubs on opposite sides of Lower Richmond Road, which form a gateway to Mortlake Green;
- an intimate collection of houses to the west of the Green, with Woodbine Cottage, Eton Lodge and Rosemary Terrace forming an attractive group, alongside the architecturally distinctive Rosemary Gardens. This is contrasted by unattractive blocks of flats in the adjacency; and
- Mortlake Station, which is formed of traditional brick and timber detailing and modest in scale.

TCA5: Kingsway and Surrounds

16.42 This area consists of several housing developments to the south of Lower Richmond Road. This TCA is primarily located to the south west of the Site, although it is partly located within the southern part of the Chalkers Corner component of the Site (Application C).

16.43 The area is characterised by:

- predominantly residential development with a few shops;
- traffic on Lower Richmond Road, being a main thoroughfare into Mortlake;
- residential development with a variety of eras and styles including:
  - an inter-war cul-de-sac of semi-detached brick and render houses at Langdon Place;
  - late 19th Century semi-detached houses, the oldest in the area, bordering Lower Richmond Road; a small post-war block of flats;
  - a large area of Edwardian development with quiet, leafy streets of terraces; and
  - semi-detached houses generally of eclectic or Arts and Crafts detailing;
- original architectural details including:
  - red and painted brick;
  - roughcast render;
  - applied timbering;
  - timber frame windows;
  - timber porches;
  - clay tiled roofs;
  - clay chimneypots; and
  - brick gate piers with dwarf walls incorporating railings and fencing; and
- planted front gardens and street trees.

TCA6: Watney Road and Surrounds

16.44 This area is located to the north of Lower Richmond Road between the Chalkers Corner Component of the Site and the Stag Brewery component of the Site. It encompasses the northern part of the Chalkers Corner component of the Site.

16.45 The area is characterised by:

- four distinctive residential developments of various eras, with an overall piecemeal nature;
- properties on Watney Road built for workers of the Stag Brewery, which are the earliest housing in the area. A wide street of Edwardian semi-detached houses with roughcast render and gables, which in contrast culminates in a cul-de-sac of inter-war housing;
- Chertsey Court, a London County Council (LCC) housing estate of the 1930s, is characterised by large, green open space at its centre, surrounded by four- and five-storey blocks of flats;
- recently completed properties at Wadham Mews and fronting Williams Lane of sympathetic neo-Georgian aesthetic, also incorporating a pair of original stone gate piers;
- post-war blocks of flats of the 1950s and 60s at the northern end of Williams Lane; and
- properties are generally on substantial plots and contain trees. Many properties look over large expanses of undeveloped land such as Mortlake Cemetery and Watney's Sports Ground playing fields. This gives the area a feeling of being relatively open in comparison with adjacent areas of Mortlake, despite not looking out over the river.

TCA7: Stag Brewery

16.46 This area, which is wholly located within the Stag Brewery component of the Site, is bound by the River Thames and properties on Thames Bank to the north, Lower Richmond Road and Mortlake High Street to the south, and Williams Lane to the west.

16.47 The area is characterised by:

- large modern structures associated with the brewing process. These are utilitarian in appearance and highly visible from the surrounding area;
- the former bottling building was constructed in 1869 and rises to three-storeys. It is locally distinctive for its large southern elevation of London stock brick and "1869 Mortlake Brewery" signage, on Lower Richmond Road. It is of local historic and architectural importance and contributes to the Conservation Area;
- the Maltings building located at the river frontage, which dates from 1902 and is eight- and nine-storeys constructed of London stock brick. It is an important landmark identified as a BTM and contributes to the significance of the Conservation Area;
- the former hotel building dates from the late 19th Century, situated at the junction of Lower Richmond Road and Mortlake High Street, following the curve of the road. The building is relatively plain and a typical Victorian brick structure. It contributes to the significance of the Conservation Area and to framing Mortlake Green;
- the northern boundary of the Stag Brewery component of the Site nearest Bulls Alley, which is mostly formed from the surviving river facing elevations of the now demolished old brewery buildings; and

- locally separates Mortlake from the public towpath and Thames frontage.

16.48 The 'Historic Assets in Mortlake' map within the Mortlake Village Planning Guidance, Draft SPD illustrates the locations and extents of historic assets including the local designation BTM. A BTM is defined as a:

"…*Building or group of buildings that is not on the statutory list of buildings of special architectural or historic interest but that contributes positively and significantly to the character and appearance of an area*.[11]"

16.49 BTMs are locally designated townscape features of important local value. There are many such designated buildings within or in the vicinity of the Site, most notably:

- the Maltings building within the Stag Brewery component of the Site;
- the bottling building within the Stag Brewery component of the Site;
- Ship Inn and other properties on Thames Bank north of the Stag Brewery component of the Site; the former hotel building within the Stag Brewery component of the Site;
- Jolly Gardeners public house adjacent to the Stag Brewery component of the Site along Lower Richmond Road; and
- a number of properties fronting Lower Richmond Road and Mortlake High Street.

16.50 There are no Public Rights of Way (PRoW) within the Site. However, immediately to the north of the Stag Brewery component of the Site lies part of the Thames Path National Trail running alongside the River Thames, Thames Bank and the riverside path which borders the northern edge of the eastern part of the Stag Brewery component of the Site.

16.51 There are a number of trees within the Site which are protected by individual and group Tree Preservation Orders (TPOs), as shown in **Figure 16.5**. These are concentrated in two localities:

- in the north west of the Stag Brewery component of the Site adjacent to residential properties along Thames Bank and Williams Lane; and
- along the south western boundary of the Stag Brewery component of the Site along Richmond Road.

Stag Brewery, Mortlake, SW14 Planning Brief, SPD (July 2011)

16.52 The Stag Brewery Planning Brief SPD[6] provides guidelines on future uses, layout and design for the redevelopment of Stag Brewery component of the Site and is informed, in part, by various statements about the character of the Stag Brewery component of the Site and its surroundings.

16.53 Characteristics of the Stag Brewery component of the Site include:

- "…*a number of large modern structures associated with the brewing process… utilitarian in appearance and highly visible from the surrounding area...;*
- *…exceptions to the large modern structures are three historic buildings which fall within the Mortlake Conservation Area. These are known as the former bottling building, the Maltings building and the former hotel building. In addition to these, sections of brick boundary structures survive to the north and south of the site…;*

- *…The site includes a private playing field, which is protected as 'Other Open Land of Townscape Importance' but is not designated as 'Public Open Space'".* This comprises two football / one cricket pitch and a pavilion, used by a local football club and local schools;
- the Maltings building, built in c.1902, which comprises an eight and nine storey building constructed on a rectangular footprint in London stock brick, parallel to the towpath and the River Thames. It is an important local landmark (identified as a BTM) and contributes to the significance of the Mortlake Conservation Area despite not fulfilling the criteria to be added to Historic England's list of buildings of special architectural or historic interest;
- the former bottling building, which fronts the High Street and was constructed in c.1869. It is built of London stock brick and rises to three storeys. A rendered area on the south elevation reads "1869 Mortlake Brewery";

  "*…The building is of some local historic interest and some limited architectural interest due mainly to its façade and is considered to make a contribution to the significance of the Conservation Area…";*
- the river wall within the north of the Stag Brewery component of the Site, which physically separates the main part of the Site from the public towpath. The northern boundary structure to the east nearest Bulls Alley survives in the form of historic brickwork mostly formed from the surviving river facing elevations of old brewery buildings. The boundary to the High Street to the south is largely historic although there are some additions in modern brick construction. The boundary structures are considered to contribute, in varying degrees to the significance of Mortlake Conservation Area. It is also recognised that they create a barrier to visual and physical permeability of the Site;
- other buildings on the Stag Brewery component of the Site are modern buildings such as the offices, brewhouse, process building, power house, gatehouses, sports club and packaging building (refer to **Figure 3.1**), and are not considered to contribute to the significance of the adjacent Conservation Areas;
- the visual relationship of the Stag Brewery component of the Site to the surrounding area, including views up and down stream and across the River Thames, together with key views towards and into the Stag Brewery component of the Site; and
- traffic issues including congestion.

Local Plan – Proposals Map, London Borough of Richmond upon Thames (2015)

16.54 The Local Plan Proposals Map[7] illustrates the geographic extents of several local designations within or in the vicinity of the Site.

16.55 OOLTI are areas of townscape which are predominantly open or natural in character and though not extensive enough to be defined as green belt or metropolitan open land, they contribute to local character and / or the street scene and are of value to local people due to presence and openness. OOLTI within or in the vicinity of the Site are:

- the sports ground (within the south west corner of the Stag Brewery component of the Site);
- land at Chalkers Corner (within the Chalkers Corner component of the Site);
- land to the rear of Chertsey Court (to the north east of the Chalkers Corner component of the Site); and

- Mortlake Green (to the south of the Stag Brewery component of the Site).

Description of Townscape Character Areas and Identification of Sensitivity to Change

16.56 The descriptions below summarise the composition and characteristics of each discrete TCA relevant to the assessment. Value and sensitivity to change is then identified for each of the TCAs in accordance with **Table 16.1**. The description of each TCA is informed by relevant designations and access features (refer to **Figure 16.2**) as well as the relevant Conservation Area Statements, Mortlake Village Planning Guidance Draft SPD and Stag Brewery Planning Brief SPD.

16.57 The TCAs are numbered in accordance with the numbering of Character Assessment Areas used within the Mortlake Village Planning Guidance Draft SPD (refer to **Figure 16.3**).

TCA1: Mortlake

16.58 **Townscape Sensitivity:** The Stag Brewery component of the Site abuts the western boundaries of this TCA. TCA1 lies between the Stag Brewery component of the Site and River Thames and extends eastwards towards White Hart Lane. This is a designated townscape of local value (Mortlake Conservation Area and a concentration of Buildings of Townscape Merit (BTM) such as The Ship public house, the Maltings building and Boat Race House) with many distinctive characteristics and features in good condition and intactness. However, it also contains buildings and features of national cultural importance, including Chiswick Bridge (Grade II listed), Parish Church of St Mary (Grade II* listed) and Grade II listed houses at Thames Bank. It is an area under pressure for change through development, particularly at the riverside. Parts of the townscape exhibit strong and distinctive character, such as the historic core around St Mary's Church, although positive aspects of the area's character are detracted by the dominance of traffic and of street clutter. Given that this TCA has many distinctive characteristics and features in good condition and contains nationally listed buildings, the value and sensitivity to change of this TCA has been assessed as **High**.

TCA2: West of White Hart Lane

16.59 **Townscape Sensitivity:** This TCA is located approximately 200 m to the east of the Stag Brewery component of the Site. This is an undesignated townscape of relatively widespread features, comprising predominantly late 19th and early 20th Century residential development of impressive character, distinguished by tree-lined residential streets and areas of distinctive Edwardian and Victorian architecture. Although encircled by busy transport infrastructure, the grain and settlement pattern has remained largely intact and protected. The area is capable of tolerating moderate levels of change. Given that this has relatively widespread and common features and characteristics, capable of tolerating moderate levels of change, the value and sensitivity to change has been assessed as **Medium**.

TCA3: Mortlake High Street (part)

16.60 **Townscape Sensitivity:** This TCA is located adjacent to the south eastern boundary of the Stag Brewery component of the Site, south of Mortlake High Street. This is an undesignated townscape of limited value and relatively low-quality due to the large-scale post war residential buildings and other modern infill. Despite proximity to Conservation Areas, there are few distinctive

characteristics, features or elements, the area lacks consistency and much of the townscape is in poor condition due to the influence of the high street uses. The large post war blocks of flats and the Royal Mail depot detract from significant aspects of the adjacent Mortlake Conservation Area. It is capable of tolerating substantial change, especially in the form of improvement or enhancement. Given that this is an undesignated townscape of limited value and low quality, the value and sensitivity to change has been assessed as **Low**.

TCA4: Mortlake Green

16.61 **Townscape Sensitivity:** This TCA is located adjacent to the south boundary of the Stag Brewery component of the Site. This is a designated townscape of local value (Mortlake Green Conservation Area, OOLTI) with many distinctive characteristics and features in good condition with a high level of intactness. The Green itself is a crucial and substantial component of the area's character and value, and provides a focal point. The areas also include some Buildings of Townscape Merit (BTM) such as Mortlake Green Railway Station, 11-27 Sheen Lane east of the Green and other architecturally distinctive cottages and terraced properties west of the Green. However, the area is bordered to the north and south by busy transport infrastructure which is a detractor. The area is capable of tolerating moderate levels of change. Given that this TCA is locally designated, in good condition and capable of tolerating moderate levels of change, the value and sensitivity to change has been assessed as **Medium**.

TCA5: Kingsway and Surrounds

16.62 **Townscape Sensitivity:** This TCA is primarily located to the south west of the Site, although it is partly located within the southern part of the Chalkers Corner component of the Site. This is an undesignated townscape with relatively widespread characteristics and features in reasonable condition, capable of tolerating moderate levels of change without affecting key characteristics. The area has a broad variety of architectural styles which, although there are many attractively detailed Edwardian properties with planted front gardens along leafy streets, lack local or national designation. Despite being largely surrounded by busy transport infrastructure, the area retains a good degree of intactness. Although undesignated, this TCA is in reasonable condition and capable of tolerating moderate levels of change, as such the value and sensitivity to change has been assessed as **Medium**.

TCA6: Watney Road and Surrounds

16.63 **Townscape Sensitivity:** This TCA is located between the Chalkers Corner Component of the Site and the Stag Brewery component of the Site. It encompasses the northern part of the Chalkers Corner component of the Site. This is a townscape with some distinctive characteristics and locally recognised features in reasonable condition. It is an area historically subjected to piecemeal development and so consequently the area has a broad variety of architectural styles. The area contains land designated as OOLTI at Chalkers Corner and within the grounds of Chertsey Court.

16.64 The area is partially bordered by busy transport infrastructure but many houses or flats enjoy a relatively open feeling due to proximity to undeveloped expanses such as Mortlake Cemetery or Watney's Sports Ground playing fields. It is deemed capable of tolerating substantial levels of improvement or enhancement. Given that this TCA is locally designated and in reasonable

condition, the value and the sensitivity to change has been assessed as **Medium**, although it is noted that this TCA is capable of tolerating substantial levels of improvement and enhancement.

TCA7: Stag Brewery

16.65 **Townscape Sensitivity:** This TCA is wholly located within the Stag Brewery component of the Site. This is a locally recognised townscape with some distinctive characteristics and features in reasonable condition. Alongside the utilitarian large scale built form, it includes BTMs – namely the former bottling building, the Maltings and the former hotel and the sports ground which is designated as OOLTI. It is outside of, but immediately adjacent to land within Conservation Area designation and is considered to contribute to the significance of these adjacent Conservation Areas. Although the demarcation of the TCA boundary does not reach the riverside (where TCA1 intervenes) the scale of the Stag Brewery component of the Site and the existing buildings therein have an important and locally distinctive influence on the river frontage. The area is capable of tolerating moderate levels of change without affecting key characteristics. Given that this TCA contains locally designated features in reasonable condition and capable of tolerating moderate levels of change, the value and the sensitivity to change has been assessed as **Medium**.

Visual Amenity

Visual Characteristics

Key / Protected Views

16.66 LBRuT's 'Local Development Framework Development Management Plan', adopted November 2011[12], contains Policy DM HD 7 which relates to key views and vistas. Views, in accordance with Policy DM HD 7, are illustrated on the LBRuT's Proposals Map[7]. Consequently, these locations are covered within the selection of representative views as detailed within **Table 16.5** (specifically viewpoint locations 3 and 7, and, to a lesser extent, locations 2 and 4).

Visual Analysis

Viewpoints

16.67 As indicated earlier in this Chapter, the visual assessment is based upon several representative views taken from the surrounding environs of the Site. The analysis helps to identify where visibility may exist and thus provides a focus for field work. The following descriptions describe the composition of views and likely receptors referring to the viewpoint locations illustrated on **Figure 16.4**. Images of these baseline views are also included in **Figure 16.6** to **Figure 16.18** inclusive.

Representative Views

16.68 **Table 16.5** examines the visibility of the Site with reference to 12 representative views towards the Site from the surrounding areas (refer to **Figure 16.4**). **Table 16.5** then identifies the visual receptors and their sensitivity to change for each viewpoint.

Table 16.5: Description of Representative Views and Identification of Receptors and Sensitivity to Change

Viewpoint	Approximate distance and direction from Site	Visual Receptor	Sensitivity to Change	Description of View	Rationale
1: View from Lower Richmond Road (A3003), looking east to north west towards the Stag Brewery component of the Site.	Southern boundary of the Stag Brewery component of the Site.	Residents fronting Richmond Road.	Medium.	Clear view into the Stag Brewery component of the Site at proximity. The Stag Brewery Compound can loosely be divided into two areas, the western extent comprises of Watney Sports Ground with the remaining areas, mainly to the east being a mixture of office blocks and operational premises for the brewery. Wide view of Stag Brewery component of the Site's southern boundary along Lower Richmond Road (A3003).	View towards OOLTI. Includes setting of Jolly Gardeners public house BTM and view from edge of Conservation Area.
		Users of Richmond Road.	Low.		
2: View from Thames Bank and Thames Path National Trail, looking south east towards Stag Brewery component of the Site.	55 m north of the Stag Brewery component of the Site.	Residents of Thames Bank.	High.	Northern parts of the Stag Brewery component of the Site are visible from this location, as well as upper parts of the large modern buildings internal to the Stag Brewery component of the Site. The Maltings building on the Thames frontage is a particular feature alongside adjacent listed properties.	Thames Path National Trail. Includes setting of Grade II listed properties and Conservation Area.
		Road users on Thames Bank.	Medium.		
		Recreational users of the Thames Path National Trail.	High.		
3:	150 m north west of the Stag Brewery	Pedestrians and road	Medium.	Upper parts of the tallest buildings	Grade II listed bridge. Also, a

Viewpoint	Approximate distance and direction from Site	Visual Receptor	Sensitivity to Change	Description of View	Rationale
View from southern end of Chiswick Bridge, looking south east towards the Stag Brewery component of the Site.	component of the Site.	users on Chiswick Bridge (south).		internal to the Stag Brewery component of the Site are visible from this location, but largely obscured by mature trees and intervening built form which dominate the view. A marginally higher degree of the Stag Brewery component of the Site is exposed in winter.	locally designated Landmark and View per Development Management Plan Policy DM HD 7.
4: View from the northern end of Chiswick Bridge, looking south east towards Stag Brewery component of the Site.	200 m north of the Stag Brewery component of the Site.	Pedestrians and road users on Chiswick Bridge (north).	Medium.	Clear and open view towards the Stag Brewery component of the Site from an elevated vantage point. Northern parts of the Site, including the Maltings building, are clearly visible. The Stag Brewery component of the Site is viewed in its riverside context and set against adjacent built form.	Grade II listed bridge, a local landmark. Open and elevated view.
5: View from Thames Path National Trail adjacent to Dan Mason Drive, looking south towards Stag Brewery component of the Site.	155 m north of the Stag Brewery component of the Site.	Recreational users of the National Trail.	High.	Clear view towards the northern boundary of the Stag Brewery component of the Site, the Maltings building is a particular feature. Much of the northern boundary of the Stag Brewery component of the Site is screened by mature	Thames Path National Trail. Open view across the river.
		Road users on Dan Mason Drive.	Low.		

Viewpoint	Approximate distance and direction from Site	Visual Receptor	Sensitivity to Change	Description of View	Rationale
				vegetation. The Stag Brewery component of the Site is viewed in its riverside context and set against adjacent built form.	
6: View from Thames Path National Trail adjacent to Dan Mason Drive and access to Duke Meadows Golf Club, looking south towards the Stag Brewery component of the Site.	160 m north east Stag Brewery component of the Site.	Recreational users of the National Trail.	High.	Clear view towards the Stag Brewery component of the Site, the north eastern boundary wall is a particular feature. The Stag Brewery component of the Site is viewed in its riverside context and set against adjacent built form.	Thames Path National Trail. Open view across the river.
		Road users on Dan Mason Drive.	Low.		
7: View from Thames Path National Trail adjacent to external seating area of The White Hart public house.	590 m east of the Stag Brewery component of the Site.	Recreational users of the National Trail.	High.	Clear and open view up the river towards northern parts of the Stag Brewery component of the Site. The Maltings building is a relatively distant landmark and a focal point at the bend in the river.	Open view up river. Thames Path National Trail. Locally promoted seating area. View covered under Development Management Plan Policy DM HD 7.
		Customers of The White Hart public house.	Medium.		
8: View along Mortlake High Street (A3003), looking west towards the Stag Brewery	180 m east of the Stag Brewery component of the Site.	Residents fronting Mortlake High Street.	Medium.	Enclosed view down Mortlake High Street towards the south eastern boundary of the Stag Brewery component of the Site and the former	Includes setting of Grade II* listed church, a locally designated Landmark. The Stag
		Users and workers of local shops	Low.		

Viewpoint	Approximate distance and direction from Site	Visual Receptor	Sensitivity to Change	Description of View	Rationale
component of the Site.		and businesses .		Bottling building. Upper parts of larger buildings internal to the Site are partially visible. The Stag Brewery component of the Site forms part of the backdrop to the busy urban scene. Street clutter in the foreground diminishes the prominence of tall structures on the Stag Brewery component of the Site.	Brewery component of the Site is part of the backdrop to the High Street scene.
		Road users on Mortlake High Street (A3003).	Low.		
9: View from Sheen Lane (B351) adjacent to entrance to Mortlake Green, looking north towards the Stag Brewery component of the Site.	135 m south of the Stag Brewery component of the Site.	Residents fronting Sheen Lane.	Medium.	Enclosed view down Sheen Lane towards the southern boundary of the Stag Brewery component of the Site. The former hotel building is a particular focus. Upper parts of larger buildings internal to the Stag Brewery component of the Site are partially visible. The Stag Brewery component of the Site is within the context of a busy urban street and at the edge of Mortlake Green.	Includes view towards former hotel building. The Stag Brewery component of the Site forms a backdrop to the busy urban scene.
		Users and workers of local shops and businesses	Low.		
		Road users on Sheen Lane.	Low.		
10: View from Mortlake Green, looking north towards the Stag	65 m south of the Stag Brewery component of the Site.	Recreational users of Mortlake Green.	High.	View towards the southern boundary of the Stag Brewery component of the Site, heavily screened by mature	Close range view.

Viewpoint	Approximate distance and direction from Site	Visual Receptor	Sensitivity to Change	Description of View	Rationale
Brewery component of the Site.				vegetation at the edge of Mortlake Green. The former hotel building is a particular focus as well as the tall stack and upper parts of larger buildings internal to the Stag Brewery component of the Site. The Stag Brewery component of the Site forms a substantial proportion of the background of the view, albeit obscured by intervening vegetation.	
11: View from road bridge over railway, South Circular Road, looking north east towards the Site.	200 m south of the Chalkers Corner component of the Site.	Road users.	Low.	Relatively distant view towards upper parts of larger buildings on the Stag Brewery component of the Site, viewed across the roofs of the largely residential intervening townscape.	Isolated area of elevation. Site within context of dense residential development to the south.
12: View from Lower Richmond Road adjacent to the Jolly Gardeners public house, looking north west towards Site.	20 m south east of the Stag Brewery component of the Site.	Road users.	Medium.	Clear view into the Stag Brewery component of the Site at proximity, predominantly towards boundary walls and upper parts of larger structures within the Stag Brewery component of the Site. Wide view of southern boundary of the Stag Brewery	Close range view which includes the setting of the Jolly Gardeners public house BTM with the Stag Brewery component of the Site as the backdrop.

Viewpoint	Approximate distance and direction from Site	Visual Receptor	Sensitivity to Change	Description of View	Rationale
				component of the Site along Lower Richmond Road (A3003).	

Summary of Visual Amenity

16.69 The locality of the Site is generally low lying with very limited occurrences of elevated ground. Overall, the area is densely developed and views tend to be of a short-range nature, being typical of a high-density townscape. In contrast, the River Thames provides a corridor of comparatively medium range views. There are also some relatively higher-level views from elevated transport corridors (e.g. Chiswick Bridge and the road bridge over the railway on South Circular Road) as well as private views from a few tall buildings.

16.70 The Site does not feature within any of the London Strategic Viewing Corridors. However, the Site forms part of the backdrop of views covered under Policy DM HD 7 Views and Vistas of the Adopted Development Management Plan[12], refer to viewpoints 2, 3 and 7 on **Figures 16.5.2**, and **16.5.4**.

16.71 Though not recognised specifically within policy or designation, the Stag Brewery component of the Site forms the backdrop to the finishing line of the annual Oxford and Cambridge University Boat Race. As such, the Site has a key cultural interest of local, and arguably national, relevance within the townscape and visual amenity context.

Likely Significant Effects

The Works

16.72 Local effects would arise as a result of the Works. During the demolition of existing buildings and structures there would be noise and dust with plant moving around the Stag Brewery component of the Site, a number of vehicular movements to and from the area and the conspicuous removal of buildings and structures. Subsequent to demolition of existing buildings and structures, ground preparation and construction activities would expose soils and then generate visual change as the buildings are constructed. Various vehicular movements would occur in the locality with deliveries and crane construction activities. The character of surrounding streetscape would change once buildings and walls are demolished and new buildings and structures erected. The emergence of new buildings, scaffolding and plant would not be entirely incongruous to the localised industrialised context of the Stag Brewery component of the Site. Site hoardings would initially curtail changes to street level views for pedestrians. However, as the construction works progress and buildings are constructed, the skyline and general visual amenity of the area would change.

16.73 Within and immediately adjacent to the Site, the Works would be highly prominent and extensive. Conversely, parts of the townscape not adjoining the Site would have minimal experience of the Works due to the relative distances and the discrete, contained nature of the existing urban grain.

16.74 The likely effects on townscape character during the Works are detailed within **Table 16.6**. Refer also to **Figure 16.3: Townscape Character Areas.**

Table 16.6: Likely Effects on Townscape Character During the Works.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
TCA1 Mortlake High sensitivity	Activities associated with the Works would predominantly occur outside of this TCA except for the former Maltings building, a section of the riverside pedestrian path, Bull's Alley and part of Mortlake High Street (A3003). Construction traffic using the existing road network, noise and increased activity levels would indirectly affect this TCA. Extensive demolition and construction activities on-Site would be essentially anomalous to the otherwise residential and suburban centre setting. Road traffic is a pre-existing dominant feature of the area and the addition of construction traffic would not be out of place. The Works would not lead to the clearance of any positive character features or compromise the overall integrity of the TCA.	Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **major significance**.
TCA2 West of White Hart Lane Medium sensitivity	Changes resulting from the Works on-Site would occur entirely outside of this area and would not be discernible largely due to the relative distances and the discrete, contained nature of this TCA.	Negligible.	**Insignificant**.
TCA3 Mortlake High Street (part) Low sensitivity	Activities associated with the Works would occur almost entirely outside of this TCA, with the exception of the northernmost part of Vineyard Path where it meets Mortlake High Street (A3003), and part of the northernmost extent of Sheen Lane. The Works would therefore be limited to highways improvement works. Construction traffic using the existing road network, noise and increased activity levels would indirectly affect this TCA. Extensive demolition and construction activities on Site would be essentially anomalous to this area's otherwise residential / business character. Road traffic is a pre-existing dominant feature adjacent to this area and the addition of construction traffic would not be out of place. The Works would not lead to the clearance of any positive character features or compromise the overall integrity of the TCA.	Minor	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **minor significance**.
TCA4	Construction traffic using the existing road network, noise and increased activity levels would directly affect this TCA.	Moderate	**Temporary**, **short** to

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
Mortlake Green Medium sensitivity	Extensive demolition and construction activities on Site, including the removal of boundary features which abut the northern edge of this TCA, would be essentially anomalous to an area characterised by residences, small businesses and the trees and green space of Mortlake Green. However, the mature vegetation within and bounding Mortlake Green would help to contain and limit such effects locally. A combination of works within the Stag Brewery component of the Site and highways improvements on Lower Richmond Road (A3003) and Sheen Lane would cause the Development to have a prominent and widespread detrimental effect on key characteristics of this TCA, chiefly through noise, visual intrusion and traffic and the disruption to the relative calm of local green space. However, road traffic is a pre-existing dominant feature of the area and the addition of construction traffic would not be entirely out of place.		**medium term**, **local**, **adverse effect** of **moderate significance**.
TCA5 Kingsway and surrounds Medium sensitivity	Works associated with the Stag Brewery component of the Site would occur outside this TCA, although highways improvement works on Lower Richmond Road (A3003) and at the Chalkers Corner component of the Site would be prominent but localised. There would be increased noise and activity levels from construction traffic on the local road network, however road traffic is a pre-existing dominant feature of the area and the addition of construction traffic would not be entirely out of place.	Moderate	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **moderate significance**.
TCA6: Watney Road and surrounds Medium sensitivity	Works associated with the Stag Brewery component of the Site would occur outside this TCA, although highways improvement works on Lower Richmond Road (A3003) and at the Chalkers Corner component of the Site would be prominent but localised. There would be increased noise and activity levels from construction traffic on the local road network, however road traffic is a pre-existing dominant feature of the area and the addition of construction traffic would not be entirely out of place. The feeling of relative openness imparted by proximity to Mortlake Cemetery would provide an element of separation from the Works and therefore diminishing the effects on this townscape.	Moderate	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **moderate significance**.
TCA7 Stag Brewery	This character area includes the majority of the Stag Brewery Component of the Site. Therefore, excluding the Chalkers Corner Component of the Site, activities associated with the Works would be highly prominent and extensive. Whilst demolition and construction activities would be incongruous to the industrial character, the	Major	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
Medium sensitivity	emergence of large scale buildings, scaffolding and plant would not be entirely incongruous. The Works would not lead to the clearance of any positive character features associated with the Stag Brewery component of the Site. Despite the retention of key buildings (e.g. The Maltings) and certain boundaries walls, the overall character of the TCA would be materially and irreversibly changed by the removal of the industrial context and aesthetic of the former brewery and emergence of a new mixed-use contemporary Development.		**major significance**.

16.75 The likely effects on views and visual amenity during the Works are detailed within **Table 16.7**. Refer also to **Figures 16.5.1-16.5.12: Viewpoint photographs 1-12.**

Table 16.7: Likely Effects on Views and Visual Amenity During the Works.

Viewpoint No. and Visual Receptor	Description of Likely Effect	Magnitude of Change	Significance of Effect
1: Residents fronting Richmond Road. Medium sensitivity.	The location of this view is very close to the southern boundary of the Stag Brewery component of the Site where an existing Site access and Watney's Sports Ground playing fields provide a relatively good degree of visibility into southern and western parts of the Stag Brewery component of the Site. Throughout the Works, views towards the Site would be largely screened by Site hoarding which would prevent views towards low level construction elements (i.e. plant, groundworks, roads, materials storage). However, the demolition of tall and large-scale structures and the subsequent construction of the Development would be prominent due to the proximity of visual receptors and the structures' position against the skyline. Containment of the sports ground by site hoarding would restrict and foreshorten previously open views and remove visibility over a key area of local green space. Construction traffic using the existing road network, noise and increased activity levels would directly affect visual receptors at this location, although vehicular traffic is a pre-existing feature of Lower Richmond Road (A3003). Road users would experience the Development temporarily in transit.	Major.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **major significance**.
1: Road users on Richmond Road. Low sensitivity.		Major.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **moderate significance**.

Viewpoint No. and Visual Receptor	Description of Likely Effect	Magnitude of Change	Significance of Effect
2: Residents of Thames Bank. High sensitivity.	The location of this view is from Thames Bank / Thames Path National Trail close to the northern boundary of the Stag Brewery component of the Site and the frontages of residential properties on Thames Bank. The Stag Brewery component of the Site is largely screened by intervening properties on Thames Bank, the northern façade of The Maltings building and vegetation fronting the River Thames. As such, views of the Works would be limited to cranes and larger scale structures in north eastern parts of the Stag Brewery component of the Site and occasional glimpsed views between buildings on Thames Bank. The Works on the Stag Brewery component of the Site would form a relatively small part of much wider and relatively open views across the river. A number of residents of Thames Bank would experience partial views of the Works from east- or south-facing upper storey windows, although trees within the rear gardens of these properties and trees retained within northern parts of the Site would filter such views.	Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **major significance**.
2: Road users on Thames Bank. Medium sensitivity.		Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **moderate significance**.
2: Recreational users of the Thames Path National Trail. High sensitivity.		Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **major significance**.
3: Pedestrians and road users on Chiswick Bridge (south). Medium sensitivity.	The location of this view is from the southern end of Chiswick Bridge and is an elevated view towards the northern parts of the Stag Brewery component of the Site. Views of the Works would be limited to upper parts of cranes and partially constructed buildings. The Stag Brewery component of the Site would remain largely obscured by intervening mature trees and buildings in the vicinity of Thames Bank.	Minor.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **minor significance**.
4: Pedestrians and road users on Chiswick Bridge (north). Medium sensitivity.	The location of this view is from the northern end of Chiswick Bridge and is an elevated view towards the northern parts of the Stag Brewery component of the Site. Demolition of buildings and structures immediately south of Thames Bank, and construction of buildings within western parts of the Stag Brewery component of the Site, would be conspicuous by their height and mass against the skyline. Demolition works within eastern parts of the Stag Brewery component of the Site would be not especially prominent	Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **moderate significance**.

Viewpoint No. and Visual Receptor	Description of Likely Effect	Magnitude of Change	Significance of Effect
	due to the relative distance and breadth of the view and the screening effects of the retained Maltings building and vegetation alongside the Stag Brewery component of the Site's northern boundary. The construction of new buildings in eastern parts of the Stag Brewery component of the Site would however be prominent against the skyline, albeit essentially localised in the wide view.		
5: Recreational users of the National Trail. High sensitivity.	The location of this view is from the riverside footpath (Thames Path National Trail) parallel to Dan Mason Drive on the northern bank of the River Thames. Partial removal of the substantial boundary wall at the north-eastern boundary and demolition of the large-scale industrial building immediately beyond within the Stag Brewery component of the Site would be conspicuous, especially in winter. Retention of The Maltings building would assist in the continuity of the baseline view and would continue to locally screen views further into the Stag Brewery component of the Site. Demolition of buildings and structures immediately south of Thames Bank, within western parts of the Stag Brewery component of the Site, would be a notable change due to their prominence against the skyline in the baseline view. For road users on Dan Mason Drive, views towards the Works would be in transit and perpendicular to the direction of travel.	Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **major significance**.
5: Road users on Dan Mason Drive. Low sensitivity.		Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **minor significance**.
6: Recreational users of the National Trail. High sensitivity.	The location of this view is from the riverside footpath (Thames Path National Trail) parallel to Dan Mason Drive on the northern bank of the River Thames. Partial removal of the substantial boundary wall at the north-eastern boundary and demolition of the large-scale industrial building immediately beyond within the Stag Brewery component of the Site would be conspicuous, especially in winter. Retention of The Maltings building would assist in the continuity of the baseline view and would continue to locally screen views further into the Stag Brewery component of the Site. Demolition of buildings and structures immediately south of Thames Bank, within western parts of the Stag Brewery component of the Site, would be a notable change due to their prominence against the skyline in the baseline view.	Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **major significance**.
6: Road users on Dan Mason Drive. Low sensitivity.		Moderate.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **minor significance**.

Viewpoint No. and Visual Receptor	Description of Likely Effect	Magnitude of Change	Significance of Effect
	For road users on Dan Mason Drive, views towards the Works would be in transit and perpendicular to the direction of travel.		
7: Recreational users of the National Trail High sensitivity.	The location of this view is from the riverside footpath (National Trail and Long Distance Walking Route) to the east of the Stag Brewery component of the Site. The Works would be evident in a localised part of the view as a distant focal point at the bend in the river, although the prominence would be diminished by the relative scale within the much wider view. The location of this view is from Mortlake High Street close to the frontages of residences and businesses. The removal of existing walls at the Stag Brewery component of the Site's southern boundary fronting Mortlake High Street and the demolition of large scale buildings would be evident in the view but visibility of the Stag Brewery component of the Site would remain limited by intervening street clutter, visual detraction from road traffic and the comparative prominence of foreground built form. For residents inside properties fronting Mortlake High Street, views would only be achievable from west-facing windows, of which there are a limited number, or from north-facing windows in very close proximity to the Stag Brewery component of the Site such as Rann House. The proliferation of mature street trees in the vicinity of Rann House and Craven House would limit views down the street towards the Stag Brewery component of the Site and filter views outwards from these properties. For road users on Mortlake High Street, views towards the Works would be in transit and only available to those travelling in a westbound direction.	Minor.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **moderate significance**.
7: Customers of The White Hart public house. Medium sensitivity.		Minor.	**Temporary**, **short** to **medium term**, **local**, **adverse effect** of **minor significance**.
8: Residents fronting Mortlake High Street. Medium sensitivity.		Minor.	**Temporary**, **short-** to **medium term**, **local**, **adverse effect** of **minor significance**.
8: Users and workers of local shops and businesses. Low sensitivity.		Minor.	**Temporary**, **short-** to **medium term**, **local**, **adverse effect** of **minor significance**.
8: Road users on Mortlake High Street (A3003). Low sensitivity.		Minor.	**Temporary**, **short-** to **medium term**, **local**, **adverse effect** of

Viewpoint No. and Visual Receptor	Description of Likely Effect	Magnitude of Change	Significance of Effect
			minor significance.
9: Residents fronting Sheen Lane. Medium sensitivity.	The location of this view is from Sheen Lane close to the frontages of residents and businesses. Visibility of the Works would be limited to the removal of buildings and structures on the Stag Brewery component of the Site and views towards upper parts of partially constructed new buildings and cranes. The intervening trees and other vegetation associated with Mortlake Green would substantially screen views, including during winter. Highways improvement works at the mini roundabout junction of Sheen Lane and Mortlake High Street / Lower Richmond Road (A3003) would be notable but very temporary. Views from properties fronting Sheen Lane would be extremely limited as the direction towards the Stag Brewery component of the Site is perpendicular to the general aspect of their windows. For road users on Sheen Lane, views towards the Works would be in transit and only available to those travelling in a northbound direction.	Minor.	**Temporary**, **short-** to **medium term**, **local**, **adverse effect** of **minor significance**.
9: Users and workers of local shops and businesses. Low sensitivity.		Minor.	**Temporary**, **short-** to **medium - term**, **local**, **adverse effect** of **minor significance**.
9: Road users on Sheen Lane. Low sensitivity.		Minor.	**Temporary**, **short-** to **medium term**, **local**, **adverse effect** of **minor significance**.
10: Recreational users of Mortlake Green. High sensitivity.	The location of this view is from Mortlake Green close to the southern boundary of the Stag Brewery component of the Site. Site hoarding and vegetation at the northern edge of Mortlake Green would prevent views towards low level construction elements (i.e. plant, groundworks, roads, materials storage). However, the demolition of tall and large-scale structures and the subsequent construction of the Development would be prominent due to the proximity of visual receptors and position of the structures against the skyline. However, such prominence would be substantially reduced during summer due to the existing intervening mature deciduous trees. Removal of the tall stack would be particularly conspicuous given its extreme prominence in the view. Construction traffic using the existing road network, noise and increased activity levels would directly affect visual	Major.	**Temporary**, **short-** to **medium term**, **local**, **adverse effect** of **major significance**.

Viewpoint No. and Visual Receptor	Description of Likely Effect	Magnitude of Change	Significance of Effect
	receptors at this location to a small extent because vehicular traffic is a pre-existing feature of Lower Richmond Road (A3003).		
11. Road users on road bridge over railway, South Circular Road. Low sensitivity.	The location of this view is from the bridge on South Circular Road over the railway, to the south of the Chalkers Corner component of the Site. Visibility of the Works would be limited to the removal of buildings and structures on the Stag Brewery component of the Site and views towards upper parts of partially constructed new buildings and cranes. The intervening trees and rooftops would substantially screen views, including during winter. For road users on South Circular Road, views towards the Stag Brewery component of the Site would be in transit and generally oblique to the direction of travelling.	Minor.	**Temporary**, **short-** to **medium - term**, **local**, **adverse effect** of **minor significance**.
12. Road users on Lower Richmond Road adjacent to the Jolly Gardeners public house. Medium sensitivity.	The location of this view is from Lower Richmond Road in the vicinity of the Jolly Gardeners public house BTM with visibility of the southern boundary of the Stag Brewery component of the Site and structures internal to the Stag Brewery component of the Site. Demolition of tall buildings and large structures and the subsequent construction of the Development would be highly conspicuous from this location due to the viewing distance and the relative scale of existing and proposed structures on the Stag Brewery component of the Site. Site hoarding would prevent views towards low level construction elements (i.e. plant, groundworks, roads, materials storage). Construction traffic using the existing road network, noise and increased activity levels would directly affect visual receptors at this location, although vehicular traffic is a pre-existing feature of Lower Richmond Road (A3003). Road users would experience the Works temporarily in transit.	Major.	**Temporary**, **short-** to **medium term**, **local**, **adverse effect** of **major significance**.

Completed Development

16.76 The likely effects of the completed Development upon townscape character are detailed within **Table 16.8**. Refer also to **Figure 16.3: Townscape Character Areas.**

Table 16.8: Likely Effects of the Completed Development on Townscape Character.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
TCA1: Mortlake. High sensitivity.	The majority of the completed Development would be located outside of this TCA except for the former Maltings building, a section of the riverside footpath and highways improvement works on Mortlake High Street (A3003). Following the removal of the imposing brick-built southern boundary wall alongside Mortlake High Street and the creation of new public realm avenues punctuating the Development between the blocks, such as the new high street linking east to west across the Stag Brewery component of the Site, the visual permeability of the TCA would greatly increase, including the creation of views towards the river from Mortlake High Street. Newly created punctuation into the Stag Brewery component of the Site directly from parts of the TCA (e.g. Mortlake High Street and the riverside footpath) would activate parts of the Stag Brewery component of the Site's northern and southern frontages / boundaries, and so would enhance and enliven the streetscape and riverside at localised points. Tree planting within the Stag Brewery component of the Site and along Mortlake High Street would greatly soften localised parts of the TCA. Key elements of historical and architectural importance would be retained, including those which contribute to the significance of adjacent Conservation Areas, such as The Maltings building and much of the northern boundary wall within the Stag Brewery component of the Site. Completion of the Development would not lead to the clearance of any positive character features or compromise the overall integrity of the TCA.	Minor.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.
TCA2: West of White Hart Lane. Medium sensitivity.	Changes resulting from the completed Development would occur entirely outside of this TCA and would not be discernible largely due to the relative distances and the discrete, contained nature of this TCA.	Negligible.	**Insignificant**.
TCA3: Mortlake High Street (part).	The completed Development would be located almost entirely outside of this TCA with the exception of the northernmost part of Vineyard Path where it meets Mortlake High Street (A3003), and part of the northernmost extent of Sheen Lane. Development within the TCA would therefore be limited to highways improvement works.	Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
Low sensitivity.	The area is capable of tolerating substantial change and the highways works at Vineyard Path and Sheen Lane, and indirectly works to Mortlake High Street including tree planting, would constitute improvements to this TCA.		
TCA4: Mortlake Green. Medium sensitivity.	The completed Development would be located almost entirely outside of this TCA with the exception of highway works on Lower Richmond Road and the loss of boundary walls at the southern boundary of the Stag Brewery component of the Site where TCA4 abuts TCA7 to the north. A new public community park would be located to the south of the school within the Stag Brewery component of the Site, to the north of Lower Richmond Road. New tree planting along the northern side of Lower Richmond Road would also soften the edge of the Site as perceived from TCA4. Mortlake Green (OOLTI) would be protected and retained. The Development would create a new open space link which would improve access to the riverside from Mortlake Green, as well as providing a visual link. Informal and formal open recreation space, including for children's play, would also be provided. Completion of the Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA.	Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
TCA5: Kingsway and surrounds. Medium sensitivity.	The completed Development would be located almost entirely outside of this TCA with the exception of the highways improvement works on Lower Richmond Road (A3003) and at the southern part of the Chalkers Corner Component of the Site. The completed Development within this TCA would comprise an altered junction layout and a minor increase in street tree planting. Completion of the Development would not lead to the clearance of any positive character features or compromise the overall integrity of the TCA.	Negligible.	**Insignificant**.
TCA6: Watney Road and surrounds. Medium sensitivity.	The completed Development would be located almost entirely outside of this TCA with the exception of the highways improvement works on Lower Richmond Road (A3003) and at the northern part of the Chalkers Corner Component of the Site. At Chalkers Corner the open space (OOLTI) would be reduced and a number of trees would be removed to facilitate the new road and junction layout, and a number of trees would be replaced. In the long-term the degree of canopy cover would increase, with comparison to the	Negligible.	**Insignificant**.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
	baseline and so the character of residential areas separated from busy roads by well-treed narrow buffers would persist.		
TCA7: Stag Brewery. Medium sensitivity.	This character area includes the majority of the Stag Brewery Component of the Site including all of the new buildings. Large utilitarian structures associated with the brewing process would be replaced with modern structures of similar mass and height, and so fit well with the existing pattern of the townscape. The building typologies reference building typologies common to other riverside locations in the wider area and have been chosen for their appropriateness to the uses and scale of the buildings indicated by the Planning Brief. Within the detailed element of the Stag Brewery component of the Site, the majority of building typologies would be either 'Warehouse' or 'Mansion block' with the cinema building having its own typology and character. Key buildings and structures of historical and architectural importance would be retained, including those which contribute to the significance of adjacent Conservation Areas, such as the former hotel building and former Bottling building. The warehouse typology buildings, mostly located along the southern part of the Stag Brewery component of the Site adjacent to Mortlake High Street, draw on the historical former industrial buildings on the Stag Brewery component of the Site. The sports ground (OOLTI) would be reduced in area to facilitate the new school building and residential blocks adjacent to Williams Lane. However, a substantial portion of the open space would be available for public access. Although the sense of openness would be reduced as perceived from Williams Lane and the west, the removal of the club house building and an increase in open space along the Lower Richmond Road frontage would increase the sense of openness from Lower Richmond Road and the south. Completion of the Development would not lead to the clearance of or impact upon any positive character features or compromise the overall integrity of the TCA. However, the opening-up of much of the Stag Brewery component of the Site and introduction of new areas of public realm (including the new green link, High Street, riverside walk and public squares adjacent to the Maltings and the former Bottling Building) would change the character from being closed, inaccessible, industrial and private to one of mixed-use, vibrancy and partial public access with views opened-up through the Development. In this way, the townscape	Major.	**Long-term**, **local**, **beneficial effect** of **major significance**.

Townscape Character Area	Description of Effect	Magnitude of Change	Significance of Effect
	character would be considerably enhanced and key elements conserved.		

16.77 The likely effects of the completed Development on views and visual amenity are detailed within **Table 16.9**. Refer also to **Figures 16.5-16.17: Viewpoint photographs 1-12**

Table 16.9: Likely Effects of the Completed Development on Views and Visual Amenity.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
1: Residents fronting Richmond Road. Medium sensitivity.	The proposed school is located to the south-western edge of the Development at the foreground of the view, with an area of open space primarily comprising amenity grass and trees, which would lie adjacent to Lower Richmond Road For many residents and road users in the locality this would provide an extent of soft edge to the Development. Existing retained mature trees on the southern boundary of the Stag Brewery component of the Site would provide a degree of filtering of views. Detracting elements of utilitarian aesthetic, such as large industrial buildings, would be replaced by new built form of aesthetic and materials sympathetic to the best historical aspects of the Stag Brewery component of the Site, so providing a perception of visual unity within the view by picking up on elements of local distinctiveness. To the western edge of the Stag Brewery component of the Site the large four storied school building would be located at the southern boundary of the Site (currently Watney Sports Ground). The scale and composition of the view would change with the enclosing of the views due to the introduction of built form on Watney Sports Ground. Given the viewing distance, changes would be prominent and widespread. The Jolly Gardeners public house BTM would be less noticeable where its skyline prominence would be replaced by a backdrop of new buildings, as perceived at street level. However, the removal of the very tall stack adjacent to the public house would remove a substantial detractor from the view. Road users would experience the Development temporarily in transit.	Major.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
1: Road users on Richmond Road. Low sensitivity.		Major.	**Long-term**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
2: Residents of Thames Bank. High sensitivity.	The Development would be mostly screened by intervening properties on Thames Bank, the northern façade of The Maltings building and vegetation fronting the River Thames. Visible parts of the completed Development would be limited to The Maltings building and Mansion Block buildings along the north-eastern edge of the Stag Brewery component of the Site. Users of the Thames Path and road users on Thames Bank would experience the addition of further buildings where gaps at the riverside in the baseline view would be intruded upon. The change would be evident but not especially prominent and essentially localised within the wider view.	Minor.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.
2: Road users on Thames Bank. Medium sensitivity.	Viewpoint 2 represents a worst-case view for users of the Thames Path whereby the adverse / beneficial nature of changes resulting from the Development would alter depending on proximity to the Site and the extent to which detracting elements of utilitarian aesthetic appear in the baseline view. For users of the Thames Path at this viewpoint location, the existing large-scale utilitarian structures within the northern and eastern parts of the Stag Brewery component of the Site are not visible in the baseline view and so no benefit would be experienced by their removal. However, for receptors on the Thames Path further south of the viewpoint location, detracting elements of utilitarian aesthetic do appear in the baseline view and so their removal and replacement with the Development would be considered as beneficial.		**Temporary, Long-term**, **local**, **adverse effect** of **minor significance**.
2: Recreational users of the Thames Path National Trail. High sensitivity.	Views along and across the river would continue to remain distinctive and form a key element of local visual amenity. A number of existing residents of Thames Bank would experience partial views of upper parts of the proposed buildings on the Stag Brewery component of the Site from east- or south-facing upper storey windows, although trees within the rear gardens of these existing properties and trees retained within northern parts of the Stag Brewery component of the Site would filter or seasonally screen such views. The removal of large-scale structures of industrial, utilitarian aesthetic and replacement with contemporary, mixed-use development would be of benefit to residential views, as well being more in keeping with the overriding residential character of the area. Road users would experience the Development temporarily in transit.		**Long-term**, **local**, **adverse effect** of **moderate significance**.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
3: Pedestrians and road users on Chiswick Bridge (south). Medium sensitivity.	Views towards the completed Development would be limited to upper parts of buildings within central and eastern parts of the Stag Brewery component of the Site. The tallest buildings and structures on the Stag Brewery component of the Site would be removed from the baseline view. The Stag Brewery component of the Site would remain largely obscured by intervening mature trees and buildings in the vicinity of Thames Bank. As such, changes on the Stag Brewery component of the Site would be barely perceptible in summer with deciduous vegetation in full leaf, and the perceptibility would increase negligibly during winter.	Negligible.	**Insignificant**.
4: Pedestrians and road users on Chiswick Bridge (north). Medium sensitivity.	The Development would be conspicuous by the height and mass of new built form against the skyline. The Development would comprise a substantial proportion of the wide view. Changes in western parts of the Stag Brewery component of the Site would be less noticeable when compared with the large-scale structures of the baseline view. Development within eastern parts of the Stag Brewery component of the Site would be much more prominent, although the scale, materials and façade detailing (including rhythm of fenestration) of new buildings would be complimentary to the retained Maltings building, assisting with the integration of the Development within the view. The removal of the tall stack would be of benefit to visual amenity. Detracting elements of utilitarian aesthetic in the baseline view, chiefly the large industrial structures, would be replaced by new built form of aesthetic and materials sympathetic to the best historical aspects of the Stag Brewery component of the Site, so providing a perception of visual unity within the view by picking up on elements of local distinctiveness. The Maltings building and vegetation alongside the Stag Brewery component of the Site's northern boundary would have limited screening effect.	Moderate.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.
5: Recreational users of the National Trail. High sensitivity.	New buildings within north eastern parts of the Stag Brewery component of the Site would be evident, especially in winter, and would constitute a notable change to the view given the prominence on the skyline. However, the openness of the view would not be substantially affected since the Development would be set back in line with the	Minor.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
5: Road users on Dan Mason Drive. Low sensitivity.	river frontage and seen as part of a wider view from across the river. The scale, materials and façade detailing of new buildings would be sympathetic and complimentary to the retained Maltings building and boundary walls, assisting with the integration of the Development within the view. The river frontage at this point is noted in the Mortlake Village Planning Guidance Draft SPD as being reflective of the area's industrial aesthetic where large contrasts in scale are evident yet a shared utilitarian conformity exists through the use of brickwork and detailing, and the Development would be entirely in keeping with this. The removal of the tall stack would be of further benefit to visual amenity. Within western parts of the Stag Brewery component of the Site, large-scale industrial buildings would be replaced with new built form of markedly lower height and therefore more sympathetic to existing buildings on Thames Bank including the Ship Inn. Existing trees located between the new buildings and properties on Thames Bank would partially screen views of the Development and assist with its integration in the view. For road users on Dan Mason Drive, views towards the completed Development would be in transit and oblique to the direction of travel.	Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
6: Recreational users of the National Trail. High sensitivity.	Once the Development is completed, industrial buildings and structures on the Stag Brewery component of the Site, including the very tall stack, would no longer be present. New buildings along the riverside frontage in the north east of the Stag Brewery component of the Site would appear in the view from this location and would constitute a highly noticeable change. However, the openness of the view would not be substantially affected since the Development would be set back in line with the river frontage and seen as part of a wider view from across the river.	Minor.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.
6: Road users on Dan Mason Drive. Low sensitivity.	The scale, materials and façade detailing of new buildings would be sympathetic and complimentary to the retained Maltings building and boundary walls, assisting with the integration of the Development within the view. The river frontage at this point is noted in the Mortlake Village Planning Guidance Draft SPD as being reflective of the area's industrial aesthetic where large contrasts in scale are evident yet a shared utilitarian conformity exists through the use of brickwork and detailing, and the Development	Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	would be entirely in keeping with this. Development within western parts of the Site would not be visible. For road users on Dan Mason Drive, views towards the completed Development would be in transit and perpendicular to the direction of travel.		
7: Recreational users of the National Trail High sensitivity.	Once the Development is completed, industrial buildings and structures on the Stag Brewery component of the Site, including the very tall stack, would no longer be present. New buildings along the riverside frontage in the north east of the Stag Brewery component of the Site would be evident in a localised part of the view as a mid-distant focal point at the bend in the river. However, the scale, materials and façade detailing of new buildings would be sympathetic and complimentary to the retained Maltings building, assisting with the integration of the Development within the view. Visual prominence would be diminished by the relative scale within the much wider view whereby the Development would be offset in the view and set back from the southern riverbank. Development within western parts of the Stag Brewery component of the Site would not be visible.	Minor.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.
7: Customers of The White Hart public house. Medium sensitivity.		Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
8: Residents fronting Mortlake High Street. Medium sensitivity.	As perceived by visual receptors, the completed Development would be consistent with the continuous strip of buildings along the northern side of Mortlake High Street. Despite being of increased height and mass than the existing buildings in the foreground and middle ground, the new buildings on the Stag Brewery component of the Site would integrate into the view by their rooflines by appearing as a deep perspective in this channelled view. Industrial, utilitarian structures on Site would be replaced with new built form which would be of benefit to the visual amenity of the townscape, but not easily discernible from this location, particularly given the visual detraction from road traffic and the comparative prominence of foreground built form.	Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
8: Users and workers of local shops and businesses. Low sensitivity.		Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
8: Road users on Mortlake High Street (A3003). Low sensitivity.	Highways improvement works on Mortlake High Street, including new tree planting, would be substantially screened by intervening street clutter and road traffic. For residents occupying properties fronting Mortlake High Street, views would only be achievable from west-facing windows, of which there are a limited number, or from north-facing windows very close to the Site such as Rann House. The proliferation of mature street trees in the	Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	vicinity of Rann House and Craven House would limit views down the street towards the Stag Brewery component of the Site and filter views outwards from these properties. For road users on Mortlake High Street, views towards the completed Development would be in transit and only available to those travelling in a westbound direction.		
9: Residents fronting Sheen Lane. Medium sensitivity.	The completed Development would form the backdrop to views from this location and create a new, higher skyline horizon for much of the view. Therefore, visibility of the Development would be limited to the upper parts of proposed buildings on the Stag Brewery component of the Site. The retention of the former hotel building would assist in integrating the Development as a whole within the view. New built form would be of materials and aesthetic sympathetic to the former hotel building on the Stag Brewery component of the Site and existing buildings on Sheen Lane. The intervening trees and other vegetation associated with Mortlake Green would substantially screen views, including during winter. Buildings along Sheen Lane would prevent views towards easternmost parts of the Development. The removal of large-scale structures of industrial, utilitarian aesthetic and replacement with contemporary, mixed-use development would be of benefit to visual amenity and in keeping with the prevailing residential character of the local area.	Minor.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.
9: Users and workers of local shops and businesses. Low sensitivity.		Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
9: Road users on Sheen Lane. Low sensitivity.	On completion, highways improvement works at the mini roundabout junction of Sheen Lane and Mortlake High Street / Lower Richmond Road (A3003) would not be a notable change. Views from properties fronting Sheen Lane would be extremely limited as the direction towards the Stag Brewery component of the Site is oblique to the general aspect of their windows. For road users on Sheen Lane, views towards the completed Development would be in transit and only available to those travelling in a northbound direction.	Minor.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
10: Recreational users of Mortlake Green. High sensitivity.	The completed Development would form the backdrop to views from this location and create a new, higher skyline horizon for parts of the view. Therefore, visibility of the Development would be limited to the upper parts of buildings. The retention of the former hotel building would assist in integrating the Development as a whole within the view and would screen eastern parts of the Development. New built form would be of materials and aesthetic	Minor.	**Long-term**, **local**, **beneficial effect** of **moderate significance**.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	sympathetic to the former hotel building further aiding their integration. The retention of intervening mature trees and other vegetation at the periphery of Mortlake Green, including at the location of the new pedestrian crossing over Lower Richmond Road (A3003), would substantially screen views towards the Stag Brewery component of the Site, especially during summer. Removal of the tall stack would be particularly conspicuous given its extreme prominence in the view and, in combination with the removal other large-scale structures of industrial aesthetic, would be of benefit to visual amenity. On completion, highways improvement works at the mini roundabout junction of Sheen Lane and Mortlake High Street / Lower Richmond Road (A3003) would be a barely perceptible change.		
11. Road users on road bridge over railway, South Circular Road. Low sensitivity.	Visibility of the completed Development would be limited to the upper parts of new buildings on the Stag Brewery component of the Site. The intervening trees and rooftops would substantially screen views, including during winter. The visual change between the large-scale industrial structures of the baseline view and the completed Development would be very difficult to discern. The removal of the tall stack would be evident. For road users on South Circular Road, views towards the completed Development within the Stag Brewery component of the Site would be in transit and generally perpendicular to the direction of travelling. Views towards the Chalkers Corner component of the Site would not provide any discernible change for road users in transit.	Negligible.	**Insignificant**.
12. Road users on Lower Richmond Road adjacent to the Jolly Gardeners public house. Medium sensitivity.	Visibility of the completed Development would be limited to the east- and south-facing facades of new buildings on the Stag Brewery component of the Site as well as some of the new paved areas and soft landscape at the periphery of the Stag Brewery component of the Site. The removal of boundary walls along Lower Richmond Road and Ship Lane would open-up views into the Stag Brewery component of the Site. The visual change between the large-scale industrial structures of the baseline view and the new buildings of the completed Development would be notable. The local prominence of the Jolly Gardeners public house as perceived from Lower Richmond Road would not be appreciably affected due to the relative 'set-	Moderate	**Long-term**, **local**, **beneficial effect** of **moderate significance**.

Viewpoint No. and Visual Receptor	Description of Effect	Magnitude of Change	Significance of Effect
	back' of new built form and the retention of the public house's roof line (including feature chimneys) against the skyline. Road users would experience the completed Development temporarily in transit.		

Mitigation Measures and Likely Residual Effects

The Works

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

16.79 Nonetheless, some adverse effects would be inevitable during the Works since the use of large scale plant such as tower or mobile cranes cannot be completely mitigated. As such, these changes are anticipated to result in **temporary**, **short to medium term**, **local** residual effects of **major adverse** significance to TCA 1: Mortlake and TCA7: Stag Brewery (within the Stag Brewery component of the Site) and **temporary**, **short to medium term**, **local** residual effects of **minor** to **moderate adverse** significance to TCAs surrounding the Site and within the Chalkers Corner component of the Site.

16.80 Visual receptors most likely to be affected by the Works include residents, road users, users of the National Trails or recreational users of Mortlake Green with direct, close range views towards the Site. Effects resulting to local views would remain **temporary**, **short to medium term** and **local**, ranging between **minor** and **major adverse** significance depending on the angle and distance of view from the Development.

Completed Development

16.81 Due to the nature of likely townscape and visual effects once the Development is completed, all mitigation measures are inherent within the Development design. These include the landscape strategy, as described in **Chapter 5: The Proposed Development**, which aims to create an enhanced riverside landscape with trees and indigenous plants. A series of central public squares would also provide variety and colour to the public realm. Consequently, all residual effects would remain identical to those identified within the assessment of potential changes summarised within **Table 16.10** and below.

16.82 **Long-term**, **local** effects of **moderate**, **beneficial** significance would result to TCA1: Mortlake (within the Stag Brewery component of the Site). **Long-term**, **local** effects of **major**, **beneficial** significance would result to TCA7: Stag Brewery (within the Stag Brewery component of the Site). Effects on surrounding TCAs would be **insignificant** to **long-term**, **local** and **minor beneficial** significance in the vicinity of the Site and within the Chalkers Corner component of the Site.

16.83 The majority of local views would experience either **insignificant** or **long term**, **local** effects, ranging from **minor** to **moderate beneficial** significance depending on angle, range and context of view.

16.84 It is considered that mitigation to reduce adverse effects likely to be experienced by visual receptors associated with viewpoint locations 2 would not be practicable or effective (i.e. tree planting in the intervening landscape / on Site would not provide sufficient screening effects due to the relative heights of trees and the proposed built form). As such, road users on Thames Bank at Viewpoint location 2 would experience effects of **minor adverse** significance, however this would be temporarily in transit. Recreational users of the Thames Path National Trail at Viewpoint location 2 would experience **long-term**, l**ocal effects** of **moderate adverse** significance.

Summary

16.85 **Table 16.10** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 16.10: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Townscape Character	**Temporary**, **short** to **medium term**, **local** effects of **major adverse** significance would result to TCA1: Mortlake and TCA7: Stag Brewery (within the Stag Brewery component of the Site). Surrounding TCAs would experience **temporary**, **short** to **medium term**, **local**, **minor to moderate adverse** effects in the vicinity of the Site and within the Chalkers Corner component of the Site.	Good Site management, maintenance and housekeeping, and careful siting of construction machinery would be implemented, including the use of Site hoardings and maintaining a clean, safe, pedestrian environment.	**Temporary**, **short** to **medium term**, **local** effects of **major adverse** significance would result to TCA7: Stag Brewery (within the Stag Brewery component of the Site). Surrounding TCAs would experience **temporary**, **short** to **medium term**, **local**, **minor to moderate adverse** effects in the vicinity of the Site and within the Chalkers Corner component of the Site.
Visual Amenity	Local views would experience **temporary**, **short** to **medium term**, **local** effects, ranging from **minor** to **major adverse**		Local views would experience **temporary**, **short** to **medium term**, **local** effects, ranging from **minor** to **major adverse**

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	significance depending on the angle and distance of view.		significance depending on the angle and distance of view.
Completed Development			
Townscape Character	**Long-term**, **local** effects of **moderate**, **beneficial** significance would result to TCA1: Mortlake (within the Stag Brewery component of the Site). **Long-term**, **local** effects of **major**, **beneficial** significance would result to TCA7: Stag Brewery (within the Stag Brewery component of the Site). Effects on surrounding TCAs would be **insignificant** to **long-term**, **local** and **minor** to **moderate beneficial** significance in the vicinity of the Site and within the Chalkers Corner component of the Site.	Mitigation measures are inherent within the Development design, including the Landscape Strategy which provides enhanced riverside landscape with trees and indigenous plants and public squares with variety and colour.	**Long-term**, **local** effects of **moderate**, **beneficial** significance would result to TCA1: Mortlake (within the Stag Brewery component of the Site). **Long-term**, **local** effects of **major**, **beneficial** significance would result to TCA7: Stag Brewery (within the Stag Brewery component of the Site). Effects on surrounding TCAs would be **insignificant** to **long-term**, **local** and **minor beneficial** significance in the vicinity of the Site and within the Chalkers Corner component of the Site.
Visual Amenity	The majority of local views would experience either **insignificant** or **long term**, **local** effects, ranging from **minor** to **major beneficial** significance depending on angle, range and context of view. Road users on Thames Bank at Viewpoint location 2 would experience effects of **minor adverse** significance, however this would be temporarily in transit. Recreational users of the Thames Path National Trail at Viewpoint location 2 would experience **long-term**, l**ocal effects** of **moderate adverse** significance.		The majority of local views would experience either **insignificant** or **long term**, **local** effects, ranging from **minor** to **moderate beneficial** significance depending on angle, range and context of view. Road users on Thames Bank at Viewpoint location 2 would experience effects of **minor adverse** significance, however this would be temporarily in transit. Recreational users of the Thames Path National Trail at Viewpoint location 2 would experience **long-term**, l**ocal effects** of **moderate adverse** significance.

References

1 Landscape Institute and Institute of Environmental Management and Assessment (2013); 'Guidelines for Landscape and Visual Impact Assessment', Third Edition, Routledge.

2 Natural England (2014); 'An Approach to Landscape Character Assessment', October 2014.

3 Landscape Institute (2011); 'Advice Note 01/11: Photography and Photomontage in Landscape and Visual Impact Assessment', Landscape Institute.

4 Historic England (2015); 'Tall Buildings Historic England Advice Note 4', Historic England.

5 London Borough of Richmond upon Thames (2015); 'Mortlake Village Planning Guidance', Draft Supplementary Planning Document, London Borough of Richmond upon Thames.

6 London Borough of Richmond upon Thames (2011); 'Stag Brewery, Mortlake, SW14 Planning Brief, Supplementary Planning Document', London Borough of Richmond upon Thames.

7 London Borough of Richmond upon Thames (2015); 'Local Plan – Proposals Map', available at: http://www.cartogold.co.uk/richmond_2015/richmond.htm

8 London Borough of Richmond upon Thames (2016); 'Design Quality Supplementary Planning Document', Adopted 2016.

9 London Borough of Richmond upon Thames (no-date); 'Mortlake Conservation Area 33'.

10 London Borough of Richmond upon Thames (2015); 'Mortlake Village Planning Guidance, Draft SPD', February 2015.

11 London Borough of Richmond upon Thames (2009); 'Local Development Framework Core Strategy', London Borough of Richmond upon Thames.

12 London Borough of Richmond upon Thames (2011); 'Local Development Framework, Development Management Plan', adopted November 2011.

17. Wind Microclimate

Introduction

17.1 This Chapter, which has been prepared by RWDI, presents an assessment of the likely significant effects of the Development on the local wind microclimate both within the Site and within the immediate vicinity of the Site. In particular, consideration is given to the likely significant effects of wind upon pedestrian comfort and safety. This Chapter summarises the findings of a desk-based wind assessment and wind tunnel modelling undertaken by RWDI. This is presented within **Appendix 17.1**.

17.2 This Chapter describes the methods used to assess the likely significant effects of the Development upon the local wind microclimate. A summary of the wind conditions for the existing Site is provided. This is followed by an assessment of the likely significant effects of the Development and a description of the mitigation measures required to prevent, reduce and offset any likely significant adverse effects. The Chapter concludes with an assessment of the nature and significance of the resulting likely residual effects.

Assessment Methodology and Significance Criteria

17.3 Whilst the Wind Microclimate Assessment (**Appendix 17.1**) focusses on the Stag Brewery component of the Site (and not the Chalkers Corner component of the Site), this is due to the fact that there would be no built development proposed within or close enough to this area to give rise to significant wind microclimate effects, as this part of the Development would only comprise highway and landscaping works associated with Chalkers Corner (refer to **Chapter 5: The Proposed Development**). Accordingly, and based on professional and expert judgement, the proposals at the Chalkers Corner component of the Site are unlikely to give rise to any significant wind microclimate effects. The geographical coverage of the Wind Microclimate Assessment (**Appendix 17.1**) is therefore considered to be appropriate and robust for the purposes of the assessment.

17.4 In respect of the assessment of the outline component of the Development, the assessment set out within this Chapter has considered the maximum allowable spatial parameters sought for approval. This would give rise to the greatest massing and so can be considered to reflect a 'worst-case' assessment. That said, based on professional and expert judgement, it is unlikely that the minimum allowable spatial parameters sought for approval would give rise to materially different wind microclimate effects, given the minimal difference in scale between the minimum and maximum parameters.

Assessment of the Works

Assessment of Construction

17.5 For the assessment of the likely significant effects of the Works upon the local wind microclimate, a qualitative assessment has been undertaken using professional judgement and experience. Consideration has been given to the information provided within **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, together with baseline meteorological data / conditions relevant to the Site, as presented within **Appendix 17.1**.

Assessment of the Completed Development

17.6 To predict the local wind environment associated with the completed and operational Development and the resulting pedestrian comfort and safety within the Stag Brewery component of the Site and immediately surrounding the Stag Brewery component of the Site, wind tunnel testing of the Development has been undertaken.

17.7 Wind tunnel testing is one of the most well-established and robust means of assessing the pedestrian wind microclimate. Such testing allows the pedestrian level wind microclimate at and surrounding a site to be quantified and classified in accordance with the widely accepted Lawson Comfort Criteria[1], a summary of which is provided later in this Chapter.

17.8 Wind tunnel testing delivers a detailed assessment of the mean and gust wind conditions in and around a subject site for all wind directions in terms of pedestrian comfort and strong winds

17.9 The methodology for quantifying the pedestrian wind environment is outlined below within four steps. Full details of the assessment methodology can be obtained by reference to **Appendix 17.1**:

- **Step 1:** the subject site's induced wind speeds are measured for the appropriate configuration(s) at the appropriate pedestrian level(s) in the wind tunnel;
- **Step 2:** standard meteorological data is adjusted to account for conditions at the subject site (for this assessment, combined meteorological data has been derived from the meteorological stations at three major London airports (Heathrow, Gatwick and Stansted));
- **Step 3:** data from Step 1 and Step 2 is combined to obtain the expected frequency and magnitude of wind speed for the appropriate configuration(s) and at the appropriate pedestrian level(s); and
- **Step 4:** the results of Step 3 are compared with the Lawson Comfort Criteria, and where relevant, the change in the wind microclimate conditions between appropriate test configuration(s) to 'grade / score' the conditions within and around a subject site.

17.10 To model the likely effects of gustiness or turbulence (which depends on the location of the subject site) a series of spires and floor roughness elements have been employed in the wind tunnel in order to create a 'boundary layer' that is representative of the urban location of the Stag Brewery component of the Site. In addition, the wind tunnel included relevant buildings with regards to wind flow up to a distance of 360m radius from the centre of the Stag Brewery component of the Site.

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

- Configuration 1: existing Site with existing buildings; and
- Configuration 2: the Development with existing surrounding buildings.

17.12 Photographs of the wind tunnel test model can be seen within **Figure 17.1**.

17.13 Wind speed measurements within and around the Stag Brewery component of the Site for the above test configurations were established using Irwin probes[1]. These measure the wind speed at

[1] Omnidirectional anemometer used to measure mean and gust wind speeds.

a scaled 1.5m height above the ground for all wind directions in equal increments, with 0º representing the wind blowing from the north and 90º for wind from the east. For this assessment, both the mean wind speed and the peak wind speed were determined at each measurement location.

17.14 As noted earlier in this Chapter, the results of the wind tunnel testing are presented for the worst-case, windiest season (typically December, January and February in the south of the UK) and summer (June, July and August). This is due to the fact that some pedestrian activities defined by the Lawson Comfort Criteria (refer to later in this Chapter) need to be met during the winter, whereas others are dependent upon summer conditions. When assessing the significance of the wind microclimate, consideration has been given to the sensitivity of the receptor locations. For example, proposed ground level amenity spaces and terraces associated with the Development have been assessed in terms of the summer wind microclimate (as this is when these spaces would be likely to be utilised); whereas standing areas, entrances and pedestrian routes have been assessed for winter, owing to the fact that such spaces must be 'useable' throughout the year.

17.15 It is important to note that the wind tunnel testing for Configurations 1 and 2 has been undertaken devoid of any existing or proposed trees or landscaping. This is so as to provide a set of conservative, worst-case results.

Lawson Comfort Criteria

17.16 The Lawson Comfort Criteria define a scale for assessing the suitability of wind conditions in the urban environment based upon threshold values of wind speed and frequency of occurrence, as set out within **Table 17.1**. 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.

17.17 The Lawson Comfort Criteria sets out four pedestrian activities and reflects the fact that less active pursuits require more benign wind conditions. The four categories are sitting, standing, strolling and walking, in ascending order of activity level, with a fifth category for conditions that are uncomfortable for all uses. In other words, the wind conditions in an area for sitting need to be calmer than a location that people merely walk past.

17.18 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.

17.19 The Lawson Comfort Criteria are derived for open air conditions and assume that pedestrians would be suitably dressed for the season. Thermal comfort is discussed with reference to acceptable wind environments but not evaluated as part of the assessment.

17.20 The key in **Table 17.1** corresponds to the presentation of wind tunnel test results described later in this Chapter and within **Figures 17.3-17.10** and **Appendix 17.1**.

Table 17.1: Lawson Comfort Criteria

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

17.21 Target conditions based on the above criteria are outlined as:

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

Strong Winds

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

Significance Criteria

17.23 For assessing the significance of the likely wind effects of the Development and the likely residual wind effects of the Development, the significance criteria used have been based upon the relationship between the desired pedestrian use (as defined by the Lawson Comfort Criteria) at a particular location, and the modelled (predicted) wind conditions at this same location. Accordingly, the following seven-point scale of significance has been used:

- **beneficial effect of substantial significance:** wind conditions are 3-categories calmer than desired;
- **beneficial effect of moderate significance:** wind conditions are 2-categories calmer than desired;
- **beneficial effect of minor significance:** wind conditions are 1-category calmer than desired;
- **insignificant:** wind conditions are similar to those desired;
- **adverse effect of minor significance:** wind conditions are 1-category windier than desired;
- **adverse effect of moderate significance:** wind conditions are 2-categories windier than desired; and

- **adverse effect of substantial significance:** wind conditions are 3-categories windier than desired.

17.24 For example, if the desired wind conditions at a particular location within the Stag Brewery component of the Site are required to be acceptable for standing / entrance use, but the expected wind conditions are identified as being acceptable for strolling use, the difference between the desired and expected wind condition is 1-category windier than desired. In this case, the likely effect would be identified as being **adverse**, and of **minor significance**.

17.25 For assessing the significance of likely wind effects of the Development outside of (surrounding) the Site, the above significance criteria have also been used. However, commentary is also provided in relation to the change in the wind environment, relative to the baseline conditions. This is appropriate at off-Site locations where the pedestrian use before and after implementation of the Development would be identical.

17.26 As originally proposed by Lawson, strong winds are reported separately and are not incorporated into the significance criteria.

Baseline Conditions

General Meteorological Conditions

17.27 As previously noted, meteorological data derived from three major London airports (Heathrow, Gatwick and Stansted) have been reviewed to develop a statistical model of wind speed and direction, representative of wind conditions at the Site.

17.28 **Figure 17.2** shows the wind roses for meteorological standard conditions of 10m above open, flat, level countryside terrain. The meteorological data indicates that the prevailing wind direction in London (and representative of the Site) throughout the year is from the south west. This is typical for many areas of England. The data also shows that there is a secondary peak from north easterly winds, particularly during the spring. These tend to be cold winds.

Terrain Roughness

17.29 The meteorological data has been adjusted to the Site conditions taking account of the terrain roughness using the BREVe3 software package which models the wind characteristics caused by changes in the terrain roughness at the stated reference height of 120 m above the surface. The results are shown in **Table 17.2**.

Table 17.2: BREVe3 Mean Factors for the Site at 120m (Above Ground Level)

Wind Direction (Degrees (o))	BREVe3 Mean Factors at a Height of 120m
0	1.39
30	1.41
60	1.42
90	1.43
120	1.38
150	1.40
180	1.45
210	1.44
240	1.40
270	1.38
300	1.39
330	1.36

Modelled Existing Wind Conditions: Configuration 1

17.30 **Figure 17.3** and **Figure 17.4** show the modelled wind conditions for the existing Stag Brewery component of the Site with existing surrounding buildings for the worst-case windiest season and the summer season respectively.

On-Site Conditions

17.31 Wind conditions across the existing Stag Brewery component of the Site range from suitable for 'sitting' activities to suitable for 'strolling / thoroughfare' activities during the windiest season and therefore relatively calm. These conditions are acceptable for their current usage.

17.32 There were no strong winds exceeding 15 m/s for more than 2.2 hours per annum recorded within the existing Stag Brewery component of the Site with existing surrounds.

Off-Site Conditions

17.33 Wind conditions surrounding the Site, including along the towpath, within the River Thames and Mortlake Green, were proven to be relatively calm and suitable for the existing pedestrian uses that occur, namely outdoor seating use during the summer season.

17.34 No off-Site test locations were found to experience strong winds for either the worst-case windiest season, or the summer season.

Likely Significant Effects

The Works

17.35 As described in **Chapter 3: Existing Land Uses and Activities**, the majority of the Site comprises the former Stag Brewery estate. This includes 16 industrial buildings surrounded largely by hard-standing. An area of approximately 2.1 ha within the Stag Brewery component of the Site is occupied by the Watney's Sports Ground playing fields.

17.36 Based upon professional judgement, the demolition of the existing medium rise structures of the Site is not anticipated to give rise to any significant change to the existing (relatively calm) wind microclimate both on and off-Site. The likely effect is therefore judged to be **insignificant** and wind conditions both on and off-Site would remain suitable for their intended pedestrian uses.

17.37 As construction of the Development proceeds, the wind conditions of the Stag Brewery component of the Site and its surrounds would gradually adjust to those described below for the completed Development.

17.38 Furthermore, exceedances of the pedestrian safety criteria are not expected.

Completed Development

17.39 **Figure 17.5** to **Figure 17.7** show the modelled wind conditions for the Development with existing surrounding buildings for the worst case windiest season for ground and elevated levels.

17.40 **Figure 17.8** to **Figure 17.10** show the modelled wind conditions for the Development with existing surrounding buildings for the summer season for ground and elevated levels.

Modelled Wind Conditions, Configuration 2 (The Development with Existing Surrounds) - On-Site Conditions

Thoroughfares

17.41 With reference to **Figure 17.5** and **Figure 17.8**, pedestrian thoroughfares in and around the Development within the context of existing surrounds would experience wind conditions ranging from being acceptable for sitting to acceptable for strolling use.

17.42 These wind conditions are acceptable for the intended thoroughfare use.

17.43 The likely effect of these conditions ranges from **insignificant** to **long-term**, **local**, **beneficial** and of **moderate significance**.

Entrances

17.44 Entrances to the Development are represented by the receptor locations set out in **Table 17.3**. It should be noted that entrance locations are only defined for the detailed component of the Development.

Table 17.3: Entrance Receptor Locations within the Development

Building	Receptor
1	118
2	129, 150, 151, 153, 155, 321
3	132, 133, 134, 148
4	144,146
5	185
6	194
7	175, 177, 178, 179
8	204, 205, 211
9	243

10	232
11	217, 220
12	238, 299
School	73, 92

17.45 **Table 17.3** demonstrates that the wind conditions at all entrances within the detailed component of the Development (Buildings 1 to 12 inclusive and the school) would be suitable for standing use or calmer during the windiest season. As such, the effect of these wind conditions would range from **insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**.

17.46 In relation to the outline component of the Development (Buildings 13 to 22 inclusive), the location of building entrances is not currently known. This is because the outline element of the hybrid planning application does not seek approval for building appearance, layout and so forth. This detail would be sought via future reserved matters applications. However, it is reasonable to assume that building entrances would be located at various ground floor locations around the buildings. Reference to **Figure 17.5** shows that immediately surrounding Building 13 to 22 inclusive, the wind conditions would be suitable for standing use or calmer during the windiest season and therefore the effect of these wind conditions would range from **insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**. However, should a building entrance be located on the west façade at Building 16 (Location 40) the wind conditions during the windiest season would be suitable for strolling use. This would be one category windier that the required standing / entrance use wind environment. As such, should a building entrance be located here, the effect would be **long-term**, **local**, **adverse** and of **minor significance**.

Ground Level Amenity Areas

17.47 **Figure 17.8** shows that wind conditions within the Stag Brewery component of the Site within the context of existing surrounds during summer are suitable for a mixture of standing and sitting use.

17.48 These conditions are acceptable, in terms of pedestrian comfort, for their intended. However, provided seating areas cannot be located at areas where wind conditions are suitable for standing use. Therefore the likely effect of these conditions would be **insignificant**.

Above Ground Amenity Areas

17.49 **Figure 17.9** shows that wind conditions at most elevated balconies and elevated terraces across the Stag Brewery component of the Site would be suitable for sitting activities during summer and therefore represent an **insignificant** effect. However, Locations 259, 264, 265 and 268, (within Buildings 6, 9 and 12) would be suitable for standing use during the summer. As this is one category windier than desired this would represent a **long-term**, **local**, **adverse effect** of **minor significance**

17.50 Wind conditions across the school rooftop are suitable, in terms of pedestrian comfort, for sitting use during summer (refer to **Figure 17.10**) and would therefore represent an **insignificant** effect.

Strong Winds

17.51 No strong winds in exceedance of the pedestrian safety criteria were recorded.

Modelled Wind Conditions, Configuration 2 (The Development with Existing Surrounds) - Off-Site Conditions

17.52 **Figure 17.8** shows that wind conditions around and surrounding the Stag Brewery component of the Site within the context of existing surrounds during summer are suitable for a mixture of standing and sitting use. In particular, the wind conditions across Mortlake Green to the south of the Stag Brewery component of the Site and the tow path to the north of the Stag Brewery component of the Site were found to be suitable for sitting during summer. With the completed Development in place, these locations (as well as within the River Thames) were generally found to be the same as existing conditions during the summer (refer to **Figure 17.4**).

17.53 With the completed Development in place, these locations were also generally found to be the same as existing conditions during the windiest season (refer to **Figure 17.3 and Figure 17.5**). As such, the likely effects of the completed Development on surrounding users of the Stag Brewery component of the Site would be **insignificant**.

17.54 There were no strong winds exceeding 15m/s for more than 2.2 hours per annum recorded off-Site with existing surrounds.

Mitigation Measures and Likely Residual Effects

The Works

17.55 The Works would likely give rise to insignificant effects. Accordingly, no mitigation is considered necessary. The resulting likely residual effect would therefore remain as **insignificant**.

Completed Development

Configuration 2 (The Development with existing surrounding Site conditions) - On-Site Conditions

17.56 The assessment of completed Development significant wind microclimate effects has demonstrated that even in the absence of mitigation, the majority of the Stag Brewery component of the Site (and therefore the Development) would be suitable for its intended pedestrian activities. In all such instances, no mitigation would be required and the likely residual effects would therefore remain as the likely effects, that is:

- thoroughfares - **insignificant** to **long-term**, **local**, **beneficial** and of **moderate significance**;
- entrances to buildings (with the exception of a possible building entrance location at the west facing façade of Building 16 (Location 40)) - **insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**;
- ground level amenity areas - **insignificant**; and
- above ground amenity areas (with the exception of balconies associated with Buildings 6, 9 and 12 (Locations 259, 264, 265 and 268)- **insignificant**.

17.57 Despite the above, in respect of the detailed component of the Development, there are a few very limited receptor locations whereby it has been demonstrated that with the Development in place, the wind microclimate would likely not be ideal for the intended pedestrian uses. This would be the case for the balconies associated with Buildings 6, 9 and 12 (Locations 259, 264, 265 and 265). It is therefore recommended that solid balustrades of at least 1.5m are included at these locations. This would likely improve wind conditions at these locations so that sitting conditions are achieved during the summer. The likely residual effect would therefore be **insignificant.**

17.58 In respect of the outline component of the Development, it has been identified that if a building entrance were to be located at the west facing façade of Building 16 (Location 40) then this location would be subject to wind conditions that would not be suitable for use. As this part of the Development is proposed in outline only, it is considered that this issue be deferred to subsequent reserved matters applications in respect of Building 16 whereby:

- a building entrance is not located at this location; or
- a building entrance at Location 40 is recessed by 1.5m; and
- 3m to 5m tall trees or screens of at least 2m high are planted / erected on both sides of any entrance at Location 40.

17.59 It is anticipated that the above would give rise to wind conditions that were suitable for use at this location. As such, the likely residual effects have the potential to be **insignificant**. However, this would need to be verified through further wind tunnel testing at the reserved matters stage.

17.60 No strong winds would occur within the Site.

Configuration 2 (The Development with existing surrounding Site conditions) - Off-Site Conditions

17.61 Surrounding conditions with the completed Development in place would generally be the same as existing conditions, therefore no mitigation measures would be required and the likely residual effect would be **insignificant**.

17.62 In addition, it has been demonstrated that there would be no occurrence of strong winds off-Site.

Summary

17.63 **Table 17.4** summarises the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 17.4: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Wind conditions experienced by construction Site workers.	**Insignificant**.	None required.	**Insignificant**.
Completed Development			
Thoroughfares.	**Insignificant** to **long-term**, **local**, **beneficial** and of **moderate significance**.	None required.	**Insignificant** to **long-term**, **local**, **beneficial** and of **moderate significance**.
Entrances to buildings (with the exception of a possible building entrance location at the west facing façade of Building 16 (Location 40).	**Insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**.	None required.	**Insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**.
Ground level amenity areas.	**Insignificant**.	None required.	**Insignificant**.
Above ground amenity areas (with the exception of balconies associated with Buildings 6, 9 and 12 (Locations 259, 264, 265 and 268).	**Insignificant**.	None required.	**Insignificant**.
Off-Site Receptors (including Mortlake Green, the tow path and within the River Thames).	**Insignificant**.	None required.	**Insignificant**.
Wind conditions on the balconies associated with Buildings 6, 9 and 12 (Locations 259, 264, 265 and 268).	**Long-term, local, adverse** and of **minor significance**.	Implementation of solid raised balustrades to a height of at least 1.5 m.	**Insignificant** (provided inclusion of the suggested mitigation measures).
Wind conditions at the potential building entrance on the west facing façade of Plot 16 (Location 40).	**Long-term, local, adverse** and of **minor significance** (only if an entrance were to exist at this location).	Reserved matters application to either: • exclude a building entrance at this location; or • recess the building entrance; or • plant 3m to 5m tall trees or erect screens of at least 2m high on both sides of any	**Insignificant** (provided inclusion of the suggested mitigation measures).

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
		entrance at Location 40. Further wind testing would need to be verified through further wind tunnel testing at the reserved matters stage.	

References

1 Lawson TV (2001); 'Building Aerodynamics', Imperial College Press, London.

18. Daylight, Sunlight, Overshadowing and Light Pollution

Introduction

18.1 This Chapter, which has been prepared by eb7, presents an assessment of the likely significant effects of the Development on daylight, sunlight, overshadowing and light pollution at sensitive receptors surrounding the Site.

18.2 This Chapter provides a description of the methods used in the assessment, followed by a description of the relevant baseline conditions of the Site and surrounding area, together with an assessment of the likely significant effects of the Development during the Works and once the Development is completed and operational. Mitigation measures are identified where appropriate to avoid, reduce or offset adverse effects. Taking account of the mitigation measures, the nature and significance of the likely residual effects of the Development are described.

18.3 This Chapter is accompanied by the following appendices presented in **Volume 3**:

- **Appendix 18.1**: Drawings of the Baseline Condition and Development Scenario;
- **Appendix 18.2**: Detailed Results of the Daylight (VSC, NSC and ADF) and Sunlight (APSH) Analysis;
- **Appendix 18.3**: Results of the Overshadowing (Sunlight Amenity) Analysis;
- **Appendix 18.4**: Transient Overshadowing Images; and
- **Appendix 18.5**: Light Pollution

18.4 As agreed during the EIA Scoping Process, internal daylight and sunlight of the residential units within the Development is not considered an EIA issue, as such, this will be presented in a standalone report prepared by eb7, to accompany the planning application.

18.5 In addition, due to the location and materials used for the proposed buildings, Solar Glare has been scoped out of the EIA (refer to **Chapter 2: EIA Methodology**).

Assessment Methodology and Significance Criteria

18.1 The technical analysis has been undertaken via the creation of a digital three-dimensional model of the Site and surroundings, based on laser scan measured survey data. Where survey data was not available, building dimensions have been worked out using Ordnance Survey (OS) data and Site photographs. Reasonable assumptions as to the internal configuration of the existing surrounding rooms behind the fenestration were made. A standard 4.27 m deep room was assumed unless the building form dictated otherwise. The use of the rooms behind the fenestration was also assumed from external observation. This is common accepted practice when access is unavailable.

18.2 In respect of the assessment of the outline component of the Development, the assessment set out within this Chapter has considered the maximum allowable spatial parameters sought for approval. This would give rise to the greatest massing and so can be considered to reflect a 'worst-case' assessment. That said, based on professional and expert judgement, it is unlikely that the minimum allowable spatial parameters sought for approval would give rise to materially different daylight, sunlight and overshadowing effects, given the minimal difference in scale between the minimum and maximum parameters.

18.3 The appendices for this Chapter (**Appendices 18.1** - **18.5**) focus on the Stag Brewery component of the Site (and not the Chalkers Corner component of the Site), this is due to the fact that there would be no built development proposed within or close enough to the Chalkers Corner area to

give rise to significant daylight, sunlight, overshadowing and light pollution effects, as this part of the Development would only comprise highway and landscaping works associated with Chalkers Corner (refer to **Chapter 5: The Proposed Development**). Accordingly, and based on professional and expert judgement, the proposals at the Chalkers Corner component of the Site are unlikely to give rise to any significant daylight, sunlight, overshadowing and light pollution effects. The geographical coverage of these appendices are therefore considered to be appropriate and robust for the purposes of the assessment.

The Works Assessment Methodology

18.4 No technical analysis of the likely significant effects on the surrounding properties and amenity areas during the Works was carried out due to the transient nature of the massing of the Development as construction progresses. However, a qualitative assessment of the likely effects during the Works have been made based on professional judgement.

Completed Development Assessment Methodology

18.5 The Building Research Establishment (BRE) 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice[1] document provides advice on site layout planning to achieve good sunlighting and daylighting within buildings, and in the open spaces between them (referred to as the BRE guidelines in this report). It is intended to be used in conjunction with the interior daylight recommendations in the British Standard (BS) 8206 Part 2[2] and the Applications Manual Window Design of the Chartered Institute of Building Services Engineers (CIBSE)[3].

18.6 The BRE guidelines are intended for building designers, developers, consultants and planning officials. The advice it gives is not mandatory and should not be used as an instrument of planning policy. It states:

18.7 *"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 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."*

18.8 Likely effects (and their significance) on daylight, sunlight and overshadowing are assessed with respect to relevant target criteria as described in further detail below. The 2011 BRE Guidelines do not specifically relate to town centre locations and therefore, a degree of flexibility should be applied when assessing the significance of daylight and sunlight effects in urban locations.

Daylight

18.9 The BRE guidelines provide three different methods for assessing daylight for existing residential accommodation:

- Vertical Sky Component (VSC) method;
- No Sky Line (NSC); and
- Average Daylight Factor (ADF).

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

18.11 The levels of significance for impact to neighbouring properties is determined through VSC and NSC assessment. The ADF results have been provided as supplementary information only.

Vertical Sky Component (VSC) Method

18.12 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, which is one basis for the British Standard (BS) recommendations on interior daylighting.

18.13 VSC is calculated by using a sky light indicator or 'Waldram Diagram'. For calculation purposes, trees are ignored unless they form dense continuous belts. In addition, whilst not technically relevant, VSC levels have been included for windows that are not vertical (e.g. skylights) for completeness.

No Sky Line Contour (NSC) Method

18.14 The NSC method is a measure of the distribution of daylight at the 'working plane' within a room. In houses, the 'working plane' means a horizontal 'desktop' plane 0.85 metres (m) in height.

18.15 The NSC divides those areas of the working plane in a room which receive direct sky light through the windows from those areas of the working plane which cannot.

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

18.17 The effect of daylight distribution in an existing building is found by plotting the NSC in each of the main rooms. For houses, this will include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are considered less important.

Average Daylight Factor (SDF) Method

18.18 The ADF is defined as:

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

18.19 The ADF method of assessment takes into account the diffuse visible transmittance of the glazing to the room in question (i.e. how much light gets through the window glass); the net glazed area of the window in question; the total area of the room surfaces (ceiling, walls, floor and windows); proportion of window located above the working plane and the angle of visible sky reaching the window / windows in question. It also makes allowance for the average reflectance of the internal surfaces of the room and of external obstruction. Reasonable estimations of internal reflectance are used if not known.

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

Sunlight Assessment

Annual Probable Sunlight Hours

18.21 With regard to sunlighting, 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.

18.22 The BRE guidelines also notes:

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

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

Overshadowing Assessment

Sunlight Amenity Assessment (Sun on the Ground)

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

Transient Overshadowing

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

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

18.26 For each of these dates, the overshadowing was calculated at hourly intervals throughout the day from 8.00am to 7.00pm. September 21st (Autumn Equinox) provides the similar overshadowing images as March 21st (Spring Equinox) as the sun follows a similar path at these corresponding times of year.

18.27 The indicators are calculated for different latitudes, London being 51.5° north. Clearly, southern orientation is critically important, as are the heights of the Development, existing buildings on Site and surrounding buildings.

Light Pollution

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

18.29 Light pollution is a general term which encompasses Sky Glow, Light Trespass, Glare and Building Luminance as described in the Institute of Lighting Professionals (ILP) Guidelines [4], as follows:

- **Sky Glow** is the brightening of the of the night sky over our towns, cities and countryside. This can be quantified by measuring the Upward Light Ratio (ULR). This is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky. The values suggested in **Table 18.1** are the maximum allowable levels for their respective environmental zones.
- **Light Trespass** is the spilling of light beyond the Site boundary. This is assessed using vertical illuminance in lux (EV) measured flat on the glazing at the centre of the window.
- **Glare** is the uncomfortable brightness of a light source when viewed against a dark background. This applies to each source in the obtrusive direction and is quantified as source intensity (I) (kcd). The values suggested in **Table 18.1** are the maximum allowable levels for their respective environmental zones (pre and post curfew).
- **Building Luminance** can cause an increase in the brightness of the general area. This is measured in Cd/m2 (L) as an average over the building façade. The values suggested in **Table 18.1** are the maximum allowable pre curfew levels for their respective environmental zones caused only by externally lighting on the building façade.

18.30 The ILP Guidelines suggest that in many cases the target levels for each of the forms of light pollution are not obtainable. Specific cases will be dealt with on a case by case basis and maximum mitigation should be utilised to ensure that the effects are within acceptable limits.

18.31 The ILP Guidelines quantify the levels of sky glow, glare and light trespass seen as acceptable for varying environmental zones:

- E0: UNESCO Starlight Reserves, IDA Dark Sky Parks;
- E1: Intrinsically dark landscapes - National Parks, Areas of Outstanding Natural Beauty, etc;
- E2: Low district brightness areas - Rural, small village, or relatively dark urban locations;
- E3: Medium district brightness areas - Small town centres or urban locations; and
- E4: High district brightness areas - Town/city centres with high levels of night time activity.

18.32 **Table 18.1** sets out light limitations for exterior lighting installations specified in the ILP Guidelines.

Table 18.1: Obtrusive Light Limitations for Exterior Lighting Installations

Environmental Zone	Sky Glow Upward Light Ratio [Max %]	Light Trespass (Into Windows) Vertical Illuminance (Lux)[1]		Source Intensity 1 [kcd][2]		Building Luminance Average L[cd/m2]
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Pre-curfew
E1	0	2	1[3]	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1.0	10
E4	15.0	25	5	25	2.5	25

Notes:
1 – E_v = Vertical Illuminance in Lux normal to glazing.
2 – Light Intensity in kilo-candelas.
3 – Acceptable from public road lighting installations only.

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

18.33 The Site is considered to fall under Zone E3 as a Medium District Brightness area. By reference to the ILP Guidance, Environmental Zone E3 allows up to 10 lux of light pre-curfew measured vertically upon the face of residential windows surrounding the Development and an *'after curfew'* value of 2 lux. This value has therefore been used to assess the light pollution associated with the Development.

18.34 A detailed lighting scheme has not been fixed for the Development as a whole at the time the assessment was undertaken and, as such, a qualitative assessment has been provided as is standard practice. This is based on the Provisional Lighting Masterplan put forward by Michael Grubb Studio. Further to this, the sports pitch would be served by floodlights. A final design is not fixed at this stage and two options have been prepared based on either 120 lux or 200 lux and as such, an assessment of light trespass as a result of these floodlights has been provided to ensure that it would be possible to control the light emitted.

Significance Criteria

18.35 The BRE guidelines states the following for use in Environmental Impact Assessments (EIA):

"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 ***Insignificant*** *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* ***Insignificant*** *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* ***substantial adverse****. Factors tending towards* ***minor adverse*** *impact 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 ***substantial adverse*** *impact include:*

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

Daylight

VSC Criteria

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

18.37 In order to be regarded as meeting the VSC criteria once the 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 Development is constructed.

18.38 In special circumstances the developer or Local Planning Authority (LPA) 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 height and proportions of existing buildings.

18.39 Where a neighbouring window has its light obscured by an overhang, existing levels will be low. As such this can lead to relatively modest developments causing technical breaches of the BRE guidance. In order to allow for this the BRE guidance recommends an additional assessment with balconies removed is undertaken to determine if this is the driver of the impact. Where balconies unfairly constrain daylight, professional judgment may be applied to set a suitable level of significance which deviates from the targets set out below.

18.40 Where the results show compliance with the BRE guidelines criteria, the effect is considered to be **Insignificant** since the BRE guidelines indicate that the occupants are unlikely to experience any noticeable change to their daylight amenity levels.

18.41 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 VSC the ranges of reduction have been set at 20-29.9% (**minor significance**), 30-39.9% (**moderate significance**) and >40% (**major significance** (note, substantial as used in the BRE guidelines has been replaced with major to match the terminology within this ES)).

NSC Criteria

18.42 If, following construction of a new Development, the NSC moves so that the area of the existing room which does receive 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.

18.43 In order to be regarded as meeting the NSC criteria once the Development has been constructed, it should retain at least 80% of its existing NSC value after the Development is constructed.

18.44 Where a neighbouring window has its light obscured by an overhang, existing levels will be low. As such this can lead to relatively modest developments causing technical breaches of the BRE guidance. In order to allow for this the BRE guidance recommends an additional assessment with

balconies removed is undertaken to determine if this is the driver of the impact. Where this assessment has been applied it has been described in the description of likely significant effects. impacts. Where balconies unfairly constrain daylight, professional judgment may be applied to set a suitable level of significance which deviates from the targets set out below.

18.45 Where the results show compliance with the BRE guidelines criteria, the effect is considered to be **insignificant** since the BRE guidelines indicate that the occupants are unlikely to experience any noticeable change to their daylight amenity levels.

18.46 Where there will be a noticeable change, the results have been summarised dependant on how far beyond the suggested targets the reductions from baseline levels will occur. For NSC the ranges of reduction have been split into 20-29.9% (**minor significance**), 30-39.9% (**moderate significance**) and >40% (**major significance**).

ADF Criteria

18.47 The recommended ADF value is dependent upon the use of the room in question. The BRE guidelines suggest a bedroom should have an ADF of 1%, a living room 1.5% and a kitchen 2%. Where room use is unknown an ADF target value of 1.5% (that of a living room) has been assumed. The ADF results are presented as supplementary information and are not used to determine significance of impact.

Sunlight

18.48 The BRE Guidelines states 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."

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

18.50 Retain at least 25% total APSH with 5% in the winter months in absolute terms;

18.51 Retain at least 80% of its existing total and winter APSH values after the Development is constructed; or

18.52 Loss of total absolute annual APSH is less than 4% of total APSH from the existing level.

18.53 Where the results show compliance with the BRE Guidance criteria, the effect is considered to be **insignificant** since the BRE Guidelines indicate that the occupants are unlikely to experience any noticeable change to their sunlight amenity levels.

Overshadowing

18.54 It is suggested that for an area to appear adequately sunlit throughout the year, at least half (50%) of any assessment area should see direct sunlight for at least 2 hours on the 21st March (sunlight amenity assessment).

18.55 Where the results show compliance with the BRE guidelines criteria, the effect is considered to be **insignificant**. Should the relevant criteria not be achieved, a judgment is made on significance of effect based on the level of loss, retained sunlight levels and the relevant baseline condition.

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

this reason the significance of effect is described through the sunlight amenity assessment described above.

Light Pollution

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

Baseline Conditions

Sensitive Receptors

18.58 Potentially sensitive receptors (existing nearby residential and relevant educational buildings as well as amenity areas) to the Development are identified in **Table 18.2** and their locations in relation to the Site is shown in **Figure 18.1**. The window maps for the residential properties are shown in within **Appendix 18.1**.

Table 18.2: Potentially Sensitive Receptors

Type of Receptor	Property Address (All floors unless otherwise stated)
Residential properties	Butler House
	Rann House
	31 Vineyard Path
	Vineyard Heights (third floor and above)
	The Tapestry (first floor only)
	3 – 9 Richmond Road (odd numbers only)
	39 – 41 Lower Richmond Road
	43 – 51 Lower Richmond Road
	51a – 55 Lower Richmond Road
	57 – 59 Lower Richmond Road
	61 – 63 Lower Richmond Road
	67 Lower Richmond Road
	Lady Elizabeth House
	2 – 10 Waldeck Road (even numbers only)
	3 – 9 Waldeck Road (odd numbers only)
	1 – 5 Varsity Row
	6 – 7 Varsity Row
	2 – 6 Williams Lane (even numbers only)
	8 – 10 Williams Lane (even numbers only)
	12 – 20 Williams Lane (even numbers only)
	22 – 26 Williams Lane (even numbers only)
	1 – 3 Watney Road
	4 – 5 Watney Road

Type of Receptor	Property Address (All floors unless otherwise stated)
	11 – 13 Watney Road (odd numbers only)
	15 – 21 Watney Road (odd numbers only)
	23 – 29 Watney Road (odd numbers only)
	31 – 37 Watney Road (odd numbers only)
	39 – 45 Watney Road (odd numbers only)
	47 and 49 Watney Road
	51 and 53 Watney Road
	55 and 57 Watney Road
	59 and 61 Watney Road
	63 and 65 Watney Road
	Parliament Mews
	Combe House
	1 – 10 Cromwell Place
	22 Cromwell Place
	Reid Court
	Churchill Court
	17 – 18 Langdon Place
	Tudor Lodge
	The Ship
	Thames Bank Cottage
	Asplin Cottage
	Aynescombe Cottage
	Thames Bank House
	Old Stable
	Leyden House
	Jolly Gardeners (first and second floor only)
Nursery / Daycare	35 Lower Richmond Road
External Amenity Spaces	Gardens serving 11-61 (odd only) Watney Road
	Gardens serving 1-11 Parliament Mews
	Gardens serving Aspin Cottage
	Gardens serving Thames Bank House
	Gardens serving Tudor Lodge
	Thames Tow Path
	Mortlake Green

18.59 The baseline condition has been assessed as the light levels which exist within the building surrounding the Site as they currently stand. **Figure 18.1** shows the buildings included within the baseline scenario assessment.

Daylight and Sunlight

18.60 **Tables 18.3** to **18.6** summarise the baseline daylight and sunlight results at the relevant receptors identified above. Only Site facing windows with a potential to see a change in light levels have been assessed.

Table 18.3: Baseline Daylight (VSC) Summary

Surrounding Properties	Total Number of Windows	Total number of windows that achieve VSC levels above those suggested in the BRE Guidance	Total number of windows that achieve VSC levels below those suggested in the BRE Guidance
Butler House	63	29	34
Rann House	96	24	72
31 Vineyard Path	30	28	2
Vineyard Heights	149	135	14
The Tapestry	5	3	2
3 – 9 Richmond Road	16	8	8
39 – 41 Lower Richmond Road	5	5	0
43 – 51 Lower Richmond Road	33	33	0
51a – 55 Lower Richmond Road	14	9	5
57 – 59 Lower Richmond Road	8	6	2
61 – 63 Lower Richmond Road	6	6	0
67 Lower Richmond Road	17	10	7
Lady Elizabeth House	50	47	3
2 – 10 Waldeck Road	25	16	9
3 – 9 Waldeck Road	37	19	18
1 – 5 Varsity Row	31	29	2
6 – 7 Varsity Row	10	9	1
2 – 6 Williams Lane	15	15	0
8 – 10 Williams Lane	8	8	0
12 – 20 Williams Lane	21	20	1
22 – 26 Williams Lane	10	9	1
1 – 3 Watney Road	15	12	3
4 – 5 Watney Road	11	8	3
11 – 13 Watney Road	9	9	0
15 – 21 Watney Road	21	21	0
23 – 29 Watney Road	29	27	2
31 – 37 Watney Road	23	21	2
39 – 45 Watney Road	25	25	0
47 and 49 Watney Road	10	10	0
51 and 53 Watney Road	10	10	0

Surrounding Properties	Total Number of Windows	Total number of windows that achieve VSC levels above those suggested in the BRE Guidance	Total number of windows that achieve VSC levels below those suggested in the BRE Guidance
55 and 57 Watney Road	10	10	0
59 and 61 Watney Road	10	10	0
63 and 65 Watney Road	10	10	0
Parliament Mews	78	52	26
Combe House	75	61	14
1 – 10 Cromwell Place	90	80	10
22 Cromwell Place	1	1	0
Reid Court	88	81	7
Churchill Court	83	52	31
17 – 18 Langdon Place	4	2	2
Tudor Lodge	9	8	1
The Ship	9	3	6
Thames Bank Cottage	11	8	3
Asplin Cottage	5	5	0
Aynescombe Cottage	14	11	3
Thames Bank House	28	24	4
Old Stable	23	18	5
Leyden House	20	15	5
Jolly Gardeners	18	17	1
35 Lower Richmond Road	31	12	19

Table 18.4: Baseline Daylight (NSC) Summary

Surrounding Properties	Total Number of Rooms	Total number of rooms above 50% well lit	Total number of rooms below 50% well lit
Butler House	21	19	2
Rann House	48	48	0
31 Vineyard Path	24	24	0
Vineyard Heights	75	75	0
The Tapestry	3	3	0
3 – 9 Richmond Road	8	8	0
39 – 41 Lower Richmond Road	5	5	0
43 – 51 Lower Richmond Road	31	31	0
51a – 55 Lower Richmond Road	11	10	1
57 – 59 Lower Richmond Road	6	6	0

Surrounding Properties	Total Number of Rooms	Total number of rooms above 50% well lit	Total number of rooms below 50% well lit
61 – 63 Lower Richmond Road	6	6	0
67 Lower Richmond Road	7	6	1
Lady Elizabeth House	40	40	0
2 – 10 Waldeck Road	12	12	0
3 – 9 Waldeck Road	29	27	2
1 – 5 Varsity Row	18	18	0
6 – 7 Varsity Row	6	6	0
2 – 6 Williams Lane	9	9	0
8 – 10 Williams Lane	6	6	0
12 – 20 Williams Lane	16	15	1
22 – 26 Williams Lane	9	9	0
1 – 3 Watney Road	11	11	0
4 – 5 Watney Road	7	7	0
11 – 13 Watney Road	7	7	0
15 – 21 Watney Road	15	15	0
23 – 29 Watney Road	15	15	0
31 – 37 Watney Road	15	15	0
39 – 45 Watney Road	17	17	0
47 and 49 Watney Road	6	6	0
51 and 53 Watney Road	6	6	0
55 and 57 Watney Road	6	6	0
59 and 61 Watney Road	6	6	0
63 and 65 Watney Road	6	6	0
Parliament Mews	45	42	3
Combe House	60	60	0
1 – 10 Cromwell Place	73	71	2
22 Cromwell Place	1	1	0
Reid Court	64	64	0
Churchill Court	32	32	0
17 – 18 Langdon Place	4	4	0
Tudor Lodge	5	4	1
The Ship	6	5	1
Thames Bank Cottage	9	9	0
Asplin Cottage	5	5	0
Aynescombe Cottage	6	6	0
Thames Bank House	9	9	0

Surrounding Properties	Total Number of Rooms	Total number of rooms above 50% well lit	Total number of rooms below 50% well lit
Old Stable	8	6	2
Leyden House	9	9	0
Jolly Gardeners	9	9	0
35 Lower Richmond Road	5	4	1

Table 18.5: Baseline Daylight (ADF) Summary

Surrounding Properties	Total Number of rooms	Total number of rooms above BRE suggested targets	Total number of rooms below BRE suggested targets
Butler House	21	12	9
Rann House	48	38	10
31 Vineyard Path	24	21	3
Vineyard Heights	75	45	30
The Tapestry	3	2	1
3 – 9 Richmond Road	8	8	0
39 – 41 Lower Richmond Road	5	5	0
43 – 51 Lower Richmond Road	31	24	7
51a – 55 Lower Richmond Road	11	6	5
57 – 59 Lower Richmond Road	6	6	0
61 – 63 Lower Richmond Road	6	0	6
67 Lower Richmond Road	7	6	1
Lady Elizabeth House	40	27	13
2 – 10 Waldeck Road	12	10	2
3 – 9 Waldeck Road	29	10	19
1 – 5 Varsity Row	18	15	3
6 – 7 Varsity Row	6	4	2
2 – 6 Williams Lane	9	6	3
8 – 10 Williams Lane	6	6	0
12 – 20 Williams Lane	16	15	1
22 – 26 Williams Lane	9	8	1
1 – 3 Watney Road	11	6	5
4 – 5 Watney Road	7	4	3
11 – 13 Watney Road	7	4	3
15 – 21 Watney Road	15	11	4
23 – 29 Watney Road	15	9	6
31 – 37 Watney Road	15	5	10
39 – 45 Watney Road	17	6	11

Surrounding Properties	Total Number of rooms	Total number of rooms above BRE suggested targets	Total number of rooms below BRE suggested targets
47 and 49 Watney Road	6	2	4
51 and 53 Watney Road	6	2	4
55 and 57 Watney Road	6	0	6
59 and 61 Watney Road	6	0	6
63 and 65 Watney Road	6	0	6
Parliament Mews	45	13	32
Combe House	60	14	46
1 – 10 Cromwell Place	73	53	20
22 Cromwell Place	1	0	1
Reid Court	64	46	18
Churchill Court	32	13	19
17 – 18 Langdon Place	4	0	4
Tudor Lodge	5	3	2
The Ship	6	3	3
Thames Bank Cottage	9	2	7
Asplin Cottage	5	0	5
Aynescombe Cottage	6	4	2
Thames Bank House	9	7	2
Old Stable	8	3	5
Leyden House	9	5	4
Jolly Gardeners	9	7	2
35 Lower Richmond Road	5	2	3

Table 18.6: Baseline Sunlight (APSH) Summary

Surrounding Properties	Total Number of windows facing the Site and within 90° of due south	Total number of windows above BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Butler House	28	15	13
Rann House	16	0	16
31 Vineyard Path	0	0	0
Vineyard Heights	46	40	6
The Tapestry	1	1	0
3 – 9 Richmond Road	0	0	0
39 – 41 Lower Richmond Road	0	0	0
43 – 51 Lower Richmond Road	11	11	0

Surrounding Properties	Total Number of windows facing the Site and within 90° of due south	Total number of windows above BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
51a – 55 Lower Richmond Road	2	0	2
57 – 59 Lower Richmond Road	1	0	1
61 – 63 Lower Richmond Road	0	0	0
67 Lower Richmond Road	6	4	2
Lady Elizabeth House	6	6	0
2 – 10 Waldeck Road	10	10	0
3 – 9 Waldeck Road	17	17	0
1 – 5 Varsity Row	24	24	0
6 – 7 Varsity Row	10	10	0
2 – 6 Williams Lane	0	0	0
8 – 10 Williams Lane	8	8	0
12 – 20 Williams Lane	20	20	0
22 – 26 Williams Lane	10	10	0
1 – 3 Watney Road	2	0	2
4 – 5 Watney Road	1	0	1
11 – 13 Watney Road	0	0	0
15 – 21 Watney Road	0	0	0
23 – 29 Watney Road	3	3	0
31 – 37 Watney Road	0	0	0
39 – 45 Watney Road	0	0	0
47 and 49 Watney Road	0	0	0
51 and 53 Watney Road	0	0	0
55 and 57 Watney Road	0	0	0
59 and 61 Watney Road	0	0	0
63 and 65 Watney Road	0	0	0
Parliament Mews	54	49	5
Combe House	3	3	0
1 – 10 Cromwell Place	52	50	2
22 Cromwell Place	1	1	0
Reid Court	44	44	0
Churchill Court	20	16	4
17 – 18 Langdon Place	0	0	0
Tudor Lodge	9	9	0
The Ship	9	8	1
Thames Bank Cottage	8	7	1

Surrounding Properties	Total Number of windows facing the Site and within 90° of due south	Total number of windows above BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Asplin Cottage	3	3	0
Aynescombe Cottage	4	4	0
Thames Bank House	16	15	1
Old Stable	19	19	0
Leyden House	16	16	0
Jolly Gardeners	7	7	0
35 Lower Richmond Road	17	11	6

18.61 A number of neighbouring properties under the existing baseline scenario enjoy a relatively open outlook and as such enjoy good light levels. These levels are typical of suburban locations and this should be considered when applying the BRE criteria.

18.62 In the baseline condition a small number of windows surrounding the Site fall below the BRE suggested VSC levels of 27%. These instances are where the low levels are primarily driven by overhanging / recessed balconies and amenity spaces which serve to self-limit both daylight and sunlight to the window face below. The following properties have windows with low existing levels of daylight as the results of the overhanging / recessed amenity spaces:

- Butler House;
- Rann House; and
- Churchill Court.

18.63 The APSH results indicate that some of the surrounding properties will have low existing levels of direct sunlight, below those suggested in the BRE guidelines. Given the suburban nature of the Site, these results are not unusual.

Overshadowing

18.64 The results of the sunlight amenity assessment has shown that 21 of the 40 existing areas surrounding the Site receive direct sunlight for two hours or more on the 21st March across more than 50% of its area, which is the recommended level suggested in the BRE guidance. These areas include the Thames Tow Path, Mortlake Green and various gardens serving neighbouring residential properties.

18.65 The other areas all fall below the targets due to the density and orientation of the spaces and these spaces can be identified within the drawings within **Appendix 18.3** as follows:

- 11 Watney Road;
- 17 Watney Road;
- 19 Watney Road;
- 21 Watney Road;
- 25 Watney Road;
- 29 Watney Road;
- 31 Watney Road;

- 33 Watney Road;
- 37 Watney Road;
- 41 Watney Road;
- 43 Watney Road;
- 45 Watney Road;
- 51 Watney Road;
- 10 Parliament Mews;
- 11 Parliament Mews;
- 6 Parliament Mews;
- 7 Parliament Mews;
- 8 Parliament Mews; and
- 9 Parliament Mews.

Transient Overshadowing

18.66 The transient shadow images for three key points throughout the year are set out within **Appendix 18.4** and commented on below.

18.67 A review of the transient shadow drawings shows that the existing buildings on-Site cause little additional shadow to the surrounding amenity areas identified in the current condition in March and June. The only area that is overshadowed by the existing buildings on Site at these times of the year is the element of the Thames Tow path to the north east of the Stag Brewery component of the Site. This area sees a level of shadow throughout the day on these dates.

Light Pollution

18.68 It is not possible to measure the Sky Glow caused by the lighting on the Site in the baseline condition as the light emitted from all sources is not known. However, a review of the fittings indicates the majority are downward facing and as such it is considered that sky glow would be within suggested levels. Similarly, there is currently no lighting on Site that would cause adverse effects with regard to Building Luminance or Glare.

18.69 In order to ascertain the vertical illuminance levels at neighbouring residential properties in the current condition, a night time Site visit was undertaken and light levels measured with a light meter. This Site visit was undertaken at 9pm on the 30th October 2017. This is pre curfew (11pm) in the hours of darkness. It should be noted that best efforts were made to take readings that occurred as a result of fixed lighting on and surrounding the Site. Notwithstanding this, due to the level of traffic on Lower Richmond Road and Mortlake High Street, car headlights may have caused increased readings. Readings were taken as close to surrounding residential properties as possible, although without gaining access it was not possible to obtain readings at the window face. The results can be found in **Appendix 18.5**. They show that the pre-curfew light levels are generally below 5 Lux apart from along Lower Richmond Road and Mortlake High Street where levels increase up to 30 Lux, primarily as a result of street lighting and the headlights of passing traffic.

18.70 It should be noted that the sports pitch on Site is not currently artificially lit.

Likely Significant Effects

The Works

Demolition Effects

18.71 The level of effect in relation to daylight, sunlight and overshadowing to the surrounding properties would vary throughout the Work, depending on the level of obstruction caused. There would be a slight temporary improvement in levels of daylight and sunlight after the buildings and structures on the Site are demolished. The likely effects to daylight, sunlight and overshadowing would be generally **local**, **short to medium term** and of **minor** to **moderate beneficial** significance at the closest sensitive receptors but would be **insignificant** at those sensitive receptors at a greater distance from the Stag Brewery component of the Site.

18.72 Lighting used during the Works would accord with the ILP Guidance so as not to cause a nuisance to nearby receptors. The likely effect is therefore considered to be **insignificant**.

Construction Effects

18.73 The construction of the new buildings on the Site would have a gradual effect upon the levels of daylight, sunlight and overshadowing to residential properties and amenity spaces surrounding the Site as the massing of the proposed buildings increases over time as construction progresses. The effects upon light spillage and light pollution would not occur until the external pedestrian lighting and internal lighting was commissioned and activated after construction. The likely effects that are perceptible as the superstructure progresses would be similar, albeit lesser, to those of the completed Development. Therefore, reference should be made to the assessments of the completed Development below.

18.74 During the construction phase, a number of tall cranes would be present on-Site; however their size and temporary presence would lead to generally imperceptible effects to local reductions in daylight and sunlight. The likely effect of construction cranes on daylight, sunlight and overshadowing levels is considered to be **insignificant**.

Completed Development

Daylight to Existing Surrounding Properties

18.75 The assessed scenario is shown in **Appendix 18.1**. The detailed results can be found within **Appendix 18.2**. **Tables 18.7** to **18.11** below summarise the daylight and sunlight effects of the Development on existing nearby residential properties.

18.76 Properties with windows that do not have a direct line of sight to the Development or are at a significant distance from the Site have not been included within this assessment. In some cases where buildings are a significant distance from the Site, only windows which would see the greatest loss have been assessed to present a worst case. Should these windows see a minor adverse or insignificant effect it can be said that other windows within the building would see an effect that is the same or less.

Daylight

Table 18.7: Completed Development – VSC in relation to the BRE Guidance

Existing Property	Total Number of Windows	Total number of windows that achieve VSC levels in excess of 27% or a reduction of less than 20% from the baseline level	Total number of windows that see VSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
Butler House	63	52	3	3	5	11
Rann House	96	74	8	10	4	22
31 Vineyard Path	30	26	3	1	0	4
Vineyard Heights	149	149	0	0	0	0
The Tapestry	5	5	0	0	0	0
3 – 9 Richmond Road	16	16	0	0	0	0
39 – 41 Lower Richmond Road	5	5	0	0	0	0
43 – 51 Lower Richmond Road	33	33	0	0	0	0
51a – 55 Lower Richmond Road	14	14	0	0	0	0
57 – 59 Lower Richmond Road	8	8	0	0	0	0
61 – 63 Lower Richmond Road	6	6	0	0	0	0
67 Lower Richmond Road	17	17	0	0	0	0
Lady Elizabeth House	50	50	0	0	0	0
2 – 10 Waldeck Road	25	25	0	0	0	0
3 – 9 Waldeck Road	37	37	0	0	0	0
1 – 5 Varsity Row	31	31	0	0	0	0
6 – 7 Varsity Row	10	10	0	0	0	0
2 – 6 Williams Lane	15	5	1	9	0	10
8 – 10 Williams Lane	8	8	0	0	0	0
12 – 20 Williams Lane	21	21	0	0	0	0
22 – 26 Williams Lane (even numbers only)	10	10	0	0	0	0
1 – 3 Watney Road	15	15	0	0	0	0

Existing Property	Total Number of Windows	Total number of windows that achieve VSC levels in excess of 27% or a reduction of less than 20% from the baseline level	Total number of windows that see VSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
4 – 5 Watney Road	11	11	0	0	0	0
11 – 13 Watney Road	9	9	0	0	0	0
15 – 21 Watney Road	21	21	0	0	0	0
23 – 29 Watney Road	29	29	0	0	0	0
31 – 37 Watney Road	23	23	0	0	0	0
39 – 45 Watney Road	25	25	0	0	0	0
47 and 49 Watney Road	10	10	0	0	0	0
51 and 53 Watney Road	10	10	0	0	0	0
55 and 57 Watney Road	10	10	0	0	0	0
59 and 61 Watney Road	10	10	0	0	0	0
63 and 65 Watney Road	10	10	0	0	0	0
Parliament Mews	78	78	0	0	0	0
Combe House	75	75	0	0	0	0
1 – 10 Cromwell Place	90	90	0	0	0	0
22 Cromwell Place	1	1	0	0	0	0
Reid Court	88	84	4	0	0	4
Churchill Court	83	64	10	5	4	19
17 – 18 Langdon Place	4	4	0	0	0	0
Tudor Lodge	9	9	0	0	0	0
The Ship	9	9	0	0	0	0
Thames Bank Cottage	11	11	0	0	0	0
Asplin Cottage	5	5	0	0	0	0
Aynescombe Cottage	13	12	1	0	0	1

Existing Property	Total Number of Windows	Total number of windows that achieve VSC levels in excess of 27% or a reduction of less than 20% from the baseline level	Total number of windows that see VSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
Thames Bank House	28	28	0	0	0	0
Old Stable	23	23	0	0	0	0
Leyden House	20	20	0	0	0	0
Jolly Gardeners	18	10	0	4	4	8
35 Lower Richmond Road	31	31	0	0	0	0

Table 18.8: Completed Development – NSC in relation to the BRE Guidelines

Existing Property	Total Number of rooms	Total number of rooms that see a reduction of less than 20% baseline level in NSC	Total number of windows that see NSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
Butler House	21	21	0	0	0	0
Rann House	48	48	0	0	0	0
31 Vineyard Path	24	19	2	3	0	5
Vineyard Heights	75	75	0	0	0	0
The Tapestry	3	3	0	0	0	0
3 – 9 Richmond Road	8	8	0	0	0	0
39 – 41 Lower Richmond Road	5	5	0	0	0	0
43 – 51 Lower Richmond Road	31	31	0	0	0	0
51a – 55 Lower Richmond Road	11	11	0	0	0	0
57 – 59 Lower Richmond Road	6	6	0	0	0	0
61 – 63 Lower Richmond Road	6	6	0	0	0	0
67 Lower Richmond Road	7	7	0	0	0	0
Lady Elizabeth House	40	40	0	0	0	0
2 – 10 Waldeck Road	12	12	0	0	0	0

Existing Property	Total Number of rooms	Total number of rooms that see a reduction of less than 20% baseline level in NSC	Total number of windows that see NSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
3 – 9 Waldeck Road	29	29	0	0	0	0
1 – 5 Varsity Row	18	18	0	0	0	0
6 – 7 Varsity Row	6	6	0	0	0	0
2 – 6 Williams Lane	9	3	1	2	3	6
8 – 10 Williams Lane	6	6	0	0	0	0
12 – 20 Williams Lane	16	16	0	0	0	0
22 – 26 Williams Lane	9	9	0	0	0	0
1 – 3 Watney Road	11	11	0	0	0	0
4 – 5 Watney Road	7	7	0	0	0	0
11 – 13 Watney Road	7	7	0	0	0	0
15 – 21 Watney Road	15	15	0	0	0	0
23 – 29 Watney Road	15	15	0	0	0	0
31 – 37 Watney Road (odd numbers only)	15	15	0	0	0	0
39 – 45 Watney Road (odd numbers only)	17	17	0	0	0	0
47 and 49 Watney Road	6	6	0	0	0	0
51 and 53 Watney Road	6	6	0	0	0	0
55 and 57 Watney Road	6	6	0	0	0	0
59 and 61 Watney Road	6	6	0	0	0	0
63 and 65 Watney Road	6	6	0	0	0	0
Parliament Mews	45	45	0	0	0	0
Combe House	60	60	0	0	0	0
1 – 10 Cromwell Place	73	73	0	0	0	0
22 Cromwell Place	1	1	0	0	0	0

Existing Property	Total Number of rooms	Total number of rooms that see a reduction of less than 20% baseline level in NSC	Total number of windows that see NSC reductions suggested as noticeable in the BRE Guidance			
			20%-29.9% reduction	30% - 39.9% reduction	>40% reduction	Total
Reid Court	64	64	0	0	0	0
Churchill Court	32	27	2	2	1	5
17 – 18 Langdon Place	4	4	0	0	0	0
Tudor Lodge	5	5	0	0	0	0
The Ship	6	6	0	0	0	0
Thames Bank Cottage	9	9	0	0	0	0
Asplin Cottage	5	5	0	0	0	0
Aynescombe Cottage	6	6	0	0	0	0
Thames Bank House	9	9	0	0	0	0
Old Stable	8	8	0	0	0	0
Leyden House	9	9	0	0	0	0
Jolly Gardeners	9	9	0	0	0	0
35 Lower Richmond Road	5	5	0	0	0	0

Table 18.9: Completed Development – ADF in relation to the BRE Guidelines

Surrounding Properties	>2%	1.5-1.99%	1-1.49%	0.5-0.99%	<0.49%	Total number of rooms	Total number of rooms above suggested levels for use	Total number of rooms below suggested levels for use
Butler House	9	0	2	6	4	21	11	10
Rann House	7	17	5	19	0	48	29	19
31 Vineyard Path	6	11	5	2	0	24	17	7
Vineyard Heights	32	13	25	1	4	75	45	30
The Tapestry	0	2	1	0	0	3	2	1
3 – 9 Richmond Road	4	0	4	0	0	8	8	0
39 – 41 Lower Richmond Road	1	4	0	0	0	5	5	0
43 – 51 Lower Richmond Road	13	11	5	2	0	31	24	7

Surrounding Properties	>2%	1.5-1.99%	1-1.49%	0.5-0.99%	<0.49%	Total number of rooms	Total number of rooms above suggested levels for use	Total number of rooms below suggested levels for use
51a – 55 Lower Richmond Road	4	2	4	0	1	11	6	5
57 – 59 Lower Richmond Road	4	1	1	0	0	6	6	0
61 – 63 Lower Richmond Road	0	0	6	0	0	6	0	6
67 Lower Richmond Road	4	2	0	0	1	7	6	1
Lady Elizabeth House	4	12	22	2	0	40	27	13
2 – 10 Waldeck Road	5	2	4	1	0	12	10	2
3 – 9 Waldeck Road	7	3	11	7	1	29	10	19
1 – 5 Varsity Row	7	6	2	3	0	18	15	3
6 – 7 Varsity Row	2	2	0	2	0	6	4	2
2 – 6 Williams Lane	0	6	0	2	0	9	6	3
8 – 10 Williams Lane	4	0	2	0	0	6	6	0
12 – 20 Williams Lane	10	0	5	0	1	16	15	1
22 – 26 Williams Lane	3	5	0	1	0	9	8	1
1 – 3 Watney Road	0	6	3	2	0	11	6	5
4 – 5 Watney Road	3	1	1	2	0	7	4	3
11 – 13 Watney Road	2	2	1	1	1	7	4	3
15 – 21 Watney Road	0	11	0	4	0	15	11	4
23 – 29 Watney Road	4	4	5	2	0	15	8	7
31 – 37 Watney Road	3	2	9	0	1	15	5	10
39 – 45 Watney Road	5	1	11	0	0	17	6	11
47 and 49 Watney Road	0	2	3	1	0	6	2	4

Surrounding Properties	>2%	1.5-1.99%	1-1.49%	0.5-0.99%	<0.49%	Total number of rooms	Total number of rooms above suggested levels for use	Total number of rooms below suggested levels for use
51 and 53 Watney Road	0	2	3	1	0	6	2	4
55 and 57 Watney Road	0	1	4	1	0	6	0	6
59 and 61 Watney Road	0	0	4	2	0	6	0	6
63 and 65 Watney Road	0	0	4	2	0	6	0	6
Parliament Mews	2	4	20	11	8	45	13	32
Combe House	2	9	37	0	12	60	11	50
1 – 10 Cromwell Place	29	17	15	8	4	73	57	16
22 Cromwell Place	0	0	0	1	0	1	0	1
Reid Court	18	18	27	1	0	64	36	28
Churchill Court	7	6	8	11	0	32	11	21
17 – 18 Langdon Place	0	0	4	0	0	4	0	4
Tudor Lodge	2	1	1	1	0	5	3	2
The Ship	1	2	2	0	1	6	3	3
Thames Bank Cottage	1	1	2	5	0	9	2	7
Asplin Cottage	0	0	2	3	0	5	0	5
Aynescombe Cottage	2	1	2	1	0	6	5	1
Thames Bank House	6	2	0	1	0	9	8	1
Old Stable	3	0	1	3	1	8	3	5
Leyden House	3	2	2	2	0	9	5	4
Jolly Gardeners	3	2	3	1	0	9	5	4
35 Lower Richmond Road	3	0	1	1	0	5	3	2

18.77 The VSC and NSC results indicate that the following properties would not see a noticeable effect in terms of daylight potential at the window face:

- Vineyard Heights
- The Tapestry;
- 3 – 9 Richmond Road;
- 39 - 41 Lower Richmond Road;

- 43 – 51 Lower Richmond Road;
- 51a – 55 Lower Richmond Road;
- 57 – 59 Lower Richmond Road;
- 61 – 63 Lower Richmond Road;
- 67 Lower Richmond Road;
- Lady Elizabeth House;
- 2 – 10 Waldeck Road;
- 3 – 9 Waldeck Road;
- 1 – 5 Varsity Row;
- 6 – 7 Varsity Row;
- 8 – 10 Williams Lane;
- 12 – 20 Williams Lane;
- 22 – 26 Williams Lane;
- 1 – 3 Watney Road;
- 4 – 5 Watney Road;
- 11 – 13 Watney Road;
- 15 – 21 Watney Road;
- 23 – 29 Watney Road;
- 31 – 37 Watney Road;
- 39 – 45 Watney Road;
- 47 and 49 Watney Road;
- 51 and 53 Watney Road;
- 55 and 57 Watney Road;
- 59 and 61 Watney Road;
- 63 and 65 Watney Road;
- Parliament Mews;
- Combe House;
- 1 – 10 Cromwell Place;
- 22 Cromwell Place;
- 17 – 18 Langdon Place;
- Tudor Lodge;
- The Ship;
- Thames Bank Cottage;
- Asplin Cottage;
- Thames Bank House;
- Old Stable;
- Leyden House; and
- 35 Lower Richmond Road.

18.78 It can therefore be said that the effect of the Development on the daylight to these properties would be **insignificant** and no further detailed discussion of the daylight levels is required.

Butler House

18.79 The VSC results suggest that with the Development in place, 52 (83%) of the 63 windows assessed within Butler House would see no noticeable change in the daylight received at the window face. Of the remaining windows, 3 would see minor reductions, 3 moderate and 2 major reductions in VSC. These windows are all overhung by balconies, thus self-limiting light to the windows below. In addition, all but 1 window serve rooms that are also served by additional windows that do not experience any noticeable change to their VSC. The remaining window serves a single aspect bedroom which is considered to be less sensitive compared to main living spaces.

18.80 Floor layouts have been obtained as such, these have be applied for the NSC assessment. The results of the NSC assessment have shown that all rooms assessed would experience no noticeable alteration in daylight.

18.81 With the vast majority of rooms assessed being served by at least one window with an insignificant effect by reference to VSC, with the remaining room being an isolated bedroom, coupled with the full compliance in NSC, the likely effect to daylight with the Development in place is considered to be of **long-term**, **local** and of **minor adverse** significance.

Rann House

18.82 The VSC results suggest that with the Development in place, 74 (77%) of the 96 windows assessed within Rann House would see no noticeable change in the daylight received at the window face. Of the remaining windows, 8 would see minor reductions, 10 moderate and 4 substantial reductions in VSC. These windows all sit behind recessed balconies and as such, are currently limited in direct daylight levels and sensitive to changes in massing on the Site. The results show that where similar windows are not recessed, the window would see no noticeable change in daylight levels, thus indicating that these significant effects are primarily driven by the neighbouring buildings design.

18.83 The results of the NSC assessment have shown that all rooms assessed would experience no noticeable alteration in daylight.

18.84 The overall likely effect daylight with the Development in place is considered to be of **long-term**, **local** and of **minor** to **moderate adverse** significance.

31 Vineyard Path

18.85 The VSC results suggest that with the Development in place, 26 (87%) of the 30 windows assessed within 31 Vineyard Path would see no noticeable change in the daylight received at the window face. The remaining 4 windows would experience minor adverse reductions.

18.86 The minor reduction in daylight are driven by the high daylight levels in the baseline condition, which is proven by the good retained levels of retained VSC to these windows with the majority of windows achieving at least 22%, with all windows achieving at least 16% VSC.

18.87 The results of the NSC assessment have shown that 24 (86%) of the 28 rooms assessed would experience no noticeable alteration in daylight. Of the remaining rooms, 1 would see minor reductions and 3 rooms show moderate adverse reductions. As with VSC, high daylight levels in the baseline condition leave this buildings open to relatively high proportional reductions.

18.88 The effect to daylight with the Development in place is considered to be of **long-term**, **local** and of **minor significance**.

2 – 6 Williams Lane

18.89 The VSC results suggest that with the Development in place, 12 (80%) of the 15 windows assessed within 2 – 6 Williams Lane would see no noticeable change in the daylight received at the window face. Of the remaining windows, 1 would see minor reductions and 9 would see moderate adverse reductions.

18.90 The reductions in daylight are driven by the high daylight levels in the baseline condition, which is proven by the good retained levels of retained VSC to these windows of at least 19.8% VSC.

18.91 The results of the NSC assessment have shown that 3 (33%) of the 9 rooms assessed would experience no noticeable alteration in daylight. Of the remaining rooms, 1 would experience minor reductions, 2 would see moderate adverse reductions and 3 would see major adverse impacts. As with VSC, high daylight levels in the baseline condition leave this buildings open to relatively high proportional reductions.

18.92 The likely effect to daylight with the Development in place is considered to be of **long-term**, **local** and of **moderate adverse** significance.

18.93 It should be noted the elements of the Development in proximity to this receptor have been submitted in outline and assessed at their maximum extents thus presenting the worst case position.

Reid Court

18.94 The VSC results suggest that with the Development in place, 84 (95%) of the 88 windows assessed within Reid Court would see no noticeable change in the daylight received at the window face. The remaining windows would experience minor adverse reduction.

18.95 The minor reduction in daylight are between 20.1-24.6%, marginally above the 20% level where changes may be noticeable. It should be noted the elements of the Development in proximity to this receptor have been submitted in outline and assessed at their maximum extents thus presenting the worst case position.

18.96 The results of the NSC assessment have shown that all rooms assessed would experience no noticeable alteration in daylight.

18.97 The likely effect to daylight with the Development in place is considered to be of **long-term**, **local** and of **minor adverse** significance

Churchill Court

18.98 The VSC results suggest that with the Development in place, 64 (77%) of the 83 windows assessed within Churchill Court would see no noticeable change in the daylight received at the window face. Of the remaining windows, 10 would see minor reductions, 5 moderate and 4 major reductions in VSC.

18.99 Of these windows, 15 are overhung by balconies, thus self-limiting light to the windows below. The remaining 4 windows serve two rooms and show minor reductions in VSC levels.

18.100 The results of the NSC assessment have shown that 27 (84%) of the 32 rooms would see no noticeable alteration in daylight. Of the remaining rooms, 2 would see minor reductions, 2 would

see moderate reductions and 1 major reductions. These rooms are all overhung by balconies and as such self-limited in terms of daylighting.

18.101 Given the nature of the VSC and NSC impacts, together with the effects of self-limiting balconies, the overall likely effect to daylight with the Development in place is considered to be of **long-term**, **local** and of **moderate adverse** significance.

18.102 It should be noted the elements of the Development in proximity to this receptor have been submitted in outline and assessed at their maximum extents thus presenting the worst case position.

Aynescombe Cottage

18.103 The VSC results suggest that with the Development in place, 12 (92%) of the 13 windows assessed within Aynescombe Cottage would see no noticeable change in the daylight received at the window face. The remaining window would experience minor adverse reduction.

18.104 The minor reduction in daylight are of 20.2%, marginally above the 20% level where changes may be noticeable. This window also serves a room where is served by additional windows that do not experience any noticeable change to their VSC.

18.105 The results of the NSC assessment have shown that all rooms assessed would experience no noticeable alteration in daylight.

18.106 The likely effect to daylight with the Development in place is considered to be of **long-term**, **local** and of **minor adverse** significance.

Jolly Gardeners

18.107 This Public House includes an element of residential accommodation and as it is not clear where the accommodation is situated, the results for all windows and rooms on the first and second floors have been included for completeness.

18.108 The VSC results suggest that with the Development in place, 10 (55%) of the 18 windows assessed within Jolly Gardeners would see no noticeable change in the daylight received at the window face. Of the remaining windows, 3 would see minor reductions, 2 moderate and 3 major reductions.

18.109 The results show that 4 of these windows serve dual aspect rooms with an additional window which would see no noticeable reduction in VSC levels. The remaining 4 windows show retained levels of at least 16% VSC.

18.110 The results of the NSC assessment have shown that all rooms assessed would experience no noticeable alteration in daylight.

18.111 The elements of the Development in proximity to this receptor have been submitted in outline and assessed at their maximum extents thus presenting the worst case position.

18.112 The overall likely effect to daylight with the Development in place is considered to be of **long-term**, **local** and of **minor** to **moderate adverse** significance.

Sunlight to Existing Surrounding Properties

Table 18.10: Completed Development – APSH in relation to the BRE Guidelines

Surrounding Properties	Total Number of windows facing the Site and within 90° of due south	Total number of windows above BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Butler House	28	28	0
Rann House	16	16	0
31 Vineyard Path	0	0	0
Vineyard Heights	46	46	0
The Tapestry	1	1	0
3 – 9 Richmond Road	0	0	0
39 – 41 Lower Richmond Road	0	0	0
43 – 51 Lower Richmond Road	11	11	0
51a – 55 Lower Richmond Road	2	2	0
57 – 59 Lower Richmond Road	1	1	0
61 – 63 Lower Richmond Road	0	0	0
67 Lower Richmond Road	6	6	0
Lady Elizabeth House	6	6	0
2 – 10 Waldeck Road	10	10	0
3 – 9 Waldeck Road	17	17	0
1 – 5 Varsity Row	24	24	0
6 – 7 Varsity Row	10	10	0
2 – 6 Williams Lane	0	0	0
8 – 10 Williams Lane	8	8	0
12 – 20 Williams Lane	20	20	0
22 – 26 Williams Lane	10	10	0
1 – 3 Watney Road	2	2	0
4 – 5 Watney Road	1	1	0
11 – 13 Watney Road	0	0	0
15 – 21 Watney Road	0	0	0
23 – 29 Watney Road	3	3	0
31 – 37 Watney Road	0	0	0
39 – 45 Watney Road	0	0	0
47 and 49 Watney Road	0	0	0
51 and 53 Watney Road	0	0	0
55 and 57 Watney Road	0	0	0
59 and 61 Watney Road	0	0	0
63 and 65 Watney Road	0	0	0

Surrounding Properties	Total Number of windows facing the Site and within 90° of due south	Total number of windows above BRE suggested targets for total and winter APSH	Total number of windows below BRE suggested targets for total and winter APSH
Parliament Mews	54	54	0
Combe House	3	3	0
1 – 10 Cromwell Place	52	52	0
22 Cromwell Place	1	1	0
Reid Court	44	44	0
Churchill Court	20	19	1
17 – 18 Langdon Place	0	0	0
Tudor Lodge	9	9	0
The Ship	9	9	0
Thames Bank Cottage	8	8	0
Asplin Cottage	3	3	0
Aynescombe Cottage	4	4	0
Thames Bank House	16	16	0
Old Stable	19	19	0
Leyden House	16	16	0
Jolly Gardeners	7	7	0
35 Lower Richmond Road	17	17	0

18.113 The APSH results in **Table 18.10** indicate that all the windows orientated towards 90° of due south serving main living spaces would not see a noticeable effect in terms of sunlight potential.

18.114 The results of the APSH assessment for Churchill Court have shown a single bedroom would experience deviations from the targets. The impacted room is likely to serve a bedroom (based on external observation) and as such is considered to be an isolated deviation to a room without a significant sunlight requirement.

18.115 Given the high levels of overall compliance to main living spaces, it can therefore be said that the effect of the Development on the sunlight to these properties would be **insignificant** and no further detailed discussion of the sunlight levels is required.

Overshadowing to Existing Amenity Spaces Surrounding the Site

Sunlight Amenity (Sun on Ground)

Surrounding Amenity Areas

18.116 The results of the sunlight amenity assessment has shown that all amenity areas surrounding the Site would experience direct sunlight across more than 50% of their area for 2 hours or more on the 21st of March or see a reduction of less than 20% from the existing level. The effect of the Development on surrounding amenity areas is considered to be **insignificant**.

Proposed Amenity Areas

18.117 As part of the Development there would be newly created external amenity spaces relevant for assessment. The Development has been designed to allow suitable light penetration to amenity areas where possible. The assessment has shown that 14 of the 20 amenity areas would experience direct sunlight across more than 50% of their area for 2 hours or more on the 21st of March. As such, six areas would not achieve the target and these areas are identified as amenity areas 5, 6, 8, and 10 within the detailed element of the Stag Brewery component of the Development (East of Ship Lane), and 2P2, 5P2 within the outline element of the Stag Brewery component of the Site (West of Ship Lane) as shown **Appendix 18.3**

18.118 The results for proposed amenity areas 5, 10 and 5P2 of the Development show levels just below the 50% target, with at least c.42% of the area achieving 2 hours of direct sunlight. In addition to undertaking an assessment to show the areas that achieve 2 hours of sunlight, a graded assessment showing the areas that achieve between 0 – 2 hours of sunlight has been provided in **Appendix 18.3**. The results show that whilst these areas may not achieve 2 hours of direct sunlight, at least half of each of these areas would receive a level of direct sunlight on the 21st March.

18.119 The remaining three amenity areas, being 6 and 8 (within the detailed element of the Development) and 2P2 within the outline element of the scheme show levels of 37.1%, 9.3% and 40.4% respectively. As mentioned above, a graded study has also been undertaken. The results show that approximately half of the areas with sunlight below 2 hours would achieve at least 1 hour. Whilst these results indicate deviations from the suggested targets, the areas would achieve partial sunlight which would benefit the future occupiers.

18.120 With only a small number of areas showing deviations from the suggested targets, and the majority of amenity spaces meeting the suggested targets, the effect of the Development to the internal amenity areas would be **insignificant** to **long-term**, **local** and of **minor** to **moderate adverse** significance.

Transient Overshadowing

18.121 The transient shadow images for three key points throughout the year are located within **Appendix 18.4**.

21st March

18.122 As would be expected with an increase in massing, the Development would cause additional shadowing in the early morning to the gardens to the west of the Stag Brewery component of the Site, however the additional shading passes by 9 am.

18.123 Later in the day, the Development does cause some shadow to the Thames Tow Path, however, it should be noted that the existing buildings on Site already cause a level of overshadowing in the afternoon. The buildings within the Stag Brewery component of the Development (East of Ship Lane) have been designed to have gaps facing onto the Thames Tow Path in order to allow a good level of direct sunlight to penetrate. As such levels of overshadowing would be less than in the baseline condition at specific times during the day.

18.124 Additional assessments have been provided in appendix 18.4 for 21st June when the shadows cast would be at their shortest and 21st December, when the shadows cast will be at their longest.

Light Pollution

18.125 As is usual at the planning stage, a final and fixed lighting scheme has not been developed for the Development. There is however a provisional lighting scheme in place produced by Michael Grubb Studio. As the provisional lighting scheme is not fixed, a qualitative review of light pollution has been provided for the majority of the Site. The only area that has been assessed quantitatively is the area surrounding the sports pitch as this includes floodlighting in order to stratify the requirements of this use. Two options have been assessed for the sports pitch, Class III FA standard and Class II. It should be noted that the lighting strategy for this area, as with the remainder of the Development, has not been fixed and this assessment simply shows that it would be possible to light the area for use without causing an adverse impact on the neighbours. The provisional lighting scheme has been designed to meet the recommendations of the ILP guidelines. The key receptors were identified as the residential accommodation and ecological receptors along the River Thames.

18.126 In the development of the provisional lighting scheme, full consideration has been given to the sensitive receptors described above. The primary ecological consideration is the river bank along the River Thames. The provisional lighting scheme primarily lights this area with recessed wall luminaires within the river wall facing away from the river and towards the Site to light this area. These would not result in light trespass to the river or river bank.

18.127 External light fittings have not been located in proximity to surrounding residential receptors in order to avoid issues relating to light trespass. Mortlake High Street and Lower Richmond Road are currently sufficiently lit by street lighting and as such it is not proposed to add significant additional lighting to these areas.

18.128 The provisional lighting scheme for the sports pitch is proposed to provide a facility to FA Class III standard (120 lux / 0.6 Uo) or Class II (200 lux / 0.6 Uo)

18.129 This schemes both include 8 No 15m columns, as these are needed to provide the correct levels of uniformity. This height means the lights would not be tilted beyond what is considered good practice and the required light uniformity values are achieved across the pitch.

18.130 The fitting suggested are Philips Lighting 'OptiVision' floodlights. These floodlights include internal louvres that are used to control light trespass to neighbouring residential properties, ensuring that the maximum value at neighbouring receptors is below what is an acceptable level for E3 Environment Zone (pre-curfew - 10 lux and post curfew 2 lux) for both schemes. This ground level light spill grid can be seen in drawing 2201 – LP2 and 2201 – LP3 respectively within **Appendix 18.5** which shows the light levels in lux mapped onto the pitch and surrounding area. The light spill on the façades for the FA class III scheme (120 Lux) are shown in drawings 2201 - LP4 (houses to the west) and 2201 – LP5 (houses to the north west. The light spill on the façades for the Class II scheme (200 Lux) are shown in drawings 2201 – LP6 (houses to the west) and 2201 – LP7 (houses to the north west. The assessment of vertical illuminance to the windows at the rear of the properties across Williams Lane shows that levels as a result of the flood lights would not exceed 1.13 Lux when in use (shown in drawings 2201-LP3 and 2201-LP4 within **Appendix 18.5**).

18.131 In addition to light trespass, Luminaire Intensity (glare) has been considered as is recommended for floodlights. This assessment considers 3 assessment points located at the windows at the residential properties across Williams Lane. In each case the Luminaire intensity would not exceed 1,000 lumens. This is well below the suggested 10,000 Lumens suggested as the maximum pre curfew levels.

18.132 Finally, it should be noted that the simulations do not include for any obstacles, such as the proposed landscaping around the perimeter of the pitch. As such, this analysis presents a worst case scenario and light trespass would reduce further should the proposed landscaping be included.

18.133 The provisional lighting scheme has been designed in order to ensure that the ILP guidelines are met. The overall likely effect to light trespass and luminaire intensity as a result of the provisional lighting scheme is considered to be **insignificant**.

Mitigation Measures and Likely Residual Effects

The Works

Demolition Effects

18.134 As existing buildings are demolished, some temporary improvements to daylight, sunlight and overshadowing are predicted at the closest residential receptors to the Site. No adverse effects are predicted during demolition activities. Therefore, mitigation measures are not required and the likely residual effect would remain insignificant to generally **local**, **long-term** and of **minor** to **moderate beneficial**.

18.135 Nevertheless, the main contractor and sub-contractors would adhere to a Construction Environmental Management Plan (CEMP) to help minimise environmental effects arising from demolition works. For example, the CEMP would recommend that the use of portable external lighting be used in such a way so as to avoid the trespass of light into neighbouring properties and into the night sky. Furthermore, lighting used during the Works would accord with the ILP Guidance so as not to cause a nuisance to nearby receptor. The likely residual effect from light pollution during the Works would therefore remain **insignificant**.

Construction Works

18.136 Worst case construction effects are considered to be directly comparable to the effects of the completed Development. As such, reference should be made to the sections below.

18.137 However, the likely residual effect of construction cranes on daylight, sunlight and overshadowing levels would remain **insignificant**.

Completed Development

Daylight and Sunlight

18.138 As would be expected with a Development of this scale, there are isolated significant effects to the neighbouring residential properties. In this case the Development replaces relatively low rise buildings and as such the proportional reduction of daylight, on which significance is based, is large to the residential receptors nearest to the Site. The number of properties that experience significant effects with the Development in place is low and the majority of effects are to windows that are placed beneath overhanging balconies, which inhibit levels of daylight.

18.139 Once the Development is completed, the likely effects on daylight for residential properties in the vicinity of the Site would range from being insignificant for the majority of the residential properties to long-term, local, adverse and of minor significance on Butler House, and Aynescombe Cottage and minor to moderate significance for Rann House 2 to 6 Williams Lane, Churchill Court, and Jolly Gardeners. The minor to moderate adverse effects are generally isolated or driven by self-

light limiting overhangs. Furthermore, the effects of outline massing considers the 'worst case' scenario and as the scheme evolves the impacts are likely to lessen. Accordingly, no mitigation measures are considered necessary. The likely residual effects in relation to daylight would be **insignificant** to **long-term, local, adverse** and of **minor** to **moderate** significance.

18.140 Once the Development is completed, the effects on sunlight for residential receptors in the vicinity of the Site are **insignificant.**

Overshadowing

18.141 Once the Development is completed, the likely residual effects on overshadowing to existing surrounding amenity areas would remain **insignificant**.

18.142 Once the Development is completed, the likely effects on overshadowing to the proposed amenity areas within the Development would range from being insignificant to long-term, local, adverse and of moderate significance. The moderate adverse effects are generally isolated to a small number of areas within the Development. Accordingly, no mitigation measures are considered necessary. The likely residual effects in relation to overshadowing would be **insignificant** to **long-term, local, adverse** and of **moderate** significance.

18.143 Furthermore, in respect of the outline component of the Development, it has been identified that the proposed amenity areas 2P2 and 5P2may not achieve 2 hours of direct sunlight. However, with this element of the Development being assessed at its maximum extents, there would be scope to improve these levels through detailed design. As such the likely residual effects to the proposed amenity areas within the outline component of the Development have the potential to be **insignificant** to **long-term, local, adverse** and of **minor** significance. However, this would need to be verified through further assessment at the reserved matters stage.

Light Pollution

18.144 The provisional lighting scheme has been designed to the ILP guidelines and would have **insignificant** residual effects, as such no mitigation has been suggested.

Summary

Table 18.11 summaries the likely significant effects, mitigation measures, and likely residual effects identified within this Chapter.

Table 18.11: Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Demolition of existing buildings on-Site.			
Daylight, sunlight and overshadowing to surrounding receptors.	**Local**, **short to medium-term** and of **minor** to **moderate beneficial**.	None required.	**Local**, **short to medium-term** and of **minor** to **moderate beneficial**.
Light Pollution	**Insignificant**.	None required.	**Insignificant**.
Construction of proposed buildings			

Description of Effect	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	Insignificant. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners).	Not applicable.	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, , Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners).
Sunlight to surrounding receptors.	**Insignificant**.	None required.	**Insignificant**.
Overshadowing (Surrounding amenity areas).	**Insignificant**.	None required.	**Insignificant**.
Light Pollution.	**Insignificant**.	None required.	**Insignificant**.
Completed Development			
Daylight to surrounding receptors	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners).	Not applicable.	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, , Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners).
Sunlight to surrounding receptors	**Insignificant**.	None required.	**Insignificant**.
Overshadowing (surrounding amenity areas).	**Insignificant**.	None required.	**Insignificant**.
Overshadowing (proposed amenity areas).	**Insignificant** to **local**, **long-term**, **adverse** and of **moderate significance**	None required. Detailed design during reserved matters application may result in reduced maximum extents. Effects to be verified through further testing at the reserved matters stage.	**Insignificant** to **local**, **long-term**, **adverse** and of **moderate significance**. Potentially reduced to **insignificant** to **minor adverse significance** for the proposed amenity areas within the outline component of the Development
Light Pollution.	**Insignificant**.	None required.	**Insignificant**.

References

1 Building Research Establishment (BRE) (2011): ‘Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice

2 British Standard (BS) 8206 Part 2 (2008): Lighting for Buildings

3 Applications Manual Window Design of the Chartered Institute of Building Services Engineers (CIBSE) (1999).

4 Institute of Lighting Practitioners: Guidance Notes for the Reduction of Obtrusive Light, 2011

19. Cumulative Effects

Introduction

19.1 This Chapter presents an assessment of the likely significant cumulative effects of the Development. The Chapter has been prepared by Waterman Infrastructure & Environment (WIE) with input from all technical specialists who contributed to the Environmental Impact Assessment (EIA) and this Environmental Statement (ES). The Chapter has been informed by all preceding technical chapters of this ES (**Chapter 7** to **Chapter 18**).

Assessment Methodology

19.2 As noted within **Chapter 2: Environmental Impact Assessment Methodology**, only cumulative effects relating to the combination of individual effects (for example noise, dust and visual effects) during the Works from the Development itself on a particular receptor were considered in this assessment.

19.3 As advised in the EIA Scoping Opinion (**Appendix 2.1**) and Appendix A of the EIA scoping clarification letter (**Appendix 2.3**), there are no applications currently before the Council or extant permissions in place within 1 km of the Site that would give rise to significant environmental effects owing to their small scale and location within established residential areas. As such, cumulative effects arising from the completed and operational Development and any such permissions are not considered further within this assessment.

19.4 Likely in-combination cumulative effects have been identified and qualitatively assessed using the findings of all technical assessments reported within this ES (**Chapter 7** to **Chapter 18**), together with professional judgement. In-combination cumulative effects have only been considered for the likely significant residual effects of the Development during the Works, on the assumption that identified mitigation measures would be implemented, such as a Construction Management Plan (CMP).

19.5 In-combination cumulative effects likely to arise from the Development have been considered during the Works and not once the Development is completed and operational on a particular receptor. This is because the greatest likelihood of adverse effect interaction, and hence potential adverse cumulative effects, would arise during the Works.

Likely Cumulative Effects

19.6 The likely in-combination cumulative effects for various sensitive receptors and land uses (identified in **Chapter 7 to Chapter 18**) in the vicinity of the Site are listed in **Table 19.1**. **Table 19.1** identifies the anticipated effect interactions during each of the key stages of the Works. In accordance with **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction**, the demolition, alteration, refurbishment and construction activities have been outlined, some of which would overlap in terms of programme and timescales.

19.7 In view of the assessment methodology and the findings of the technical assessments reported within this ES, the likely in-combination cumulative effects interactions during the Works are likely to result from:

- **temporary**, **short** to **medium term**, **local**, **adverse effects** of **minor** to **major significance** on nearby residents in relation to noise generated from activities such as demolition and site

preparation works, construction, landscaping and highways works (refer to **Chapter 9: Noise and Vibration**);

- **temporary**, **short** to **medium term**, **local**, **adverse effects** of **minor significance** on nearby residents in relation to vibration generated from sheet piling operations (refer to **Chapter 9: Noise and Vibration**);
- **permanent**, **local**, **adverse effects** of **minor significance** on heritage assets within the Site (Former Hotel Building, Former Bottling Building, Maltings Building, boundary walls, memorials and historic gates) arising from the removal of historic fabric within the Stag Brewery component of the Site (refer to **Chapter 15: Built Heritage**);
- **permanent**, **local, beneficial effects** of **minor** to **moderate significance** on the setting of heritage assets within and surrounding the Stag Brewery component of the Site arising from the demolition of existing modern brewery buildings and structures within the Stag Brewery component of the Site (refer to **Chapter 15: Built Heritage**);
- **temporary**, **short** to **medium term**, **local** effects of **major adverse significance** on Townscape Character Area (TCA) 7: Stag Brewery (within the Stag Brewery component of the Site) in relation to the visual presence of large scale plant such as tower or mobile cranes.
- **temporary**, **short** to **medium term**, **local**, **minor to moderate adverse** effects on TCAs (other than TCA 7) in the vicinity of the Site and within the Chalkers Corner component of the Site in relation to the visual presence of large scale plant such as tower or mobile cranes (refer to **Chapter 16: Townscape and Visual Assessment**); and
- **temporary**, **short** to **medium term**, **local** effects, ranging from **minor** to **major adverse** significance on local views and visual receptors including residents, road users, users of the National Trails or recreational users of Mortlake Green (depending on the angle and distance of view) from the visual presence of large scale plant such as tower or mobile cranes (refer to **Chapter 16: Townscape and Visual Assessment**).

19.8 Within **Table 19.1**, the likely sensitive receptors have been grouped together according to land use and / or key receptors.

19.9 Socio-economic and archaeology effects have not been included in the assessment of likely in-combination effects. This is because the likely effects would not have the potential to interact with any other identified environmental effect.

Table 19.1: Likely cumulative effect interactions during the different stages of the Works (refer to 'Notes' overleaf)

Sensitive Receptor / Land Use	Demolition Works	Alteration and Refurbishment Works	Piling, Basement and Substructure Works	Superstructure and Façade Cladding	Fit-Out	Landscaping and External Works
Existing surrounding residential occupants.	N, LV, T	N, LV, T	V, N, LV, T	N, LV, T	(N), (LV), (T)	(N), (LV), (T)
Future residential occupants of the Development.	×	N, LV, T	N, LV, T	N, LV, T	(N), (LV), (T)	(N), (LV), (T)
Existing and future pedestrians, cyclists and road / rail users.	×	×	×	×	×	×
Former Hotel Building (BTM).	H, HS**, T7	×	×	×	×	×
Former Bottling Building (BTM).	H, HS**, T7	×	×	×	×	×
Maltings Building (BTM).	HS**, T7	H, T7	×	×	×	×
Northern Boundary Walls.	H, HS*, T7	×	×	×	×	×
Eastern Boundary Wall.	H, HS*, T7	×	×	×	×	×
Southern Boundary Wall.	H, HS*, T7	×	×	×	×	×
Memorials.	H, HS*, T7	×	×	×	×	×
Historic Gates.	H, HS*, T7	×	×	×	×	×

Notes: *H – permanent, local, adverse effects of minor significance on heritage assets within the Site (Former Hotel Building, Former Bottling Building, Maltings Building, boundary walls, memorials and historic gates) arising from the removal of historic fabric within the Stag Brewery component of the Site.*

HS - indirect, permanent, local, beneficial effects of minor significance upon the setting of heritage assets within and surrounding the Stag Brewery component of the Site arising from the demolition of existing modern brewery buildings and structures within the Stag Brewery component of the Site.*

*HS** - indirect, permanent, local, beneficial effects of moderate significance upon the setting of heritage assets within and surrounding the Stag Brewery component of the Site arising from the demolition of existing modern brewery buildings and structures within the Stag Brewery component of the Site.*

N –temporary, short to medium term, local, adverse effects of minor to major significance in relation to noise generated from activities.

V –temporary, short to medium term, local, adverse effects of minor significance in relation to vibration generated from sheet piling activities.

T - temporary, short to medium term, local, minor to moderate adverse effects on TCAs (other than TCA 7) in the vicinity of the Site and within the Chalkers Corner component of the Site in relation to the visual presence of large scale plant such as tower or mobile cranes.

T7 - temporary, short to medium term, local effects of major adverse significance to Townscape Character Area 7: Stag Brewery (within the Stag Brewery component of the Site) in relation to the visual presence of large scale plant such as tower or mobile cranes.

LV - temporary, short to medium term, local effects, ranging from minor to major adverse significance on local views and visual receptors including residents, road users, users of the National Trails or recreational users of Mortlake Green (depending on the angle and distance of view) from the visual presence of large scale plant such as tower or mobile cranes.

( ) = Effect/s of only very minor significance

× - No interactive effects.

References

There are no references for this Chapter.

20. Summary of Mitigation Measures and Likely Residual Effects

20.1. This Chapter presents a summary of the mitigation measures and likely residual effects of the Development. Likely residual effects are defined as those effects that remain following the implementation of mitigation measures. Mitigation measures relate to both the Works and the completed and operational Development, which are discussed in full in the relevant technical chapters of this ES (**Chapters 7 to 18**).

20.2. This EIA has been undertaken in parallel with the design process. Hence, many measures have already been incorporated into the design to eliminate adverse environmental effects. These include, for example, design evolution of the building form and massing, and inherent detailed mitigation for the Development in relation to flood risk and drainage strategies, ventilation design, and landscaping principles.

20.3. A Site-wide Construction Environmental Management Plan (CEMP) would be prepared and approved by the London Borough of Richmond upon Thames (LBRuT) prior to the commencement of the Works (refer to **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction** for further details). This document would include mitigation measures to address all relevant environmental issues to the Works including (but not limited to) construction traffic, dust, noise and vibration, waste management, protection of heritage assets and ecology, hours of working and neighbour liaison.

20.4. A summary of likely residual effects arising, following the implementation of mitigation measures is provided in **Table 20.1**.

Table 20.1: Summary of Mitigation Measures and Likely Residual Effects

Issue	Mitigation Measures	Likely Residual Effect
Socio-Economics		
The Works		
Loss of 35,402m^2 GIA of employment floorspace.	No mitigation required – employment floorspace and employment generating uses being provided as part of the Development.	**Insignificant**.
Generation of an average of up to 1,110 FTEs per annum over 8 years.	Section106 Agreement to target local employment during Site preparation and construction.	**Short-medium term**, **beneficial**, **district** to **regional** and of **minor significance**.
Completed Development		
Population and Labour Market.	No mitigation required.	**Long-term**, **beneficial**, **local** to **district** and of **minor significance**.
Provision of housing contributing to LBRuT targets.	No mitigation required.	**Long-term**, **local**, **beneficial** and of **moderate significance**. **Long-term**, **district**, **beneficial** and of **minor significance**.
Generation of employment as a result of the Development and expenditure of the new resident population and visitors to the Development.	No mitigation required.	**Long-term**, **local**, **beneficial** and of **moderate significance**. **Long-term**, **district**, **beneficial** and of **minor significance**.
An additional population of children under the age of 5 and demand for early years places.	Section 106 / Community Infrastructure Levy receipts to mitigate.	**Insignificant**.
An additional population primary school aged children and demand for primary school places.	Section 106 / Community Infrastructure Levy receipts to mitigate.	**Insignificant**.
The additional demand for secondary school places arising from the Development would be accommodated by proposed Secondary School and existing surpluses.	No mitigation required - Secondary school provided as part of the Development.	**Insignificant**.

Issue	Mitigation Measures	Likely Residual Effect
Additional demand by the new population of the Development for primary health care.	Section 106 / Community Infrastructure Levy receipts to mitigate.	**Insignificant**.
Provision of 14,353m^2 of children's play space and a total of 3.89 ha of public and private amenity space on Site as part of the Development to accommodate additional demand.	No mitigation required – Provision of children's play space and amenity space provided as part of the Development.	**Direct**, **long-term**, **beneficial** at **local** to **district** and of **minor significance**.
Provision of a school (with shared sports facilities via a Community Use Agreement), cinema, gym, and an area for flexible community uses which could include a community boathouse, together with up to private amenity space, public amenity space and Public Community Park.	No mitigation required – community facilities and inclusion of Community Use Agreement as part of the Development.	**Direct**, **long-term**, **beneficial**, **local** and of **minor significance**. **Insignificant** at the **district** level.
The Development would seek to design out crime features and would animate and activate the Site.	No mitigation required.	**Direct**, **long-term**, **beneficial**, **local** and of **minor significance**. **Insignificant** at the **district** level.
Transport and Access		
The Works		
Severance	Not required	**Insignificant**
Driver Delay	Not required	**Insignificant**
Pedestrian Delay	Not required	**Insignificant**
Pedestrian and Cycle Amenity	Not required	**Insignificant**
Fear and Intimidation	Not required	**Insignificant**
Accidents and Road Safety	Not required	**Insignificant**
Completed Development		
Severance	Not required	**Insignificant**
Driver Delay	Traffic calming measures along Lower Richmond Road and Mortlake High Street to improve conditions for pedestrians	AM Peak Hour:

Issue	Mitigation Measures	Likely Residual Effect
	and cyclists at the cost of driver delay effects. However, signal timings at the Chalkers Corner junction could be adjusted post Development implementation to ease driver delay especially along the Lower Richmond Road arm.	Chalkers Corner -Sheen Lane/South Circular Road junction: **moderate adverse** (EB) Chalkers Corner – White Hart Lane / The Terrace roundabout: **insignificant** to **minor adverse** (EB), **insignificant** to **minor beneficial** (WB) <u>PM Peak Hour:</u> Chalkers Corner – White Hart Lane/The Terrace roundabout: **insignificant** to **minor adverse** (EB)
Pedestrian Delay	Not required	**Insignificant**
Pedestrian Amenity	Not required	**Insignificant**
Cycle Amenity	Re-configuration of Williams Lane, resulting in an improved cycle environment	**Insignificant**
Fear and Intimidation	Not required	**Insignificant**
Accidents and Road Safety	Not required	**Insignificant**
Noise and Vibration		
The Works		
Temporary increase in noise levels from work activities affecting receptors close to the Site.	Implementation of a CEMP.	**Insignificant** to **Temporary, short-term, local residual effect** of **minor** to **moderate adverse**.
Vibration generated during sheet piling operations affecting receptors close to the Site.		**Insignificant** to **temporary, short-term, local adverse** effects of **minor significance**.
Vibration effects on building structures and underground utilities (assuming CFA or rotary bored piling techniques).	None required.	**Insignificant**.

Issue	Mitigation Measures	Likely Residual Effect
Increase in heavy plant movements on strategic roads.	None required, however a Construction Traffic Management Plan would also be implemented.	**Insignificant**.
Completed Development		
Noise from fixed plant and building services.	Inherent mitigation would allow plant and building services noise to meet the required plant noise limit of LBRuT.	**Insignificant**.
Noise from non-residential land-uses.	Control through planning conditions and implementation of Delivery and Servicing Plan.	**Insignificant**.
Noise from changes in road traffic.	None required.	**Insignificant**.
Noise from proposed school and play space.	None proposed.	**Insignificant** to **long-term, local, intermittent adverse effects** up to **minor significance** during usage of 3G sports pitch and MUGA.
Air Quality		
The Works		
Dust emissions on surrounding existing receptors and early occupiers of the Development.	Implementation of CEMP and Framework Construction Management Plan.	**Insignificant**.
Exhaust emissions from construction traffic on surrounding existing receptors and early occupiers of the Development.	None required, a Construction Traffic Management Plan would also be implemented.	**Insignificant**.
Emissions from construction plant on surrounding existing receptors and early occupiers of the Development.	None required, all construction plant would meet the Emissions Standard set out in the London Plan.	**Insignificant**.
Completed Development		
Traffic related exhaust emissions on existing sensitive locations surrounding the Site and future residential and school users of the Development.	None required, refer to Table 10.16 of Chapter 10: Air Quality for list of inherent air quality mitigation measures.	**Insignificant**.
Changes in local air quality from the proposed Energy Centre plant on existing sensitive locations surrounding		**Insignificant**.

Issue	Mitigation Measures	Likely Residual Effect
the Site and future residential and school users of the Development.		
Introduction of future residential and school uses to the Site.		**Insignificant**.
Ground Conditions and Contamination		
The Works		
Effects to the human health of construction workers from ground contamination and dust.	Implementation of a CEMP to manage the Works to effectively minimise contamination risks.	**Insignificant**.
Effects to the human health of the public surrounding the Site, and early occupants of the Development from dust.		**Insignificant**.
Installation of piles associated with the buildings of the Development, creating a pollutant pathway to the Secondary A Aquifer beneath the Site.		**Insignificant**.
Installation of piles associated with the river wall, creating a pollutant pathway to the River Thames.		**Insignificant**.
Removal of existing areas of hardstanding, thereby increasing the permeable cover of the Site, allowing for increased rainwater / surface water infiltration to the ground, underlying Secondary A Aquifer and River Thames.		**Insignificant**.
Removal of existing areas of hardstanding, thereby increasing the permeable cover of the Site, allowing for increased rainwater / surface water infiltration to the ground, underlying Principal Aquifer.		**Insignificant**.
Introduction of potential contaminants on the Site which could increase the risk of leakages and spillages to the ground (Secondary A Aquifer) and the River Thames.		**Insignificant**.
Effects to ecological receptors on and off the Site from ground contamination and dust.		**Insignificant**.

Issue	Mitigation Measures	Likely Residual Effect
Effects associated with UXO.	Undertaking of a detailed desk-based UXO assessment to identify and classify the actual on-Site risk posed by UXO and appropriate mitigation measures.	**Insignificant**.
Completed Development		
Effects to the human health of occupants, users and visitors of the Development from ground gas within buildings and hard-landscaped areas.	Further ground and geotechnical investigation to inform an appropriate Remediation Strategy for the Site, as required, thereby ensuring the Site is suitable for its intended end use and does not pose any significant contamination risk to human health and the environment. This may include the implementation of ground gas and vapour mitigation measures and the likely use of imported clean and inert soils within areas of proposed soft-landscaping.	**Insignificant**.
Effects to the human health of occupants, users and visitors of the Development from ground contamination within soft-landscaped areas.		**Insignificant**.
Effects to controlled waters (including the River Thames) from ground contamination.		**Long-term**, **local**, **beneficial** and of **minor significance**.
Effects to buildings structures and services from ground contamination.		**Insignificant**.
Effects to ecological receptors on the Site from ground contamination.		**Insignificant**.
Effects to ecological receptors off-Site, including those associated with the River Thames.		**Insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**.
Surface Water Drainage and Flood Risk		
The Works		
Groundwater flood risk from excavation works of eastern basement.	Dewatering of excavation activities.	**Insignificant**.
Surface water (pluvial) flood risk.	Implementation of CEMP to ensure appropriate adequate drainage and to manage surface water run-off.	**Insignificant**.
Access to the river wall.	None required.	**Insignificant.**
Tidal flood risk during remodelling of the river wall.	None required, to be undertaken through an Environmental Permit.	**Insignificant**.

Issue	Mitigation Measures	Likely Residual Effect
Foul water infrastructure capacity.	None required.	**Insignificant**.
Increase in potable water demand.	Implementation of CEMP to include measures to monitor and reduce water consumption.	**Insignificant**.
Existing drainage infrastructure.	Implementation of CEMP to ensure existing drainage is protected and appropriate piling methods are used to minimise vibration.	**Insignificant**.
Completed Development		
Tidal flood risk to future occupants of the Development.	A self-activating flood barrier would be required for the entrance to the eastern basement car park from Mortlake High Street. Flood proof doors and / or demountable barriers would be required for access from the Community Boathouse (Building B09) to the river foreshore.	**Insignificant**.
Tidal flood risk to off-Site receptors.	None required.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
Surface water (pluvial) flood risk.	None required, maintenance programme to be implemented to ensure beneficial effects are maintained.	**Long-term**, **local**, **beneficial** and of **minor significance**.
Flood risk from sewers surcharging	None required.	**Insignificant**.
Groundwater flood risk.	None required.	**Insignificant**.
Access to the river wall.	None required.	**Insignificant**.
Change in tidal flood risk from upgrading the tidal defences (river wall).	A flood proof gate would be required at some point in the future at Ship Lane to account for future flood levels through an appropriately worded planning condition.	**Long-term**, **local**, **beneficial** and of **moderate significance**.
Change in foul water drainage capacity.	None required.	**Insignificant**.
Change in potable water demand.	None required.	**Insignificant**.
Ecology		

Issue	Mitigation Measures	Likely Residual Effect
The Works		
Direct effects on the River Thames and Tidal Tributaries SINC.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from dust, noise, vibration, surface water run-off and lighting.	Implementation of a CEMP to include measures to minimise dust, noise, vibration, surface water run-off and lighting.	**Insignificant**.
Direct effects on commuting and foraging bats.	None required.	**Insignificant**.
Indirect effects on commuting and foraging bats from noise and lighting.	Implementation of a CEMP to include measures to minimise noise and lighting.	**Insignificant**.
Completed Development		
Direct effects on the River Thames and Tidal Tributaries SINC.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from public disturbance.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from lighting.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from overshadowing.	None required.	**Insignificant**.
Indirect effects on the River Thames and Tidal Tributaries SINC from pollution.	None required.	**Long-term**, **local**, **beneficial effect** of **minor significance**.
Direct effects on commuting and foraging bats.	Implementation of a Landscape and Environment Management Plan (LEMP).	**Long-term**, **local**, **beneficial effect** of **minor significance**.
Indirect effects on commuting and foraging bats from lighting.	None required.	**Insignificant**.
Archaeology		
The Works		

Issue	Mitigation Measures	Likely Residual Effect
Archaeological remains of national importance (medieval and post-medieval remains).	Implementation of a phased archaeological evaluation programme, following demolition and Site clearance, moving across the Site behind the demolition. Implementation of further excavation work dependent upon the results of the evaluation recommended above.	**Insignificant**.
Archaeological remains from the pre-historic, Roman and Anglo-Saxon periods.		**Insignificant**.
Archaeological remains likely to have been previously truncated by existing development i.e. the Stag Brewery.		**Insignificant**.
Built Heritage		
The Works		
Demolition of historic fabric within the Stag Brewery component of the Site.	Undertaking of a programme of archaeological building recording prior to commencement of the Works.	**Insignificant** to **direct**, **permanent**, **local**, **adverse** effects of **minor significance**.
Retention in-situ of the railway tracks, paving and moorings within the Stag Brewery component of the Site.	Not applicable.	**Insignificant**.
Indirect effects upon the setting of heritage assets within and surrounding the Stag Brewery component of the Site arising from the demolition of existing modern brewery buildings and structures within the Stag Brewery component of the Site.	Not applicable.	**Insignificant** to **indirect**, **permanent**, **local**, **beneficial** effects of **minor** to **moderate significance**.
Indirect effects upon the setting of heritage assets within and surrounding the Stag Brewery component of the Site arising from noise, vibration, dust and traffic associated with the Works.	Implementation of CEMP to limit and appropriately manage noise, vibration, dust and construction traffic associated with the Works. Implementation of appropriate easements around heritage assets to be retained during the demolition and slab removal works required to facilitate the Development.	**Insignificant**.
Completed Development		
Conversion of the Maltings building and a new building behind the retained façades of the former Hotel building and former Bottling Building.	Not applicable.	**Insignificant** to **direct**, **long-term**, **local**, **adverse** effect of **minor significance**.
Retention and improvement to the setting of the railway tracks, paving and moorings.	Not applicable.	**Direct**, **long-term**, **local beneficial** effect of **minor significance**.

Issue	Mitigation Measures	Likely Residual Effect
Retention of part of the boundary wall.	Not applicable.	**Insignificant**.
Retention and relocation of memorials.	Not applicable.	**Insignificant**.
Retention and relocation of historic gates.	Not applicable.	**Insignificant**.
Change of setting of the heritage assets within and surrounding the Stag Brewery component of the Site.	Not applicable.	**Insignificant** to **indirect**, **long-term**, **beneficial** effects of **minor significance**.
Townscape and Visual		
The Works		
Townscape Character	Good Site management, maintenance and housekeeping, and careful siting of construction machinery would be implemented, including the use of Site hoardings and maintaining a clean, safe, pedestrian environment.	**Temporary**, **short** to **medium term**, **local** effects of **major adverse** significance would result to TCA7: Stag Brewery (within the Stag Brewery component of the Site). Surrounding TCAs would experience **temporary**, **short** to **medium term**, **local**, **minor to moderate adverse** effects in the vicinity of the Site and within the Chalkers Corner component of the Site.
Visual Amenity		Local views would experience **temporary**, **short** to **medium term**, **local** effects, ranging from **minor** to **major adverse** significance depending on the angle and distance of view.
Completed Development		
Townscape Character	Mitigation measures are inherent within the Development design, including the Landscape Strategy which provides enhanced riverside landscape with trees and indigenous plants and public squares with variety and colour.	**Long-term**, **local** effects of **moderate**, **beneficial** significance would result to TCA1: Mortlake (within the Stag Brewery component of the Site). **Long-term**, **local** effects of **major**, **beneficial** significance would result to TCA7: Stag Brewery (within the Stag Brewery component of the Site).

Issue	Mitigation Measures	Likely Residual Effect
		Effects on surrounding TCAs would be **insignificant** to **long-term**, **local** and **minor beneficial** significance in the vicinity of the Site and within the Chalkers Corner component of the Site.
Visual Amenity		The majority of local views would experience either **insignificant** or **long term**, **local** effects, ranging from **minor** to **moderate beneficial** significance depending on angle, range and context of view. Road users on Thames Bank at Viewpoint location 2 would experience effects of **minor adverse** significance, however this would be temporarily in transit. Recreational users of the Thames Path National Trail at Viewpoint location 2 would experience **long-term**, l**ocal effects** of **moderate adverse** significance.
Wind Microclimate		
The Works		
Wind conditions experienced by construction Site workers.	None required.	**Insignificant**.
Completed Development		
Thoroughfares.	None required.	**Insignificant** to **long-term**, **local**, **beneficial** and of **moderate significance**.
Entrances to buildings (with the exception of a possible building entrance location at the west facing façade of Building 16 (Location 40).	None required.	**Insignificant** to **long-term**, **local**, **beneficial** and of **minor significance**.
Ground level amenity areas.	None required.	**Insignificant**.

Issue	Mitigation Measures	Likely Residual Effect
Above ground amenity areas (with the exception of balconies associated with Buildings 6, 9 and 12 (Locations 259, 264, 265 and 268).	None required.	**Insignificant**.
Off-Site Receptors (including Mortlake Green, the tow path and within the River Thames).	None required.	**Insignificant**.
Wind conditions on the balconies associated with Buildings 6, 9 and 12 (Locations 259, 264, 265 and 268).	Implementation of solid raised balustrades to a height of at least 1.5 m.	**Insignificant** (provided inclusion of the suggested mitigation measures).
Wind conditions at the potential building entrance on the west facing façade of Plot 16 (Location 40).	Reserved matters application to either: • exclude a building entrance at this location; or • recess the building entrance; or • plant 3m to 5m tall trees or erect screens of at least 2m high on both sides of any entrance at Location 40. Further wind testing would need to be verified through further wind tunnel testing at the reserved matters stage.	**Insignificant** (provided inclusion of the suggested mitigation measures).
Daylight, Sunlight, Overshadowing and Light Pollution		
The Works		
Demolition of existing buildings on-Site.		
Daylight, sunlight and overshadowing to surrounding receptors.	None required.	**Local**, **short to medium-term** and of **minor** to **moderate beneficial**.
Light Pollution	None required.	**Insignificant**.
Construction of proposed buildings		
	Not applicable.	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2

Issue	Mitigation Measures	Likely Residual Effect
		to 6 Williams Lane, Churchill Court and Jolly Gardeners).
Sunlight to surrounding receptors.	None required.	**Insignificant**.
Overshadowing (Surrounding amenity areas).	None required.	**Insignificant**.
Light Pollution.	None required.	**Insignificant**.
Completed Development		
Daylight to surrounding receptors	Not applicable.	**Insignificant**. **Local**, **long-term**, **adverse** and of **minor significance** (Butler House, Aynescombe Cottage). **Local**, **long-term**, **adverse** and of **minor** to **moderate significance** (Rann House, 2 to 6 Williams Lane, Churchill Court and Jolly Gardeners).
Sunlight to surrounding receptors	None required.	**Insignificant**.
Overshadowing (surrounding amenity areas).	None required.	**Insignificant**.
Overshadowing (proposed amenity areas).	None required. Detailed design during reserved matters application may result in reduced maximum extents. Effects to be verified through further testing at the reserved matters stage.	**Insignificant** to **local**, **long-term**, **adverse** and of **moderate significance**. Potentially reduced to **insignificant** to **minor adverse significance** for the proposed amenity areas within the outline component of the Development.
Light Pollution.	None required.	**Insignificant**.

Waterman

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